Textiles
Key Stage 2 Thematic Unit
Supporting the Areas of Learning and STEM
## Contents

| Section 1 | Activity 1 | Planning Together | 3 |
| Section 1 | Activity 2 | Sorting by Property | 4 |
| Section 1 | Activity 3 | Manufactured in Northern Ireland | 6 |
| Section 1 | Activity 4 | A Passion for Fashion | 8 |

| Section 2 | Activity 5 | Match the Properties | 13 |
| Section 2 | Activity 6 | Heat Insulation and Conduction | 14 |
| Section 2 | Activity 7 | Waterproof and Absorbent | 16 |
| Section 2 | Activity 8 | Transparent, Translucent and Opaque | 18 |
| Section 2 | Activity 9 | Stains | 19 |
| Section 2 | Activity 10 | Stretch and Shrink | 21 |
| Section 2 | Activity 11 | Safety Fabrics | 22 |
| Section 2 | Activity 12 | Using Textiles | 23 |

### Resources

| Suggested Additional Resources | 33 |

This Thematic Unit is for teachers of Key Stage 2 children. Schools can decide which year group will use this unit and it should be presented in a manner relevant to the age, ability and interests of the pupils.

This Thematic Units sets out a range of teaching and learning activities to support teachers in delivering the objectives of the Northern Ireland Curriculum. It also supports the STEM initiative.
Acknowledgement
CCEA wishes to acknowledge Ballymacash Primary School for their contribution to the enclosed images of their school and pupils.
Exploring Textiles

Planning for the theme.

Finding out about types of materials and where they are used.

Grouping and classifying textiles.

Tracking a textile from raw material to product.

Researching textile industries in Northern Ireland.

Considering the advantages and disadvantages of using a particular textile.

Developing research and ‘managing information’ skills.
**Activity 1**

**Planning Together**

**Suggested Learning Intentions**

We are learning to:
- contribute to the planning for our learning; and
- develop our ideas through research.

Ask the class what they think the word 'textile' means and allow them to use dictionaries to find a definition. When they have established what a textile is, use a KWL* grid and encourage the children to come up with statements of things they currently know about textiles. This may be about what textiles are, what they are used for or how they are made. Insert these into the 'K' section of the grid.

Next, ask the children if there is anything they would like to find out about textiles. Use Think, Pair, Share* to find out ideas that the children would like to investigate and record the ideas in the 'W' section of the grid. This grid can be referred to and/or added to throughout the theme, children can add to the 'L' section when they have learned anything new.

Place large sheets of paper around the room with one of the following headings on each:
- Clothing
- Living Room
- Car Interior
- Office

The children should contribute to the sheets of paper any items that they can think of, which are made of various types of textiles. For example, on the clothing page, the children may write trousers, tie or socks, and on the living room page they may write lampshade, curtains or sofa. Provide each group with a different coloured marker so that you can see which group has contributed which ideas. Each group should rotate around the room, taking turns to add their ideas to the pages. When each group has had an opportunity to contribute to all of the sheets, discuss the answers given.

Using the library, encyclopedias and suitable search engines, get the children to research textiles, perhaps still working in their groups, in order to create a textiles fact-file. They should present their findings to the rest of the class and evaluate one another’s work.

* see Active Learning and Teaching Methods for Key Stages 1&2

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**New Words and Phrases**

- textiles
- fact-file
- polyester
- linen
- cotton
- silk
- denim
- wool

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**CONNECTED LEARNING OPPORTUNITIES**

Use information gathered for the KWL* grid to discuss with the children how their learning could be extended to the other Areas of Learning.

**ASSESSMENT FOR LEARNING OPPORTUNITIES**

**Fist to Five!**
Get the children to demonstrate how much they feel they know about textiles. Five fingers indicates that the children are very confident, three fingers means partial success and a fist if they feel they have made little or no progress. The activity may be repeated throughout the theme as a means of self-assessment.
Activity 2
Sorting by Property

Suggested Learning Intentions
We are learning to:
• use different categories to group textiles;
• know where to look to find good sources of information;
• understand that working with others can help make a good idea even better;
• compare and contrast textiles; and
• decide why some textiles are used instead of others for a purpose.

