National 2 unit specification

Unit specification

Science in the Environment: Forces (Alternative Context) (National 2)

Unit code:	J6SD 72
SCQF:	level 2 (6 SCQF credit points)
Valid from:	session 2022–23

This document provides detailed information about the unit to ensure consistent and transparent assessment year on year.

This document is for teachers and lecturers and contains all the mandatory information required to deliver and assess the unit.

This Unit should only be used where a learner has already achieved the original Unit, which carries the same title but without the words "Alternative Context". There should be at least one year between the delivery of the original Unit and the delivery of the "Alternative Context" version.

For this Unit, centres can use one of the Unit Assessment Support Packs provided with the original Unit, but adjust it to reflect the alternative context in which the Unit is delivered. The alternative context could relate to the delivery setting, the maturity of the learner or the activities the learner is asked to complete.

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This edition: September 2022 (version 1.0)

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Unit outline

The aim of this unit is to provide learners with opportunities to explore different types of forces, the effect of forces on objects, and the size and direction of forces. This unit raises learners' awareness of the effect forces can have through carrying out practical experiments. Learners will also ensure health and safety during all experiments.

Learners who complete this unit will be able to:

1 participate in practical experiments to observe forces in the world around us
2 participate in practical experiments to explore forces in action

This unit is an optional unit of the National 2 Science in the Environment course and is also available as a freestanding unit. Please read this unit specification in conjunction with the unit support notes, which provide advice and guidance on delivery, assessment approaches, and developing skills for learning, skills for life and skills for work.

Exemplification of the standards in this unit is given in unit assessment support.

Recommended entry

Entry to this unit is at the discretion of the centre. Learners should have the skills, knowledge and understanding required by one or more of the following, or have equivalent qualifications and/or experience:

It may help if learners complete some units at SCQF levels 1 or 2 before they start this unit but this is not a requirement for entry.

Relevant experiences and outcomes may provide an appropriate basis for doing this unit.

Standards

Outcomes and assessment standards

Outcome 1

1 Participate in practical experiments to observe forces in the world around us by:

1.1 observing and recording the effect of different forces on an object

1.2 identifying types of forces acting on an object, from a given list

Outcome 2

2 Participate in practical experiments to explore forces in action by:

2.1 observing forces and measuring the effect they have on objects

2.2 taking part in practical experiments using simple mechanisms to make forces bigger

2.3 applying appropriate safety procedures when taking part in experiments involving forces

Evidence requirements for the unit

You should use your professional judgement, subject knowledge and experience, and understanding of your learners, to determine the most appropriate ways to generate evidence, and which conditions and contexts to use.

Evidence for this unit could include observation checklists, logs, short recorded oral responses, photographic evidence or equivalent. You should be confident that there is enough evidence to support your judgement that the assessment standards have been met:

- outcome 1: the learner must record the effects of at least two different types of force
- outcome 2: the learner must participate in at least two experiments, record how much force is acting on the objects involved (this could be any measurement that indicates the amount of force or the effect the force has), and use a simple mechanism to make the force bigger or smaller. The learner must also follow health and safety instructions while completing the experiments

Learners will normally receive a high degree of support to achieve the outcomes of the unit. It is your responsibility to ensure that the level of support is appropriate for the requirements of the unit.

Unit assessment support provides exemplification of assessment.

Skills for learning, skills for life and skills for work

This unit helps learners to develop broad, generic skills. These skills are based on SQA's Skills Framework: Skills for Learning, Skills for Life and Skills for Work and draw from the following main skills areas:

1 Literacy

1.3 Listening and talking

5 Thinking skills

5.4 Analysing and evaluating

You must build these skills into the unit at an appropriate level, where there are suitable opportunities.

Equality and inclusion

This unit is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

You should take into account the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence. The unit support notes provide further information.

