



National 2
unit
specification



Unit specification

Science in the Environment: Exploring Everyday Materials (National 2)

Unit code:	J5HF 72
SCQF:	level 2 (6 SCQF credit points)
Valid from:	session 2021–22

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.

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Unit outline

The aim of this unit is to provide learners with opportunities to explore the properties of different materials, and changes that can be made to those materials through variation of heat or force or through contact with other materials. This unit raises learners' awareness of the differences between materials through simple experiments. Learners will also ensure health and safety during all experiments.

Learners who complete this unit will be able to:

- 1 explore the properties and uses of different materials
- 2 participate in practical experiments to explore changes in materials

This unit is a mandatory 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 Explore the properties and uses of different materials by:

- 1.1 observing and recording the properties of different materials
- 1.2 identifying how materials are used in everyday life

Outcome 2

2 Participate in practical experiments to explore changes in materials by:

- 2.1 taking part in experiments that cause changes to the properties of different materials
- 2.2 identifying what can make the properties of materials change
- 2.3 applying appropriate health and safety during experiments on changes to the properties of materials

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 observe the properties of at least two materials and identify at least two uses of each material
- ◆ outcome 2: the learner must participate in at least two experiments that bring about changes in the properties of materials and apply appropriate health and safety during those experiments. The learner must also identify what caused the changes in the properties of the material

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: Exploring Everyday Materials

Outcome 1: explore the properties and uses of different materials

Outcome 2: participate in practical experiments to explore changes in materials

Assessment standards

Approaches for learning and teaching

1.1 observing and recording the properties of different materials

1.2 identifying how materials are used in everyday life

The properties should be simple, observable and straightforward for learners. Suggested types of material: water; oil; wood, metal; plastic; rubber; clay; peat.

Water

Properties (physical or chemical)

Uses

- ◆ transparent
- ◆ fluid
- ◆ freezes and melts
- ◆ evaporates

- ◆ life
- ◆ fire extinguishers
- ◆ cleaning
- ◆ sewage
- ◆ heating
- ◆ cooking
- ◆ leisure activities
- ◆ source of energy, for example renewable energy

Suggested learning activities

- ◆ observe properties of water from different sources, then discuss and record observations
- ◆ take a trip to local waterfall, river, stream, dam, or hydro power station, and produce notes or drawings based on observations
- ◆ make ice, melt in hand, melt ice using salt and de-icer, and record changes in state
- ◆ investigate mixing different substances in water such as oil and water or sugar and syrup, and record changes in state through words, pictures or photographs
- ◆ maintain a diary, log or photo diary of properties of water, its uses and changing states

Assessment standards	Approaches for learning and teaching	
	Oil	
	Properties (physical or chemical)	Uses
	<ul style="list-style-type: none"> ◆ viscous ◆ flammable ◆ fluid 	<ul style="list-style-type: none"> ◆ fuel ◆ plastics ◆ lubricant ◆ cooking and heating
	Suggested learning activities	
	<ul style="list-style-type: none"> ◆ measure how long it takes for an oil, for example sunflower oil or engine oil, to be poured from one container to another; measure and record speeds using clocks or watches ◆ observe oil sitting on top of water then add detergent to allow mixing; record observations and discuss why this might be happening ◆ burn small sample of oil and measure time taken to burn ◆ watch videos from oil companies to find out where oil comes from; produce a project booklet about oil, recording observations, measurements and information found from various sources ◆ keep a diary, log or photo diary of properties of oil and its uses 	
	Wood	
	Properties (physical or chemical)	Uses
	<ul style="list-style-type: none"> ◆ strong ◆ flammable ◆ bendy ◆ floats ◆ dense ◆ rough or smooth texture 	<ul style="list-style-type: none"> ◆ construction ◆ fuel ◆ furniture ◆ paper ◆ boats ◆ musical instruments
	Suggested learning activities	
	<ul style="list-style-type: none"> ◆ use touch to explore the texture of different types of wood ◆ visit woodlands or forests to observe how living things use trees or wood ◆ carry out a survey of everyday items, for example furniture that used wood to provide strength ◆ use thin wood to build a model bridge and investigate the amount of weight that the structure can handle ◆ burn small sample of wood and measure time taken to burn ◆ make boats out of wood, experimenting with different types of wood 	