Sorting and Properties
Arrange the class into groups. Distribute pictures of a variety of clothes from magazines, catalogues or from Resource A to each group. Tell the children that they are going to put the items into categories. They should sort through the items and find ways of creating groups by finding what ‘goes together’. When the groups have found ways of categorising, discuss as a class how the items were classified. For example, groups may sort by summer and winter clothes, natural and manufactured materials or by material used.

Assemble samples of a range of textiles for each group such as silk, cotton, nylon, wool and acrylic. Let the children feel and observe each fabric. Ask them to think of as many ways they could test each material to find out about its properties. Bring the groups together to discuss their ideas.

Explore how the items of clothing are made from fibres woven together. Each child could use a magnifying glass to view a school jumper to see this. If the jumper is slightly stretched it may be easier to view the stitching.

Ask one child to be a volunteer to have his/her photograph taken. Ensure that the child in the photo is wearing full school uniform. Print off copies of the photo for all of the children and get them to label what each item in the school uniform is made of. When the children have discovered the materials used, explain that some items are made of more than one type of fibre.

The Arts
Develop skills in weaving fabrics together.

ASSESSMENT FOR LEARNING OPPORTUNITIES
Formative Feedback
When using the ‘What are Clothes Made of?’ sheet in Resource A for the grouping and classifying task, give motivation to the pupils. Tell the children that the way they thought of doing the activity was very good, but challenge them to think of another way of doing this, reassuring them that you are confident they can do it.
As a homework activity, the children should look for items which are made from the following materials:

- polyester
- lycra
- linen
- nylon
- cotton
- velvet
- wool
- acrylic
- silk

If possible, ask the children to bring in one item of each material into school. Put all of the items into piles according to the material they are made from. Arrange the children into groups and give each group a textile. They should make observations of the items brought in and use books and suitable search engines to find out about the material’s properties, for example, if researching cotton, they may find out:

- that there may be small holes between the threads;
- it allows water to soak in;
- it may stretch a very small amount; and
- it may tear.

Each group should produce a short presentation about the properties of the material. Agree on success criteria for the presentations.

Discuss why we wear certain clothes at certain times of the year. The children could use the ‘Technology: Things We Wear’ website at www.bbc.co.uk/scotland/learning to find out more. Ask them to think of people who wear special clothes for their jobs. Using the ‘Why Is That Material Used?’ sheet in Resource B, the children find out more about the materials used for particular jobs and give reasons why these materials are used. Discuss with the class the reasons for their answers and explain that the reason why one material is chosen over another is because of its properties.

**Natural Materials**

Looking at all of the items the children have brought in, ask the children to work out which materials occur naturally and which do not? Give each group a natural material such as silk, wool, linen or cotton to research. The groups should agree on which information would make their research successful. Using appropriate websites and books, each group should produce a multimedia presentation about how a natural raw material is used to make items of clothing. When each group makes their presentation, they can evaluate each other’s work against the agreed success criteria and make suggestions for improvement.

**Raw Material to Product**

Give each child a copy of Resource C, ‘Raw Material to Product’. The children should work in groups or pairs to find the three cards that show the link from raw material to product for each textile. Discuss the correct answers as a class and ask the children if they can think of any other examples, such as hemp, which may be used to make sacks and rope.

**Word Fun**

Read the phrases “Have you cottoned on?” and “That’s a bit woolly” to the children. Ask the children whether they can figure out what the phrases mean. Research how nylon may have got its name. Some writers suggest that it was developed in New York and London and the initials and first letters combined to make the term ‘nylon’. Ask the children to see if they can find another word in ‘Spandex’, the generic name for Lycra. Explain what an anagram is. Spandex is an anagram of the word ‘expands’, which is one of the main properties of the textile!
Activity 3
Manufactured in Northern Ireland

Suggested Learning Intentions
We are learning to:
• pick out the information required for a task;
• use historic maps to locate mills; and
• organise and plan what needs to be done.

Where are They?
Challenge the children to find out if there is an industry in Northern Ireland that manufactures or has manufactured textiles, and which textiles they are. They should find out where the materials for the textile come from, and how they are manufactured. If the industry no longer exists, they should try to find out why it has ceased using Northern Ireland. Textile industries to consider are:
• linen, for example, Herdmans;
• cotton, for example, Fruit of the Loom;
• polyester, for example, Vita Cortex (NI) Ltd;
• Lycra, for example, Invista (Du Pont).

