ARTP Association for Respiratory Technology & Physiology

Association for Respiratory Technology and Physiology

NATIONAL STANDARDS FOR RESPIRATORY PHYSIOLOGY

Individual Record of Clinical Practice (IRCP)

ASSOCIATE AND PRACTITIONER LEVEL

Contents

Introduction and General Guidelines

Introduction

The NHS workforce is at the heart of quality patient care and the NHS employs over 50,000 healthcare scientists in England. It is necessary to ensure that this workforce is competent to practice against national standards and it is the role of the professional body to develop and maintain these standards.

Educational Aims

- To achieve an understanding of a range of diagnostic and therapeutic respiratory measurement techniques including the rationale for the investigation and modification of the investigation where necessary.
- To become practically competent in specific areas of respiratory measurement with an understanding of the principles underlying the techniques used.
- To be able to interpret full lung function test results and treatment of respiratory disease where appropriate (Practitioner qualification).

Delivery

- Structured in-house training using the knowledge specifications outlined in the IRCP.
- Projects, assignments and case studies.
- ARTP Master class course (held annually).
- Use of other media (library, journals, internet etc).

Organisation of Training

Prior to enrolment onto the professional body qualification, candidates will have spent a significant proportion of time working and training within a Respiratory Physiology environment. You will be given a deadline for completion of the IRCP which will be six months after enrollment. During this time the candidate will demonstrate competence in performing the following investigations:

- Spirometry
- Lung volumes

- Single breath gas transfer
- Bronchodilator reversibility
- Spot check oximetry
- Calibration and Quality control

In departments where the full range of investigations/training experiences is not available, **secondments to other departments will be necessary**. This should be arranged by the Work Based Assessor (WBA) in the employing department. The WBA will be responsible for all aspects of the work based training. The WBA should have a recognised assessment qualification (e.g. D32/D33, A1) and should attend updates as provided. The candidate should be encouraged to attend relevant professional scientific meetings for development of underpinning knowledge.

The Association for Respiratory Technology and Physiology (ARTP) has overall responsibility for:

- Validation of theoretical teaching and practical training for the purposes of the professional qualifications.
- Organisation and performance of the professional examinations.
- Assuring the quality and standards of the professional examinations.
- Awarding of certificates for successful completion of professional examinations to ARTP members.

Competence to practice will be assessed by:

- Completion of the Individual Record of Clinical Practice (IRCP)
- ARTP professional examinations
- Performance evidence
- Verbal question and answer

IRCP requirements:

Associate and Practitioner Examination

It is a mandatory requirement of the Associate and Practitioner Assessment process that students provide an IRCP of evidence of the various assessments that have been performed under supervision during their training.
The IRCP should be no more than **1 lever arch file** and it should contain an index/contents page at the beginning that should enable the evidence to be identified easily.

It must contain the following elements:

1. One A4 page summarising the relevant assessor/training experience of the Work Based Supervisor (WBS) e.g. the Head of Department, the candidates nominated Work Based Assessor (WBA) and any other appropriately qualified staff involved in the assessment process, i.e. all other staff members signing IRCP.
2. A copy of a training plan for each section as required. The individual training plans should identify the core skills that will be developed for each section of the IRCP.
3. Evidence that CPR training has taken place within the preceding 12 months. This can be in the form of a certificate, departmental record sheet or witness statement from the WBA.
4. A witness testimony from the WBA confirming that the IRCP is the work of the candidate.
5. A clearly defined subdivision for each separate section of the IRCP (e.g. Practical Competencies Section; Calibration and Quality Control). In all of the **Practical/Clinical Competencies** you must include:
    a. The product of all investigations i.e. all traces, raw data and results, for all assessments
    b. A statement, where relevant, indicating the guidelines that have been used to classify the severity of the patient condition e.g. GOLD, NICE, ARTP/BTS etc.

6. The WBA must ensure that the candidates underpinning knowledge is assessed throughout the IRCP using the defined questions at the end of each assessment. Questions have been designed to ensure that candidates have a level of underpinning knowledge and understanding that will enable them to successfully undertake their ARTP practical examination. These questions should be asked under examination conditions.

7. Candidates undertaking the Associate Level Qualification must complete Sections A and B. Candidates undertaking the Practitioner Level Qualification must also complete section C of the IRCP.

8. Clinical interpretation by the candidate, with justification, of all investigations undertaken in the Clinical Competency section (Section C) must be included with the raw data and traces.

IRCP Section Requirements

<table>
<tr><td colspan="2">Each section of the IRCP should be separated and clearly labelled. Please ensure that ALL patient identification is removed. For each procedure, candidates should produce proof that they have carried out the work. The witness testimony from the WBA confirming that the IRCP is the work of the student should be placed at the front of each section.</td></tr>
<tr><td>SECTION A:
Practical Competencies</td><td>Competently perform full lung function testing and spot check oximetry
Competently perform full lung function testing with reversibility to short acting bronchodilators

The range of environments under which the candidate <u>must</u> be able to demonstrate competence are:
1. Out patients
2. In patients
(at least one patient per range must be included)

<u>This section should contain:</u>
A Training Plan outlining training to take place prior to formal competency assessments being undertaken
An Assessment plan for each formal assessment (10 in total)
8 Completed Formal Assessments of full lung function testing with spot check oximetry
2 Completed Formal Assessments of full lung function testing with reversibility to short acting bronchodilators
Assessor feedback sheets including Q & A</td></tr>
</table>

SECTION B: CALIBRATION AND QUALITY CONTROL	Perform and evaluate measurements of calibration and quality control on a range of equipment *Undertake 25 of each of the following measurements using both a syringe (physical control) <u>and</u> a physiological control subject (this should be the candidate but may be another team member if the candidate is unable to do this):* **Dynamic Lung Volumes** 1. *Syringe* • *Vital Capacity* 2. *Physiological* • *Forced Vital Capacity* • *FEV_1* • *Peak Expiratory Flow* **Static Lung Volumes** 1. *Syringe* • *Vital Capacity* 2. *Physiological* • *FRC / TGV* • *Total Lung Capacity* • *Vital Capacity* **Transfer Factor** 1. *Syringe* • *Alveolar Volume (VA)* 2. *Physiological* • *Transfer Factor* • *Alveolar Volume*