Guidance on assessment arrangements for disabled learners and/or those with additional support needs is available on the assessment arrangements web page: www.sqa.org.uk/assessmentarrangements

Further information

The following links provide useful information and background:

- National 2 web page
- Building the Curriculum 3 to 5
- Guide to Assessment
- SCQF Handbook: User Guide
- SQA Skills Framework: Skills for Learning, Skills for Life and Skills for Work
- Skills for Learning, Skills for Life and Skills for Work: Using the Curriculum Tool
- SQA e-assessment web page

Appendix: unit support notes

Introduction

These support notes are not mandatory. They provide advice and guidance to teachers and lecturers on approaches to delivering the unit. Please read these unit support notes in conjunction with the unit specification, course specification, course support notes and appropriate assessment support materials.

Developing skills, knowledge and understanding

The course support notes provide information about skills, knowledge and understanding.

If this unit is being delivered on a freestanding basis, you are free to select the skills, knowledge, understanding and contexts that are most appropriate.

Approaches to learning and teaching

This section provides general advice and guidance on approaches to learning and teaching that you can use to deliver this unit.

At SCQF level 2, learners require varying degrees of support, depending on their needs. Some learners may:

- require regular direction and prompting to enable them to take part
- take part independently or with limited support

You should give learners as much support as they need to engage with learning, teaching and assessment activities while maintaining the integrity of the outcomes and assessment standards.

The following table provides examples of approaches to learning and teaching. These may also provide naturally occurring evidence that you can use to assess learners against the assessment standards.

Science in the Environment: Forces	
Outcome 1: participate in practical experiments to observe forces in the world around us Outcome 2: participate in practical experiments to explore forces in action	
Assessment standards	**Approaches for learning and teaching**
1.1 observing and recording the effect of different forces on an object	Learners need to be able to observe and record how a force has made an object start or stop moving; or change direction or change shape. They could try the following activities: ♦ blow table tennis ball with straw ♦ drop a soft toy ♦ hit 'splat the rat' ♦ kick a cardboard box ♦ squash foam ♦ pop bubble wrap ♦ pull a shuffleboard ♦ attract metal filings on paper with a magnet ♦ push a float below the water ♦ fly a kite on a windy day
1.2 identifying types of forces acting on an object, from a given list	Learners should be able to identify at least two forces acting on an object. They should be given a list to choose from, which could be made up of a selection of images of forces acting on objects from everyday life. Learners can express the types of force that they identify in simple terms, or you can give them support to understand the different types of force that they can choose from. Types of force might include, for example: ♦ push, pull or twist ♦ friction ♦ air resistance ♦ gravity ♦ floating or sinking ♦ water resistance ♦ magnetic pull

Assessment standards	Approaches for learning and teaching
2.1 observing forces and measuring the effect they have on objects	Learners should be able to make observations and record the amount of force affecting two everyday objects. This could involve direct measurement in newtons or a more simple comparative measurement of the effect the force has, for example: ♦ the size of dent a hammer makes on a piece of wood ♦ the height a ball bounces ♦ the length of time a feather takes to fall to the ground Learners could be involved in the following activities: ♦ force of gravity pulling objects of different size or mass down — measured using a newton-meter ♦ recording the time for different sizes of parachute to reach the ground ♦ number or weight of masses held by a plasticine boat or wooden raft before it sinks ♦ distance travelled by different shaped paper aeroplanes ♦ height reached by rockets with different volumes of water or quantities of fizzing Vitamin C tablets ♦ time cars running down slopes of varying heights or different surfaces
2.2 taking part in practical experiments using simple mechanisms to make forces bigger	Learners should be able to identify how mechanisms can reduce the force needed in order to make something move or work. For example: ♦ moving blocks on rollers ♦ springs ♦ pulley systems ♦ wheels and cogs ♦ levers and fulcrum Note: learners do not need to use technical vocabulary to describe or explain the mechanisms. Simple practical examples might include: ♦ wound-up elastic bands to propel a model aeroplane ♦ increase the force of a jet of water by turning a tap or putting a thumb over the end of a hose ♦ pulling the handle on a bagatelle game to make the ball go faster ♦ pulling a rope on a simple pulley to lift a weight ♦ pumping up water pressure to make a model rocket take-off