Alternatively, it may also be possible to find out about companies in Northern Ireland who distribute the materials to the textile industry. The children could write letters to a local textile company to find out more about the business and how they use materials to make a product.

In the Past
The children should research where textile factories (or mills) were located in the past. Using NI Maps which is available through LearningNI or at www.nimaps.co.uk, find out where mills were located (using the historic maps). Many mills for linen were situated beside a river as water was needed in the manufacture of linen. Herdman’s mill in Sion Mills is a good example of this, but mills were located throughout Northern Ireland. Modern mills that use man made materials may require a supply of oil and may be located near an oil depot. On a local map, get the children to work in groups to make a decision about where they would build a mill. They should take factors such as access to good transport routes into consideration.

CONNECTED LEARNING OPPORTUNITIES
The World Around Us
Learn how features and materials in the area impacted on settlements there. Find out how developments, such as industry, impacted on people and places.

Using ICT
Research where materials for textiles originate. Find out about how products are manufactured using textiles.

ASSESSMENT FOR LEARNING OPPORTUNITIES
Traffic Lights!
Children can show how confident they are about the task by using traffic lights – red means they’re stuck, amber means they have a few problems and green means they’re confident. At the end of a task, this method can be used to review how successfully they feel they met the objectives of the activity.
Production and Recycling of Textiles

Get the children to research a method of textile processing. Give each group a word from the following list: weaving, knitting, crocheting, braiding, lacing or felting.

Each group should compile a short fact file using five sentences to explain the process involved.

The groups could also investigate if it is possible to recycle textiles, and if so, how. Use appropriate Internet sites and books to research how textiles are processed to be reused or recycled.

Ask them to come up with as many ways as possible to recycle and reuse clothes, for example:

- charity shop;
- recycling;
- dress hire shops;
- patchwork quilts (examples may be seen at the Ulster Folk and Transport Museum); and/or
- patching and mending old worn clothes.

In their groups, ask the children to create an advertisement that encourages children to recycle or reuse their old clothes. The advertisement can either be a poster, or the children can use audio or video editing software to produce radio or TV advertisement.
Activity 4
A Passion for Fashion

Suggested Learning Intentions
We are learning to:
• try out different designs, plans and ways of doing things;
• explain clearly the reasons behind our decisions;
• combine textiles according to properties to create a garment;
• identify how industry overcomes problems combining textiles; and
• use persuasive writing to advertise an item of clothing.

Good to Use?
Ask the class to think about the different uses of textiles they learned about in Activity 1. Explain to the children that a textile is only very useful when it is used in a way that exploits its properties. Ask the class to imagine that they could only use one textile for all items of clothing or furnishing. Each group should choose a type of textile and explain the advantages and the disadvantages of only being able to use or wear that textile. Encourage them to talk about how the textile would feel—some may be smooth to touch, while others may be rough and itchy. Would textiles that feel nice to wear be durable enough to be used on chairs and sofas?

Give the children a list of uses of textiles, such as, to use as carpet, to sleep on or under or to wear on your feet on a cold, wet day. The children should consider and decide upon the most suitable textile for that use. Ask them to consider the following when making their decision:
• durability;
• whether the textile allows water in;
• smoothness;
• rigidity;
• how much the textile may stretch; and
• how easily can you wash the textile.

Catwalk Designer!
Discuss the work of designers. Arrange the children to work in pairs to design and create a garment that has five different properties, being as creative as possible. The design should be annotated to highlight the special features within it. The children could make the garment using scrap materials and assemble them together. As a class, discuss the problems experienced in assembling the garment using fabrics, for example, when trying to create a waterproof garment, the stitching needs to be waterproof as well. Ask the class to consider if it is possible to overcome these problems in the classroom.

In groups, the children should research how textile technologists combine different yarns to make a garment and achieve the properties from the fabric that has been created, for example, the addition of Lycra to other yarns to make clothing stretch. Present the information in a podcast or ICT presentation and ask the groups to comment on what they thought was good and could be improved in each group’s work.