	3. Record data in 5 appropriately labelled spread sheets. • *For each set of measurements, calculate the mean and the Coefficient of Variation, these results to be shown on spread sheets* • *Plot appropriate, fully labelled graphs for each data set. Briefly report on findings, if any results fall outside expected range, comment on the reason.* This section should also contain: • A Training plan • An Assessment plan • Completed Formal Assessment of calibration • Assessor feedback sheets including Q & A

SECTION C: **CLINICAL COMPETENCIES**	Competently perform full lung function testing and spot check oximetry Competently perform full lung function testing with reversibility to short acting bronchodilators Provide an accurate clinical interpretation of all investigations performed with justifications *The range under which the candidate must be able to demonstrate competence are:* *Airflow obstruction (at least four patients)* *Restrictive ventilatory defect* *Extra thoracic restriction* *A patient aged >70 years* *A patient aged <25 years* *Significant reversibility* <u>This section should contain:</u> • An Assessment plan for each competency assessment (9 in total) • 8 Completed Formal Assessments of full lung function testing with spot check oximetry • 1 Completed Formal Assessment of full lung function testing with reversibility to short acting bronchodilators • Assessor feedback sheets including Q & A

Completing the Formal Assessments

Workplace assessment should only take place when the candidate and the Work Based Assessor (WBA) agree that the candidate is ready. Both the candidate and the WBA must be confident that the candidate has fulfilled their training plan and is ready to be assessed as competent.

The WBA should complete an assessment plan for each assessment which clearly indicates the standards that the student needs to meet. ALL of the performance criteria must be met for a successful outcome.

When a date for an assessment is agreed, the assessor and the candidate should meet to review the assessment plan and they should both sign the record of assessment to document the assessment event. Assessments should be by direct observation; simulations should only be used when direct observation is not possible, or would compromise patient safety.

Assessments

It is essential that sufficient time is allowed for completion of formal assessment and that time for assessment of underpinning knowledge and feedback immediately following the assessment is allocated. All assessments must be performed according to the ARTP/BTS Guidelines for the measurement of respiratory function (Respiratory Medicine 1994), where this does not occur and explanation must be included.

During each assessment, the assessor should observe the student without questioning or intervention, unless an emergency arises, or the patient is put at risk by the actions of the student. When each performance criterion is met during the assessment, a **YES** should be placed in the appropriate box with a suitable comment. If a performance criterion is not met, a **NO** is placed in the box and a comment should be made next to it. The assessor must query this with the student during the questioning session at the end of the investigation. If a performance criterion is not applicable, N/A should be placed in the box.

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding will not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be

repeated after appropriate training. Where candidates fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Additional supplemental questions are included in each of the formal assessment paperwork. Candidates must be questioned on their underpinning knowledge and understanding following every assessment. Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. The supplemental questions included in each assessment are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked under examination conditions and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

KNOWLEDGE SPECIFICATION FOR THE PERFROMANCE OF RESPIRATORY INVESTIGATIONS

PATIENT CARE
Importance of ensuring identity of patient and identification of patient as correct on all documentation
Basic assessment of the condition of patient and the way in which this may impact on the planned investigation
Principles and methods of effective communication with the patient and escorts
The reasons why it is necessary to put the patient at ease
Sufficient knowledge of the patient conditions and test procedure to answer any questions from the patient
The required position of the patient and how to help the patient to become more comfortable
How to maintain the patient' s sense of dignity and self esteem during the investigation
Guidelines to follow in the event of an emergency

PRINCIPLES REQUIRED FOR PLANNING RESPIRATORY INVESTIGATIONS
The need to liaise with carers/relatives to ensure maximum co-operation of the patient
The need to liaise with other allied healthcare professionals, where appropriate, in order to ensure the patient is not compromised
The level and type of support which the student can give to a patient who is suffering a seizure, adverse reaction or disturbed state
Environment suitable for the test to be performed and all necessary equipment available
Procedures and responsibilities for notification of follow up arrangements
Policies and arrangements for escorting and/or transporting patients

ANATOMY AND PHYSIOLOGY REQUIRED FOR RESPIRATORY INVESTIGATIONS
Respiratory tract including nasal passages, pharynx, larynx, tracheobronchial tree and alveoli
Thorax
Innervation and circulation of the lungs
Control of breathing to include respiratory control centre, chemoreceptors and baroreceptors
Gas exchange to include gas laws, principles of diffusion and oxygen dissociation curve, the CO dissociation curve
Respiratory mechanics to include respiratory muscles, pressure changes during breathing
Physiological and anatomical dead space
Role of haemoglobin in gas transport
Role of ventilation in gas exchange function
Role of perfusion in gas exchange function
Ventilation-perfusion relationships
Inter-relationships of alveoli, alveolar-capillary membrane, reaction rate of CO with haemoglobin and pulmonary circulation in the process of the uptake of gas exchange
Transport of oxygen within the red blood cell
Factors affecting the uptake of CO in normal subjects

NORMAL PHYSIOLOGY RELATED TO RESPIRATORY INVESTIGATIONS
Dynamic lung volumes to include vital capacity (VC), forced (expired) vital capacity (FVC), forced expiratory volume in the first second (FEV_1), peak expiratory flow (PEF), maximal flow volume curves (MFVC)
Static lung volumes to include functional residual capacity (FRC), total lung capacity (TLC), residual volume (RV), expiratory reserve volume (ERV), inspiratory vital capacity (IVC), expiratory vital capacity (EVC), tidal volume (TV), inspiratory capacity (IC), inspiratory reserve volume (IRV), thoracic gas volume (TGV)

Gas transfer parameters to include transfer factor (TLCO), transfer coefficient (KCO), alveolar volume (VA), volume inspired (Vin)
Normal response to short acting bronchodilator
Response time for short acting bronchodilator
Linear regression
Standardised residuals
Factors affecting the use of reference values