Assessment standards	Approaches for learning and teaching																
	<table border="1"> <thead> <tr> <th colspan="2" data-bbox="448 327 1378 387">Metal</th> </tr> <tr> <th data-bbox="448 387 906 488">Properties (physical or chemical)</th> <th data-bbox="906 387 1378 488">Uses</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 488 906 857"> <ul style="list-style-type: none"> ◆ strength ◆ conductivity ◆ corrodes ◆ waterproof ◆ various colours ◆ magnetic ◆ dense ◆ crumples </td> <td data-bbox="906 488 1378 857"> <ul style="list-style-type: none"> ◆ electronics ◆ buildings ◆ furniture ◆ electricity ◆ machinery ◆ construction ◆ jewellery ◆ cutlery ◆ pots and pans </td> </tr> <tr> <th colspan="2" data-bbox="448 857 1378 918">Suggested learning activities</th> </tr> <tr> <td colspan="2" data-bbox="448 918 1378 1451"> <ul style="list-style-type: none"> ◆ survey everyday materials that use metals to provide strength, and identify the different metals ◆ make a circuit to show electricity conducting through metals; investigate rusting of metals; find out about rust prevention, for example cars ◆ plan and carry out a survey to find the extent of corrosion in a particular area ◆ make a collection of a range of everyday objects made of metal and create a classroom display ◆ visit a recycling plant to see how metal is recycled for different purposes ◆ find out what happens to a coin when immersed in fizzy cola for a period of time </td> </tr> <tr> <th colspan="2" data-bbox="448 1491 1378 1552">Plastic</th> </tr> <tr> <th data-bbox="448 1552 906 1653">Properties (physical or chemical)</th> <th data-bbox="906 1552 1378 1653">Uses</th> </tr> <tr> <td data-bbox="448 1653 906 2007"> <ul style="list-style-type: none"> ◆ strong — made into any shape ◆ hard or bendy ◆ can be coloured ◆ transparent or opaque ◆ does not conduct electricity </td> <td data-bbox="906 1653 1378 2007"> <ul style="list-style-type: none"> ◆ kitchen utensils ◆ furniture ◆ toys ◆ packaging ◆ disposable medical equipment such as tubes and bags ◆ insulation of cables ◆ disposable cutlery ◆ toothbrushes </td> </tr> </tbody> </table>	Metal		Properties (physical or chemical)	Uses	<ul style="list-style-type: none"> ◆ strength ◆ conductivity ◆ corrodes ◆ waterproof ◆ various colours ◆ magnetic ◆ dense ◆ crumples 	<ul style="list-style-type: none"> ◆ electronics ◆ buildings ◆ furniture ◆ electricity ◆ machinery ◆ construction ◆ jewellery ◆ cutlery ◆ pots and pans 	Suggested learning activities		<ul style="list-style-type: none"> ◆ survey everyday materials that use metals to provide strength, and identify the different metals ◆ make a circuit to show electricity conducting through metals; investigate rusting of metals; find out about rust prevention, for example cars ◆ plan and carry out a survey to find the extent of corrosion in a particular area ◆ make a collection of a range of everyday objects made of metal and create a classroom display ◆ visit a recycling plant to see how metal is recycled for different purposes ◆ find out what happens to a coin when immersed in fizzy cola for a period of time 		Plastic		Properties (physical or chemical)	Uses	<ul style="list-style-type: none"> ◆ strong — made into any shape ◆ hard or bendy ◆ can be coloured ◆ transparent or opaque ◆ does not conduct electricity 	<ul style="list-style-type: none"> ◆ kitchen utensils ◆ furniture ◆ toys ◆ packaging ◆ disposable medical equipment such as tubes and bags ◆ insulation of cables ◆ disposable cutlery ◆ toothbrushes
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Suggested learning activities

- ◆ make a survey of items made from plastic in your house, compare this with other students — were there any surprises?
- ◆ make a collection of a range of different plastic types, for example hard, flexible, thin, opaque, transparent, coloured, that can be found in your school environment, and create a display
- ◆ visit a recycling plant to discover how plastics can be recycled for different purposes

Rubber**Properties (physical or chemical)**

- ◆ waterproof
- ◆ stretchy
- ◆ neutral
- ◆ flammable
- ◆ insulator

Uses

- ◆ tyres
- ◆ elastic bands
- ◆ footwear
- ◆ pipes
- ◆ gloves

Suggested learning activities

- ◆ make a collection of items made of rubber and use sense to explore their properties
- ◆ plan and carry out a survey of rubber items used at home, in school or college, or the local environment
- ◆ make water vessels out of different materials and find out which materials hold water the best
- ◆ make model cars and using elastic bands, explore what happens to the cars when more turns are applied to the elastic band

Clay**Properties (physical or chemical)**

- ◆ soft
- ◆ hard when baked
- ◆ waterproof (when dry)
- ◆ breakable (when dry)

Uses

- ◆ plates and cups (when dry)
- ◆ modelling
- ◆ pipes

Suggested learning activities

- ◆ using clay to make simple models or cups
- ◆ baking the clay in an oven or kiln until hard and dry
- ◆ touching the clay before and after baking to show the difference in hardness or softness
- ◆ could be linked to the delivery of a creative arts unit

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Assessment standards	Approaches for learning and teaching
2.1 taking part in experiments that cause changes to the properties of different materials	<p>Suggested experiments:</p> <ul style="list-style-type: none"> ◆ heating each material to see which ones will burn, melt, stay the same, boil or change shape ◆ applying force to the material to see if it breaks, bends, stretches or changes shape ◆ checking if the material will freeze and change properties at 0°C
2.2 identifying what can make the properties of materials change	<p>From the results of the experiments listed above, learners will identify the cause of changes in each material. Is the change due to:</p> <ul style="list-style-type: none"> ◆ heating? ◆ applying force? ◆ freezing?
2.3 applying appropriate health and safety during experiments on changes to the properties of materials	<p>Learners must show that they can follow simple safety rules and instructions given by the teacher or lecturer when completing the experiments. For example:</p> <ul style="list-style-type: none"> ◆ 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 ◆ 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 could select at least two materials to explore. Each learner should observe and record the physical or chemical properties of the materials and identify at least two uses of the materials. This could be done on a simple checklist (with support if required). You could also complete an observation checklist to show that the learner has completed the task.
- ◆ **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: Forces 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
<p>1 Literacy</p> <p>1.3 Listening and talking:</p> <ul style="list-style-type: none"> ◆ 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 	<p>Where appropriate, learners could use their normal communication method during learning and teaching activities to communicate, for example:</p> <ul style="list-style-type: none"> ◆ identifying the properties of materials ◆ identifying what causes a change in the properties of a given material
<p>5 Thinking skills</p> <p>5.4 Analysing and evaluating:</p> <ul style="list-style-type: none"> ◆ 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 	<p>Learners could evaluate the effect of changes in temperature on the properties of the materials in task 2 and 3 in the unit assessment support pack.</p>

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.