Assessment standards	Approaches for learning and teaching
2.3 applying appropriate safety procedures when taking part in experiments involving forces	Learners must show that they can follow simple safety rules and instructions given by the teacher or lecturer when completing the experiments. For example: ♦ dress appropriately — no open-toed shoes; long hair must be tied back; protective aprons or lab coats, safety goggles, gloves and long sleeves to be worn if instructed ♦ no eating or drinking in the science lab or area ♦ clean up all spillages on floor or surfaces as instructed by the teacher or lecturer ♦ do not touch any equipment or materials unless told to do so ♦ allow any materials or equipment that has been heated to cool before touching

Approaches to assessment and gathering evidence

There is no external assessment for National 2 units. All units are internally assessed against the requirements outlined and described in the unit specification and the unit assessment support pack.

To achieve the unit, learners must achieve all the unit outcomes.

At SCQF level 2, most evidence for assessment is gathered on a naturally occurring, ongoing basis, rather than from more formal assessment methods. There are many contexts that you might use for gathering evidence, for example, extra-curricular and/or outdoor learning.

Naturally occurring evidence is evidence that occurs in and as part of learning and teaching, which you can gather for assessment purposes in a variety of ways:

- observation of evidence demonstrated during an activity (using an observation checklist, visual recording, photography or equivalent)
- oral questioning before, during, and on completion of an activity (recorded using an audio-visual or audio recording or using your detailed written notes as evidence)
- learning and teaching activities that generate physical evidence for assessment
- identifying opportunities to record evidence during out-of-centre activities

You should focus on small, well-defined steps in learning. In this way, the learner is more likely to achieve success in the units and in any subsequent learning.

Learners benefit from receiving accurate and regular feedback regarding their learning. This helps to ensure they are actively involved in the assessment process. It is important that you use different approaches to assessment to suit the varying needs of learners.

Examples of evidence and how you can gather evidence for each assessment standard in this unit:

- **Assessment standards 1.1 and 1.2**: learners should observe and record two forces in action during planned experiments. Learners could complete a simple checklist (with support if required) to record their findings from the experiments and they could also highlight the type of force as part of their record. You could also complete an observation checklist to show that the learner has completed the experiments.
- **Assessment standards 2.1, 2.2 and 2.3**: learners could record their own results from their experiments using a simple proforma (with support if required). You could also record each learner's actions on an observation checklist and/or take photographs of the experiments, and of the learners following instructions and rules about health and safety.

Combining assessment within units

The assessment of the activities in this unit involving renewable energy could be combined with the assessment in the National 2 Science in the Environment: Exploring Everyday Materials unit.

Developing skills for learning, skills for life and skills for work

This section highlights the skills for learning, skills for life and skills for work that learners should develop in this unit. These are based on SQA's Skills Framework: Skills for Learning, Skills for Life and Skills for Work and should be built into the unit where there are appropriate opportunities. The level of these skills will be appropriate to the level of the unit.

Some examples of potential opportunities to practise or improve these skills are provided in the following table.

Skills for learning, skills for life and skills for work	**Approaches for learning and teaching**
1 Literacy 1.3 Listening and talking: ♦ listening means the ability to understand and interpret ideas, opinions and information presented orally for a purpose and within a context, drawing on non-verbal communication as appropriate ♦ talking means the ability to communicate orally ideas, opinions and information for a purpose and within a context	Where appropriate, learners could use their normal communication method during learning and teaching activities to communicate, for example: ♦ identifying the types of force acting on an object ♦ giving a response to indicate their like or dislike of the activities ♦ recording the effect of the force acting on an object

Skills for learning, skills for life and skills for work	Approaches for learning and teaching
5 Thinking skills 5.4 Analysing and evaluating: ♦ covers the ability to identify and weigh-up the features of a situation or issue, and using your judgement in coming to a conclusion ♦ includes reviewing and considering any potential solutions	Learners could evaluate the effect of changes in forces caused by the simple mechanisms they will use in outcome 2.

Administrative information

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History of changes

Version	Description of change	Date

Note: please check SQA's website to ensure you are using the most up-to-date version of this document.