PATHOPHYSIOLOGY
Patterns in disease (spirometry, lung volumes, gas transfer, reversibility and blood gases) – cardiac and respiratory (obstructive and restrictive)
Effects of exposure to particulates e.g. coal dust, smoking etc
Effects of age
Effects of lung volume on CO Transfer Factor
Limiting factors to pulse oximetry – circulation, hypothermia, skin pigmentation, carboxyheamoglobin, methemoglobin,
Response in hypoventilation, obstructive sleep apnoea, exercise, altitude, hypoventilation, ventilation/perfusion mismatching, diffusion limitation, shunts

TESTS, EQUIPMENT AND MEASUREMENTS FOR RESPIRATORY INVESTIGATIONS
Principles of Helium dilution
Principles of Nitrogen washout
Principles of Body plethysmography
How and why differences in lung volumes may occur when comparing the above techniques
Principles of operation of equipment
Limitations, advantages and disadvantages of measurement techniques
Gas analysers
Indications and contraindications to performing respiratory investigations
Indications to terminate test procedures

Use of flow and volume measuring spirometers for assessing bronchodilator response
Principles of operation of flow and volume measuring spirometers
Dynamic spirometry: Volume/time graphs and flow/volume curves
Advantages and disadvantages of flow and volume measuring spirometers
Identification of recording artefact, methods of identification and means of elimination
Indications and contraindications to assessing bronchodilator response
Procedure for using MDIs, spacer devices and nebulisers for administration of bronchodilator
Procedure for cleaning or disposal of used devices
Type and dosage of short acting bronchodilators commonly used
Principles of operation of pulse oximeters
The use of pulse oximeter control settings and their use to highlight salient features/principles for selection of appropriate probes
Identification of recording artefact, methods of identification and means of elimination

PRODUCTION OF THE TECHNICAL REPORT
• Organisational requirements for report writing
• Definition of standard terms to describe data
• Effects of medication (prescribed or not prescribed on normal values)
• Pathological conditions and changes in relation to age, obstructive and restrictive lung disorders, cardiac disorders, others (including obesity, unfitness, malingering)
• Effect of patient state on normal values
• Production of a comprehensive report together with any technical comments regarding patient performance
• Appropriate storage of acquired data (with respect to patient confidentiality and data protection act) and organisation of the clinical report

SECTION A:

FORMAL ASSESSMENTS OF FULL RESPIRATORY FUNCTION TESTS

FORM RP01

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS
ASSESSMENT PLAN

Candidate Name: _____

Assessor Name: _____

Assessment details:

During this assessment I will be looking to see that:

Sources of Evidence:
Direct observation and oral questioning

Signed: _____ (Assessor)

Signed: _____ (Candidate)

FORM RP02

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 1

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		

Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		
The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		

Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq$50% predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding will not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidates fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. How does a volume measuring device measure volume? 2. How does a flow measuring device measure volume? 3. Draw a volume time or flow volume graph representing glottis closure at two seconds (please attach drawing). 4. Identify three methods for measuring lung volumes. 5. What analysers are used to measure gas concentrations?	

6.	What is the purpose of the gas transfer test?	
7.	What are the pre test procedures for lung function testing that are specific to the performance of gas transfer?	
8.	Explain the principles behind the measurement of SpO_2.	
9.	What practical steps can be made to secure an accurate SpO2 results?	
10.	When should you perform a bronchodilator assessment?	
11.	What should be included in the report when a bronchodilator response is measured?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP03

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 2

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		

Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		
The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		

Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. What is the definition of FVC? 2. How may body position affect spirometry values? 3. Draw a spirogram representing the subdivisions of lung volumes and label ERV, IRV and RV. 4. List two limitations for three different methods of measuring lung volumes? 5. What gases may be used to measure alveolar volume (VA)? 6. Why is carbon monoxide the gas of choice for measuring gas transfer? 7. Explain the principles of how	

	heart rate is calculated using a pulse oximeter.	
8.	At what point during lung function testing should SpO2 not be measured?	
9.	How must medicines be stored and checked?	
10.	Explain the procedure for using a nebuliser.	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP04

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 3

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		
Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		

The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		

Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. What is the definition of peak expiratory flow? 2. Identify five indications to terminate a spirometry test. 3. Explain the principles of calculating TLC using body plethysmography. 4. Draw a diagram demonstrating leak on a helium dilution trace (attach diagram). 5. Explain the basic principles of the nitrogen washout FRC technique. 6. How is diffusion time on gas transfer calculated? 7. What methods, other than the	

single breath method, can be used to calculate TLCO? 8. How may poor perfusion affect measurements of oximetry? 9. How may rushing to their appointment influence a patients oximetry results? 10. Explain the mode of action of a short acting beta 2 agonist such as Salbutamol? 11. What is your protocol for adult dose of beta agonist during reversibility studies?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP05

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 4

Patient Details

Age: _____ Diagnosis: _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		
Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		

The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		

Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. What are the ARTP/BTS recommendations for repeatability of spirometry? 2. Draw a submaximal PIF on a flow volume curve (attach diagram). 3. Explain the difference between FRC and TGV. 4. How is the correct end point for nitrogen washout determined? 5. What is the difference between TLCO and KCO? 6. What is the recommended volume inspired time on gas transfer? 7. What accessories should be	

	available to ensure accurate results from oximetry?	
8.	What are the disadvantages of using a beta 2 agonist?	
9.	Other than FEV_1 how may bronchodilator effectiveness be measured?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……..**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP06

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 5

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		
Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		

The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		

Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. How do you ensure optimal effort from patients performing spirometry manoeuvres? 2. How do you know that your spirometry values are accurate? 3. How may alveolar pressure be estimated? 4. What are the implications of choosing an over estimated ERV on lung volumes measurements? 5. What is the term to describe an inspiratory effort against a closed glottis during breath hold? 6. What affect may this glottis	

closure have on TLCO? 7. Explain the recommended procedure for using an MDI correctly. 8. Draw a diagram representing a bronchospasm occurring during lung function testing (attach diagram).	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……..**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP07

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 6

Patient Details

Age: _____ Diagnosis: _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		
Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		

The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		

Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. Draw a sub maximal peak expiratory flow on a volume time or a flow volume trace (attach diagram). 2. With respect to question 1, how may the patient be advised or encouraged differently during spirometry to obtain accurate results? 3. What is the recommended period for thermal equilibrium inside a body box during plethysmography? 4. How long should you wait before repeating helium dilution? 5. Which test would you not perform immediately following a nitrogen washout test?	