ASSESSMENT FOR LEARNING OPPORTUNITIES
Plus-Minus-Interesting (PMI)*
Use a Plus-Minus-Interesting grid after the discussion about how to improve clothes. It will allow the pupils to consider ways of making improvements that they had not already considered.
Favourite Clothes

Give each group a selection of pictures or brochures showing different types of clothes. Ask the children to think of clothes that they do and do not enjoy wearing and write these on ‘post-it’ notes. Divide a chalkboard or whiteboard in two – one side for clothes that the children enjoy wearing and the other for those they do not. The children place their post-it notes on the board. Are there times when they prefer certain clothes to others? Discuss the items that were not as popular, how would the children improve these clothes to make them more popular.

In industry, yarns are often combined to try to achieve two properties that are required in a textile. For instance, Lycra is often added to clothing to allow it to stretch yet go back to its original shape. Sometimes clothes may be layered, such as some rain coats. One layer on the outside might be waterproof and the layer that touches the skin may need to be comfortable.

Persuasion

Show the children some pictures of clothes from the past that were once popular but are now less popular. These could include:
- leg warmers;
- pinafores;
- flat caps;
- hooped skirts;
- bandanas; or
- bonnets.

Ask the class to create a survey about what items of clothing they do not like wearing from current trends. From an agreed list, get each child to vote for one favourite and one least favourite item and use ICT to create graphs displaying the results. They should choose a suitable format to present the results, such as a bar graph. Look at the results to work out which three items were the most unpopular.

Ask the children to consider how they might persuade others to wear unpopular items of clothing. Show the groups samples of advertisements from magazines and discuss the language and images used. Look at how some words may be written in larger text than others in order to grab attention. Discuss how items of clothing are photographed in order to show the garment in the best way possible.

Think about where the photograph is taken (is it in an exotic location or in a studio). Consider the colour of the garment photographed as this may draw the reader’s attention to it. Refer back to the unpopular items of clothing discussed earlier. Ask the groups to consider positive reasons why people should wear these clothes and using ICT, they should create an advert that would take up a full page in a magazine. Challenge them to use language and images in the advertisement that will really persuade the reader.

The children may suggest ways to improve the textile of their garment to make it more popular, for example, changing the colour of the item, or combining two yarns together to change the properties of the material.
Testing Textiles

Investigating the properties of a variety of textiles.

Conducting experiments to investigate some properties of textiles.

Designing a fair test.

Researching real life situations where a textile is chosen for a particular property.

Comparing and contrasting textiles for suitability for a product.

Considering how textiles may be combined to make clothing.

Creating advertisements for a new product.
Explain to the children that they will be carrying out experiments to investigate materials to find out about their properties. Give each child a copy of Resource D, ‘What Can a Property Do?’. They must cut out the cards and match the definition to the terms. There may be some terms that they have not seen before so, if appropriate, allow them to use dictionaries or suitable search engines to help them match the pairs. The activities in this section will explore many of the terms in greater detail.

Ask the children to work in groups and give each group a copy of the Situation Cards in Resource E. Ask the children to discuss the properties required for the textile needed in each situation. They should make a list of their decisions along with their reasons, and whether they can think of a textile that has the properties that they need.

It may be useful to do this activity again at the end of the theme to allow the children to use the knowledge gained in the rest of this section.

**Suggested Learning Intentions**

We are learning to:
- know where to look for good sources of information;
- weigh up pros and cons to choose the best solution; and
- work with others to come to a decision about the most suitable material.

**CONNECTED LEARNING OPPORTUNITIES**

**Language and Literacy**
Research meanings of technical words.

**ASSESSMENT FOR LEARNING OPPORTUNITIES**

**Fist to Five!**
Ask the children if they can remember how confident they felt when they started the theme of textiles. Ask them to show what rating they gave their confidence at the start of the theme. When you call out ‘change’, the children must show how much they understand now. The children should see how well their knowledge and understanding has grown.

* see Active Learning and Teaching Methods for Key Stages 1&2
Activity 6
Heat Insulation and Conduction

Suggested Learning Intentions
We are learning to:
• understand how materials can be used to keep in heat;
• identify textiles that help keep heat in;
• plan and carry out an investigation; and
• know how to conduct experiments that are fair.

What is Insulation?
Ask the children to describe what they think the word ‘insulation’ means. Explain that it means to ‘protect something so that it prevents the passage of heat’.