6. What gases may be used to assess the diffusive properties of the lung? 7. What parts of pulse oximeter require cleaning in between patients? 8. Which group of patients require special consideration before administering a beta 2 agonist? 9. What is the purpose of the spacer device/volumatic?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……..**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP08

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 7

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		
Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		

The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		

Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. What is the significance of identifying a relative contraindication? 2. What is the difference between MEF25 and MEF75? 3. What is the difference between TLC helium and TLC pleth? 4. What is the maximal re-breathe time for a helium dilution test and why? 5. How is VA different from TLC? 6. Given the following information, calculate RV, TLC, RV/TLC%: FRC = 3.2L, IC = 3.6L, VC = 4.4L	

7. In a normal individual what is the expected maximal difference between TLC and VA? 8. How would you quality control a reading from a pulse oximeter? 9. What should a patient refrain from doing between spirometry measurements following bronchodilator delivery?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……..**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP09

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 8

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		
Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		

The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		

Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. How long is it advisable to rest between spirometry manoeuvres?	
2. Draw a flow volume curve illustrating sub maximal inspiration? (attach drawing)	
3. What is the purpose of soda lime in the circuit for helium dilution?	
4. What are the common sites for leakage during a gas dilution test?	
5. What are the default sample and discard volumes for your equipment?	
6. With regard to Q5, when would you consider altering these values?	

7. What is the significance of a high SpO2 reading? 8. What technique factors are important for optimal deposition of an inhaled drug? 9. How many times should you use a single-use spacer device?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……..**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP10

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS AND REVERSIBILITY

ASSESSMENT FORM

Assessment number: 9

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		
Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		

The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		

Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: **PREPARE ANY NECESSARY EQUIPMENT FOR THE ADMINISTRATION OF BRONCHODILATOR AND THE MEASUREMENT OF THE RESPONSE**

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Any consumables for the test are available and in adequate supply		
The correct bronchodilator and device are selected and are ready for use		
Any sources of compressed gas or oxygen are checked for functionality		

SECTION SEVEN: **MEASURE THE RESPONSE TO A SHORT ACTING BRONCHODILATOR**

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The bronchodilator/device is prepared in accordance with departmental procedure and manufacturer's instruction		
The correct bronchodilator and device are selected and are ready for use		

Instruction given to the patient is clear, understanding is checked and instructions repeated if necessary.		
Patient is positioned optimally		
The bronchodilator is administered to the patient (or the patient self-administers)		
If the patient self-administers the technique is monitored and evaluated, errors are recognised and corrected where possible or reported		
The patient is allowed to rest for the appropriate time following administration of bronchodilator		
The correct tests are re-called/selected for use as pre bronchodilator measurement		
Patient performs post bronchodilator tests in the same manner as baseline tests		
Appropriate results are selected and saved for use in the final report		

SECTION EIGHT: COMPLETE INVESTIGATION OF RESPONSE TO BRONCHODILATOR

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The patient is reassured and given appropriate time to recover from the test or administration of the bronchodilator		
Patient is clearly and accurately informed of the procedure for notification of the results		
All used consumables are dealt with in accordance with local procedure and health and safety at work act		
Any required transportation and escort is made available to coincide with the completion of the investigation and the readiness of the patient to leave		
Bronchodilators are returned to the storage facility		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION NINE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. Should the 'best' or the 'mean' effort for FEV_1 be reported?	
2. Can parameters obtained from different spirometry manoeuvres be reported and explain why?	
3. What is the range for breath hold time on gas transfer?	
4. What should you do if you measure TLCO outside of the normal breath hold time parameters?	
5. What are the limitations of spot check pulse oximetry?	
6. How long should a patient refrain from using their short acting b2 agonist prior to reversibility testing?	

7.	How long should a patient refrain from using a long acting anticholinergic agent prior to reversibility testing?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……..**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP11

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS AND REVERSIBILITY

ASSESSMENT FORM

Assessment number: 10

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The correct referral for the patient and the investigation to be performed are obtained		
If the referral contains insufficient information a request for further data is made, or the matter referred to more senior staff		
Any special requirements of the patient are identified and, if necessary, discussed with senior staff and carers		
Any requirement for technical and/or nursing assistance is identified and appropriate arrangements made		
Contraindications to testing are reviewed prior to the test – these must also be checked with the patient on arrival into the laboratory		
Patients and carers are greeted promptly and courteously and all practicable steps are taken to reassure patients and optimise effective communication and comprehension		

The patient's identity is accurately confirmed.		
Adherence to infection control at all times e.g. hand washing prior to testing.		
Relevant patient information e.g. medication, smoking history together with any previous test results are obtained and reviewed.		
Patients requiring special physical help or encouragement receive the appropriate attention		
Height and weight measurements are made in accordance with standardised procedures, adapting them where necessary.		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity, FEV_1 and PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		

Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		

Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PERFORM MEASUREMENTS OF HEART RATE AND OXYGEN SATURATION USING PULSE OXIMETRY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order and has adequate battery life (where appropriate) for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
All necessary accessories are available in accordance with the requirement of the investigation (suitable probe, nail polish remover etc)		
Test procedure and the quality of the results are reviewed and any abnormality or anomalies identified, eliminated or minimised, and the test procedure is repeated with modifications if required		
Technical problems are identified and minimised or eliminated or reported to senior physiologists if beyond the level of personal competence (e.g. removal of nail polish, poor perfusion of extremities)		
Pulse oximeter probe is removed and the patient reassured.		