Tell the children that they are going to complete investigations to explore how good a material is at insulating. Discuss the idea of insulation and heat loss with the children and choose three statements that they think may be facts about insulation or how heat is lost, for example:
• The heat escapes into the air.
• A thick material will keep the heat in more than a thin material.
• It doesn’t matter which material is used as long as it is wrapped around the warm object.

The children may not agree with all of the statements, but explain to them that they are going to carry out an investigation to prove if the statements are true.

Make a Plan
Ask the children to consider how they could plan for and carry out an investigation into proving the statements on insulation and heat loss. In small groups, ask the children to discuss what they would need to do. When they have had the opportunity to do this, discuss everyone’s plans together and draw up a class plan for the investigation.

Discuss with the children what a fair test is. Ask the children for their ideas of what should be kept the same in the experiment in order to test different materials fairly for their insulation properties.

Alternatively, the class could follow the instructions in the investigation below.

Investigate!
Put the children into groups of four. Each group will need the following equipment:
• Four cups (all of which should be of the same material, for example metal or ceramic or polystyrene and the same size)
• Samples of textiles – cut to same size
• Thermometers

Each group should choose three types of material that they would like to investigate. They should wrap their materials around three of the cups and leave one cup unwrapped. This is the ‘control’ cup.

CONNECTED LEARNING OPPORTUNITIES
Mathematics and Numeracy
Create temperature graphs.

Using ICT
Use a spreadsheet to record temperature data.

Language and Literacy
Write poems on keeping warm and being cold.

ASSESSMENT FOR LEARNING OPPORTUNITIES
Rich Questioning
By sharing some examples of wrong answers or misconceptions, pupils gain an understanding of what they think. You could use a puppet to give the wrong answer and then ask the pupils to explain why they are incorrect.
Explain to the children that this means this is the cup that has no other factors affecting it, they can then compare the results of the others with it. When the children are wrapping their material around the cup, they should try to make sure that the material does not overlap when being wrapped round the cup, as this would keep the cup warmer and affect the results.

Under supervision, get the children to pour a measured amount of warm water into each cup. Ensure that each cup is given the same amount of water. Place a thermometer into each cup and record the results using a spreadsheet or on the grid in Resource F. Looking after one cup each, the children should then measure the temperature of the water in each cup every minute for fifteen minutes and record this on their table.

Results
At the end of the fifteen minutes, get the children to note which of the cups has the warmest temperature, which is next and so on down to the cup with the lowest temperature. Discuss the results with the class:

- What material was around the cup with the highest temperature in each group?
- What material was around the cup with the lowest temperature in each group?
- What would happen to the temperature in all the cups if the material made no difference to the insulation?
- Do they think a high temperature showed that the material had good insulation? Why?

To test if the thickness of material makes a difference, use two cups with warm water and a thermometer. One cup should be wrapped once with a piece of textile, whilst another is wrapped five times. Repeat the experiment measuring the temperature every minute for fifteen minutes.
Activity 7
Waterproof and Absorbent

Suggested Learning Intentions
We are learning to:
• present information in a variety of ways (using ICT and graphs);
• recognise some places where waterproof and absorbent textiles are used and why they are suitable in those situations; and
• record an event in the classroom in order to play it back to check what happened.

Remind the children of what a fair test involves and of the things that were kept the same in the heat insulation experiment, for example, amount of water, size of cup and type of cup. Ask what factors stayed the same.

Ask the children to consider textiles they think may be waterproof or absorbent. Discuss how a textile is sometimes used because it has absorbency, while at other times a textile is chosen for use because it may be waterproof. For example, a damp proof course is a waterproof material that is placed close to the foundations of a house to stop water rising up the walls, tissue paper is created to mop up spills, so needs to be absorbent.

Ask the children for ideas how they might test textiles to see if they have waterproof or absorbent properties. Two experiments to test this are outlined below.