Patient is clearly and accurately informed of the procedure for notification of the results		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION SIX: PREPARE ANY NECESSARY EQUIPMENT FOR THE ADMINISTRATION OF BRONCHODILATOR AND THE MEASUREMENT OF THE RESPONSE

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Any consumables for the test are available and in adequate supply		
The correct bronchodilator and device are selected and are ready for use		
Any sources of compressed gas or oxygen are checked for functionality		

SECTION SEVEN: MEASURE THE RESPONSE TO A SHORT ACTING BRONCHODILATOR

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The bronchodilator/device is prepared in accordance with departmental procedure and manufacturer's instruction		
The correct bronchodilator and device are selected and are ready for use		

Instruction given to the patient is clear, understanding is checked and instructions repeated if necessary.		
Patient is positioned optimally		
The bronchodilator is administered to the patient (or the patient self-administers)		
If the patient self-administers the technique is monitored and evaluated, errors are recognised and corrected where possible or reported		
The patient is allowed to rest for the appropriate time following administration of bronchodilator		
The correct tests are re-called/selected for use as pre bronchodilator measurement		
Patient performs post bronchodilator tests in the same manner as baseline tests		
Appropriate results are selected and saved for use in the final report		

SECTION EIGHT: COMPLETE INVESTIGATION OF RESPONSE TO BRONCHODILATOR

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The patient is reassured and given appropriate time to recover from the test or administration of the bronchodilator		
Patient is clearly and accurately informed of the procedure for notification of the results		
All used consumables are dealt with in accordance with local procedure and health and safety at work act		
Any required transportation and escort is made available to coincide with the completion of the investigation and the readiness of the patient to leave		
Bronchodilators are returned to the storage facility		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION NINE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions should be asked under examination conditions. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. Is FEV_1 a flow rate or a volume? 2. Draw a volume time graph with a slow start (attach drawing). 3. How may you detect a valsava manoeuvre on gas transfer? 4. What is the repeatability criteria for gas transfer? 5. At what decreased level of saturation would you seek advice/assistance? 6. How should you prepare a patient for a spot check oximetry measurement? 7. How long should you wait	

	before repeating spirometry following the delivery of a) short acting beta agonist and b) an anticholinergic agent?	
8.	How would you perform reversibility studies in an individual who could not perform acceptable spirometry?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……..**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

SECTION B:

PERFORM AND EVALUATE MEASUREMENTS OF CALIBRATION AND QUALITY CONTROL

CALIBRATION AND QUALITY CONTROL

Perform and evaluate measurements of calibration and quality control on a range of equipment.

SECTIONS

1. Provide evidence of calibration of a range of equipment for the measurement of dynamic lung volumes, static lung volumes and gas transfer.
2. Perform quality control of equipment for the measurement of dynamic lung volumes, static lung volumes and gas transfer using both physical and physiological controls.

AIMS

- To enable the candidate to become competent in the performance of equipment calibration to ensure correctly functioning equipment.
- To enable the candidate to become competent in the measurement and evaluation of quality control data.

OBJECTIVES

To ensure that the candidate is able to:-

- Calibrate/verify equipment for the measurement of dynamic lung volumes, static lung volumes and gas transfer.
- Produce evidence of participation in departmental calibration/verification procedures.
- Undertake quality control measurements using physical and physiological measurement techniques.
- Produce reports of quality control findings to demonstrate correctly and incorrectly functioning equipment.
- Understand the role of calibration and quality control in the lung function laboratory.
- Identify errors in equipment function using calibration and quality control.

ACHIEVED BY

- Practical experience with appropriate training within the work place environment
- Completion of the Individual Record of Clinical Practice

PERFORMANCE CRITERIA FOR CALIBRATION AND QUALITY CONTROL

SECTION 1: Provide evidence of calibration/verification of equipment for the measurement of dynamic lung volumes, static lung volumes and gas transfer.

Due to the nature of commercially available lung function testing equipment, it is unlikely that hardcopy printouts are easily available. Therefore for this section two pieces of evidence are required:

1. Include a copy of a calibration log identifying the candidates involvement in routine calibration. This should include both volume and gas concentration calibration.
2. Include a printout of volume calibration verification at differing flow rates used in routine lung function testing.

SECTION 2: Perform quality control of equipment for the measurement of dynamic lung volumes, static lung volumes and gas transfer using both physical and physiological controls.

1. Undertake a **MINIMUM** 25 of each of the following measurements using both a syringe (physical control) AND a physiological control subject (who may or may not be the student):

Dynamic Lung Volumes

Syringe	-	Vital Capacity
Physiological	-	Forced Vital Capacity (FVC) Forced Expiratory Volume in the 1st second (FEV_1) Peak Expiratory Flow (PEF)

Static Lung Volumes

Syringe	Vital Capacity (VC)
Physiological	Functional Residual Capacity (FRC) or Thoracic Gas Volume (TGV) Total Lung Capacity (TLC) Vital Capacity

Transfer Factor

Syringe	Alveolar Volume (VA)
Physiological	Transfer Factor Alveolar Volume

1. Record data in 5 appropriately labelled spread sheets. The spread sheets are as follows:
    i. Physical Control (syringe) showing values for Vital Capacity

ii. Physical Control (syringe) showing values for Alveolar Volume
iii. Physiological Control showing values for Forced Vital Capacity (FVC), Forced Expiratory Volume in the 1^{st} second (FEV_1) and Peak Expiratory Flow (PEF)
iv. Physiological Control showing values for Functional Residual Capacity (FRC) or Thoracic Gas Volume (TGV), Total Lung Capacity (TLC) and Vital Capacity
v. Physiological Control showing values for Transfer Factor and Alveolar Volume

2. For each set of measurements, calculate the mean and the Coefficient of Variation, and include these results on the spread sheets.
3. Plot appropriate, fully labelled graphs for each data set. Provide a report on the findings and if any results fall outside expected range, comment on the possible reasons of the anomalous data.

Assessment procedure

1. The Quality Control Assessment record must be completed and signed by the candidate. Each section must be verified and signed by the WBA on completion (See attached form RP12).
2. All spread sheets, calculations and graphs must be included in IRCP.
3. Each must be verified and signed by WBA as being the work of the candidate.

FORM RP12

CALIBRATION AND QUALITY CONTROL

ASSESSMENT FORM

Background Information

	Equipment used:
Dynamic Lung Volumes	
Static Lung Volumes	
Transfer Factor	
Calibration syringe	
Date of calibration of Calibration Syringe	

	Physiological Control:
Age	
Height (metres)	
Weight (kilograms)	
Gender	

It is expected that the Physiological Control is the candidate completing the IRCP. However, ARTP acknowledge that there may be circumstances where this may not be possible e.g. if the candidate has asthma etc. It is acceptable to use another member of staff to act as the physiological control, but you should state this in the comments section of this unit.

Section 1.	**Provide evidence of calibration/verification of equipment for the measurement of dynamic lung volumes, static lung volumes and gas transfer.**

Performance criteria	**ACHIEVED YES/NO**	**Assessors Comments**
Undertakes routine calibration/verification of all equipment.		
Produces a copy of a calibration log, including both volume and gas concentration calibration.		
Produces a printout of volume calibration verification at differing flow rates on one piece of equipment		

Section 2.	**Perform 25 of each of physical and physiological quality control measurements on equipment for the measurement of Dynamic Lung Volumes, Static Lung Volumes and Gas transfer.**

Performance criteria	**ACHIEVED YES/NO**	**Assessors Comments**
Dynamic Lung Volumes:		
Performs Vital Capacity measurements using a calibration syringe.		
Performs Forced Vital Capacity, FEV_1 and Peak Expiratory Flow measurements on a physiological control.		

Performance criteria	ACHIEVED YES/NO	Assessors Comments
Static Lung Volumes:		
Performs Vital Capacity measurements using a calibration syringe.		
Performs FRC/TGV, Total Lung Capacity and Vital Capacity measurements on a physiological control.		

Performance criteria	ACHIEVED YES/NO	Assessors Comments
Transfer Factor		
Performs Alveolar Volume (VA) measurements using a calibration syringe.		
Performs Alveolar Volume and Transfer Test measurements on a physiological control.		

Performance criteria	ACHIEVED YES/NO	Assessors comments
Recording of results		
Records results in suitable spread sheet format		
Calculates mean and Coefficient of variation of data		
Produces suitable graphs of data.		
Provides written comments on findings, with particular reference to anomalies		

ASSESSMENT QUESTIONS

A minimum of THREE but not more than FIVE questions must be asked on completion of this section. Questions should be relevant to the assessment i.e. relate to range covered, relate to observation or task undertaken. These questions should be asked under examination conditions.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. How should a flow measuring device be verified for volume? 2. What is the dead space of the mouthpiece filters that you use? 3. What are the implications of not removing water vapour and CO_2 from the circuit? 4. Is the SpO2 measurement accurate throughout the whole physiological range? 5. Explain a two point gas analyser calibration. 6. What excludes an individual from being a biological control?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT:	**……**
SIGNATURE OF CANDIDATE:	**……**
SIGNATURE OF ASSESSOR:	**……**
NAME OF ASSESSOR: (BLOCK CAPITALS)	**……**

SECTION C:

FORMAL ASSESSMENTS OF FULL RESPIRATORY FUNCTION TESTS WITH CLINICAL INTERPRETATION

FORM RP13

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT PLAN

Candidate Name: _____

Assessor Name: _____

Assessment details:

During this assessment I will be looking to see that:

Sources of Evidence:
Direct observation and oral questioning

Signed: _____ **Signed:** _____

(Assessor) (Candidate)

FORM RP14

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 1

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

Patient condition as defined in range: **Airflow Obstruction**

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity, Forced Vital Capacity and FEV_1 are made in accordance with ARTP/BTS guidelines		
Measurements of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: • *Inspired volume >90% VC* • *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* • *Breath hold without straining/leak* • *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		

Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. These questions should be asked under examination conditions. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. What does the shape of a normal flow volume loop represent physiologically? 2. How may upper airway obstruction be identified when performing dynamic lung volumes? 3. What causes a reduced VA? 4. What influence does anaemia have on gas transfer? 5. How may FRC be reduced? 6. Draw a helium dilution curve for a restrictive patient compared to an obstructive patient. 7. What is a normal heart rate? 8. What is the normal SpO2 response to exertion? 9. What is the mode of action of a $Beta_2$ agonist?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP15

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 2

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

Patient condition as defined in range: Airflow Obstruction

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity and Forced Vital Capacity are made in accordance with ARTP/BTS guidelines		
Measurements of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volumes and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: o *Inspired volume >90% VC* o *Inspiration within 1.5-2.0 seconds if FEV/FVC ≥ 50% predicted. within 4 s ≤50% predicted* o *Breath hold without straining/leak* o *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. These questions should be asked under examination conditions. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. Draw a mixed pattern flow volume loop? 2. How does COPD differ from asthma? 3. How does VA influence TLCO? 4. What is the significance of an elevated TLCO? 5. What is hyperinflation? 6. How does hyperinflation differ from gas trapping? 7. Draw the relationship between SaO2 and PaO2. 8. What do the ARTP/BTS guidelines specify as a significant response to a bronchodilator? 9. How does increasing age influence the response to bronchodilators?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP16

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 3

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

Patient condition as defined in range: Airflow Obstruction

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity and Forced Vital Capacity are made in accordance with ARTP/BTS guidelines		
Measurements of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volume and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: o *Inspired volume >90% VC* o *Inspiration within 1.5-2.0 seconds if FEV/FVC ≥ 50% predicted. within 4 s ≤50% predicted* o *Breath hold without straining/leak* o *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. These questions should be asked under examination conditions. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. How may you classify severity of airflow obstruction? Specify guidelines used. 2. Explain the difference, with the use of diagrams, between variable intra and variable extra thoracic upper airway obstruction. 3. What is the significance of a reduced TLCO? 4. How may intra and extra thoracic restriction be identified by gas transfer measurements? 5. How does muscle weakness reduce TLC? 6. What is the relationship between BMI and ERV? 7. How may altitude affect SpO_2? 8. Why does a non significant response in FEV_1 following reversibility studies not preclude the long term use of bronchodilators?	

9. Describe a limitation of the ESCS regression equations.	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT:	**……**
SIGNATURE OF CANDIDATE:	**……**
SIGNATURE OF ASSESSOR:	**……**
NAME OF ASSESSOR: (BLOCK CAPITALS)	**……**

FORM RP17

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 4

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

Patient condition as defined in range: Airflow Obstruction

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity and Forced Vital Capacity are made in accordance with ARTP/BTS guidelines		
Measurement of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volume and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: ○ *Inspired volume >90% VC* ○ *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* ○ *Breath hold without straining/leak* ○ *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. These questions should be asked under examination conditions. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. Draw a flow volume curve demonstrating mild airflow obstruction. 2. Why may flow be increased with respect to volume in patients with ILD. 3. What is the influence of lung disease on the discard and sample volumes chosen for gas transfer? 4. How may differing obstructive pathology show different gas transfer results? 5. Explain the differences in lung volume measurements in airflow obstruction when using gas dilution techniques and body plethysmography. 6. How does SpO2 influence heart rate? 7. What happens to RV during bronchodilation?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP18

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 5

Patient Details

Age: _____ Diagnosis: _____

Medication: _____

Patient condition as defined in range: A patient with a restrictive ventilatory defect

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity and Forced Vital Capacity are made in accordance with ARTP/BTS guidelines		
Measurement of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volume and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: ○ *Inspired volume >90% VC* ○ *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* ○ *Breath hold without straining/leak* ○ *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. These questions should be asked under examination conditions. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. Draw a flow volume loop illustrating the effect of muscle weakness. 2. How may cough influence spirometry measurements? 3. What causes a reduced KCO? 4. How may hypovolaemia influence TLCO? 5. What is the significance of a low VA/TLC ratio? 6. What is the most common cause of a raised RV? 7. What respiratory conditions may affect heart rate? 8. How may beta blockers influence reversibility response?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP19

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 6

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

Patient condition as defined in range: A patient with an extra thoracic restrictive defect

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity and Forced Vital Capacity are made in accordance with ARTP/BTS guidelines		
Measurement of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volume and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: ○ *Inspired volume >90% VC* ○ *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* ○ *Breath hold without straining/leak* ○ *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. These questions should be asked under examination conditions. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. What is the Empey Index and how is it calculated? 2. What is a significant smoking history? 3. List three drugs which may have a detrimental effect on gas transfer. 4. What is theta CO and what may affect it? 5. How may hyperinflation affect a subject's SpO2? 6. Why may post bronchodilator spirometry values be less than pre?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP20

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 7

Patient Details

Age: _____ Diagnosis: _____

Medication: _____

Patient condition as defined in range: A patient aged >70 years of age

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise	.	
The patient is correctly positioned		
Measurements of Vital Capacity and Forced Vital Capacity are made in accordance with ARTP/BTS guidelines		
Measurements of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volume and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: ○ *Inspired volume >90% VC* ○ *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* ○ *Breath hold without straining/leak* ○ *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

SECTION SIX: SUPPLEMENTAL PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. These questions should be asked under examination conditions. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. Explain the difference between FVC and VC max in a severely obstructed patient. 2. How may a slow start during spirometry affect FEV_1? 3. What is the difference between anatomical and physiological dead space? 4. Why should you wait between TLCO measurements? 5. How and why may chronic heart failure affect lung volumes? 6. At what percentage of TLC does tidal breathing occur normally in a 30 year old? 7. What is the normal capillary re-fill time? 8. What is the ratio of drug deposition between an MDI and nebuliser?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP21

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 8

Patient Details

Age: _____ Diagnosis: _____

Medication: _____

Patient condition as defined in range: A patient aged <25 years of age

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity and Forced Vital Capacity are made in accordance with ARTP/BTS guidelines		
Measurements of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volume and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: ○ *Inspired volume >90% VC* ○ *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* ○ *Breath hold without straining/leak* ○ *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

SECTION SIX: SUPPLEMENTAL PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. These questions should be asked under examination conditions. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	Responses
1. Draw a flow volume loop of a patient with a restrictive defect (with a raised ratio) and mark the FEV_1. 2. Why may a cough at TLC increase PEF? 3. Would a 5ft female of 50 years of age or a 6ft male of 60 years of age be more likely to have a TLCO measurement of 10mmol/min/kPa? 4. How may exercise before testing increase TLCO results? 5. What is the relationship between FRC and age? 6. How may hyperinflation affect diaphragm function? 7. How may metabolic acidosis affect SpO_2? 8. When would you use a volume holding device over a spacer device?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

FORM RP22

PLAN, PREPARE AND PERFORM FULL RESPIRATORY INVESTIGATIONS

ASSESSMENT FORM

Assessment number: 9

Patient Details

Age: _____ **Diagnosis:** _____

Medication: _____

Patient condition as defined in range: A patient that has a significant bronchodilator response

SECTION ONE: PLAN AND PREPARE FOR THE MEASUREMENT OF FULL RESPIRATORY INVESTIGATIONS

PERFORMANCE CRITERIA *Y (achieved), N (not achieved). Complete comments for very good and very poor performances*	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Ensure that the equipment is in working order in order for the test to be performed		
Equipment faults are accurately identified and reported or rectified		
The system is correctly configured in accordance with the requirements of the test		

SECTION TWO: PERFORM MEASUREMENTS OF DYNAMIC LUNG VOLUMES

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The environment is suitable for the investigation being undertaken		
Patient is given a clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
The patient is correctly positioned		
Measurements of Vital Capacity and Forced Vital Capacity are made in accordance with ARTP/BTS guidelines		
Measurements of PEF are made in accordance with ARTP/BTS guidelines		
Errors in patient technique are identified and corrected		
Poor patient performance is distinguished from technical faults or deterioration in clinical status, which is dealt with promptly and reported in accordance with departmental protocol		
Limit of personal competence to proceed with the test is recognised and criteria for seeking external assistance agreed		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines (within 5% or 100mls)		

SECTION THREE: MEASURE STATIC LUNG VOLUMES HELIUM DILUTION

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction to the patient is accurate, clear and precise		
Initial helium value is within equipment/manufacturer's guidelines		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Accurate recording of helium concentration throughout the test with correct determination of end point according to ARTP/BTS Guidelines.		
Spirometer volume is constant during test through accurate addition of oxygen and removal of carbon dioxide *(Check student understanding if system has automatic oxygen compensation).*		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		

Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING NITROGEN WASHOUT

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is switched into the system in accordance with ARTP/BTS Guidelines (*Check student understanding if system uses automatic switch-in)*		
Correct determination of end point according to ARTP/BTS Guidelines.		
Vital Capacity manoeuvres performed in accordance with ARTP/BTS guidelines and/or equipment/manufacturer's guidelines.		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION THREE: MEASURE STATIC LUNG VOLUMES USING BODY PLETHYSMOGRAPHY

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Patient is correctly positioned with head perpendicular to chest		
Adequate time is allowed for thermal equilibration within the box		
The shutter occludes the mouthpiece at FRC.		
After the panting/quiet breathing manoeuvre, VC efforts are performed		
A minimum of 3 acceptable tests are performed		
Sufficient time allowed between manoeuvres for patient to return to normal tidal breathing.		
Errors in patient technique are identified and corrected.		
Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Malfunctioning of equipment is identified and corrected		

SECTION FOUR: MEASURE CO TRANSFER FACTOR USING AN APPROPRIATE METHOD

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Equipment is correctly prepared according to local procedure and manufacturer's guidelines.		
Appropriate selection of inspired volume, washout volume, sample volume and breath hold time		
Clear and comprehensible description of the nature and purpose of the test. Instruction is accurate, clear and precise		
Achieves the following: ○ *Inspired volume >90% VC* ○ *Inspiration within 1.5-2.0 seconds if $FEV_1/FVC \geq 50\%$ predicted. within 4 s $\leq 50\%$ predicted* ○ *Breath hold without straining/leak* ○ *Minimum of 2 acceptable tests performed with adequate rest between*		
Accurate measurements of V_{in}, breath-hold time, inhaled and exhaled gas concentrations are obtained		
Errors in patient technique are identified and corrected. Poor patient performance is distinguished from technical faults or deterioration in clinical status.		
Indications to stop or revise the test protocol are known and recognised in order to maintain the safety of the patient during the test		

SECTION FIVE: **PREPARE ANY NECESSARY EQUIPMENT FOR THE ADMINISTRATION OF BRONCHODILATOR AND THE MEASUREMENT OF THE RESPONSE**

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
Any consumables for the test are available and in adequate supply		
The correct bronchodilator and device are selected and are ready for use		
Any sources of compressed gas or oxygen are checked for functionality		

SECTION SIX: **MEASURE THE RESPONSE TO A SHORT ACTING BRONCHODILATOR**

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The bronchodilator/device is prepared in accordance with departmental procedure and manufacturer's instruction		
The correct bronchodilator and device are selected and are ready for use		
Instruction given to the patient is clear, understanding is checked and instructions repeated if necessary.		
Patient is positioned optimally		

The bronchodilator is administered to the patient (or the patient self-administers)		
If the patient self-administers the technique is monitored and evaluated, errors are recognised and corrected where possible or reported		
The patient is allowed to rest for the appropriate time following administration of bronchodilator		
The correct tests are re-called/selected for use as pre bronchodilator measurement		
Patient performs post bronchodilator tests in the same manner as baseline tests		
Appropriate results are selected and saved for use in the final report		

SECTION SEVEN: COMPLETE INVESTIGATION OF RESPONSE TO BRONCHODILATOR

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The patient is reassured and given appropriate time to recover from the test or administration of the bronchodilator		
Patient is clearly and accurately informed of the procedure for notification of the results		

All used consumables are dealt with in accordance with local procedure and health and safety at work act		
Any required transportation and escort is made available to coincide with the completion of the investigation and the readiness of the patient to leave		
Bronchodilators are returned to the storage facility		
Equipment is cleaned and left in a suitable condition for reuse		

SECTION EIGHT: PRODUCE A TECHNICAL REPORT OF THE RESULTS OBTAINED

PERFORMANCE CRITERIA ***Y (achieved), N (not achieved). Complete comments for very good and very poor performances***	**ACHIEVED YES/NO**	**ASSESSORS COMMENTS**
The results are recorded accurately in an appropriate format together with any technical comments that may influence the test outcome		
Results for reporting are correctly selected in accordance with ARTP/BTS guidelines or recognised appropriate guidelines		
A suitable report is generated		
Recognition of the requirement for further testing is made		

ASSESSMENT QUESTIONS

It is essential that candidates are questioned on any of the range that was not achieved i.e. a No or N/A was entered above. Candidates who do not demonstrate sufficient understanding would not have fulfilled the requirements of the formal assessment and therefore this assessment should not be passed and should be repeated after appropriate training. These questions should be asked under examination conditions. Where candidate fail to achieve the required competency in five or more performance criteria, the assessment should be terminated and repeated after further training.

Questions	**Responses**

UNDERPINNING KNOWLEDGE QUESTIONS

Candidates must demonstrate adequate underpinning knowledge of the principles in which they are deemed as competent. These questions are designed to assess the candidate's knowledge of respiratory physiology measurements and prepare them for their practical examination. These questions should be asked under examination conditions. All questions must be asked and the response documented by the WBA. Areas for development that are identified must be documented and specified as subsequent areas for review on future assessment plans.

Questions	**Responses**
1. Is a PEF of 250 measured in l/sec or l/min? 2. What is the difference between PEF and FEV_1? 3. In a normal subject does the RV/TLC% increase or decrease with age? Explain why this occurs. 4. Given the following information, calculate FRC: RV = 2.6L, VC = 5.1L, IC = 3.8L 5. How does smoking immediately prior to testing reduce TLCO? 6. Over what PaO_2 range are SpO_2 measurements relatively insensitive?	

ASSESSMENT OUTCOME	
PASS (All competencies met)	
FAIL (Insufficient competences met at this stage)	

ASSESSORS FEEDBACK (*WITH PLAN IF REQUIRED*)

DATE OF ASSESSMENT: **……..**

SIGNATURE OF CANDIDATE: **……**

SIGNATURE OF ASSESSOR: **……**

NAME OF ASSESSOR: **……**
(BLOCK CAPITALS)

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