Experiment 1
The children will need:
• tray
• water
• scraps of various fabrics
• ruler

1. Cut each textile into a thin strip of about 3cm wide and 15cm long.
2. Tape one of the short ends of each piece of fabric onto a ruler so that the ruler can be held horizontal and the fabric strip will hang vertically. The other pieces of fabric should be placed side by side along the ruler.
3. Fill the tray with water. Lift the ruler with fabrics attached above the tank and lower it so that about 1cm of each piece of fabric is in the water.
4. Keep the ruler steady at this height and observe the pieces of material. It may be useful to record the experiment using a digital still or video camera.
5. Hold the ruler with the pieces of textiles in the water for ten minutes.
6. Observe the materials and measure the amount of water that has risen up the material.
7. Ask the children if they think a long length of damp fabric shows that the material is waterproof or absorbent. If water is absorbed by the fabric it will rise up the fabric. Waterproof materials should not show water being absorbed by the fabric and the fabric should be dry when taken out of the water.

CONNECTED LEARNING OPPORTUNITIES
Using ICT
Use a video camera to record an experiment and explain the results.

Mathematics and Numeracy
Investigate measurement – volume and capacity.

Language and Literacy
Write a report on how to conduct a scientific investigation.

ASSESSMENT FOR LEARNING OPPORTUNITIES
Self-Evaluation
Encourage pupils to think about what they learned. The children could use prompts at the end of a lesson such as: “What I have learned that is new is...” “What surprised me was...”
Ask the children to get into groups and list different situations where we need materials to be waterproof and another list of situations where we need materials to be absorbent.

**Experiment 2**

The children will need:
- pots
- elastic bands
- samples of textiles (each the same size)
- water
- teaspoons

1. Ensuring that there is a flat surface on the top of the pot, each group should stretch a textile sample over each pot.
2. The material can be held in place by wrapping an elastic band around the side of the pot. It may be necessary to wrap the elastic band a few times in order to make sure it is tight and the fabric is securely in place.
3. When all the pots are covered with a textile, each member of the group should place a couple of teaspoons of water on each sample at the same time.
4. Observe if the water stays on the fabric or goes through it. They could record the experiment using a digital still or video camera.
5. Discuss with the children if they think a textile where the water went through the fabric is waterproof or absorbent.
6. By using a video camera to record the experiment, it may be possible to play back frame by frame the experiment to find out which textiles were most absorbent.
7. Consider and agree how to record and display the results of the experiment.

Textiles that are absorbent will soak up water. This may be seen by some of the fabric getting darker. Ask the children for examples of when they have seen this before, for example, what happens to their clothes when they have a water fight. Waterproof materials should still have globules of water sitting on the fabric, and the textile may show no change of colour. Ask the children for examples of when they have seen this.
Activity 8
Transparent, Translucent and Opaque

Suggested Learning Intentions
We are learning to:
• recognise situations where translucent and opaque materials are used;
• design an experiment to find out if textiles are translucent or opaque; and
• design and carry out a fair test.

Introduce the terms ‘transparent’, ‘translucent’ and ‘opaque’ to the children. Explain the meanings of the words to them:
• Transparent – something that is clear and allows light to pass through.
• Translucent – something that will block most of the light, but not all.
• Opaque – something that will not let any light through.

Ask the children to make a list of items that they think fall into these three categories. When they have done this, give the children a list of items and ask the children to decide whether this item should have the property of being transparent, translucent or opaque, for example, a window blind, a windscreen on a car or a bottle.

Show the children samples of textiles that have been used in previous activities. Ask the children to suggest ways in which the different textiles could be investigated to find out if they are transparent, translucent or opaque.

Encourage the children to think about how they can make their experiment a fair test. In a fair test, one thing changes, but the thing that is being tested, and everything else stays the same. This ensures that it is a fair test. Discuss with the class how they will change the fabric in the experiment through which the light is attempting to travel, so that they can get results and compare the fabrics. Discuss inconsistencies in the experiment that may occur, such as one fabric being thinner than the other and how this might affect the results.

One simple experiment that the children could conduct may include holding the materials up to a window in a dark room, or shining a torch against the material and looking at the other side. The children should not be too close to the light nor stare directly into it. Using the range of textiles from previous activities, predict and investigate which ones allow the most light through. It may be possible to borrow a light meter from a local photographer to measure the differences in the amount of light each material allows through. A light meter would allow numerical data to be compiled and thus the children could record the data on a spreadsheet to compare the fabrics.

CONNECTED LEARNING OPPORTUNITIES
The World Around Us
Research the light during night and day.

Mathematics and Numeracy
Investigate data handling by recording results of an experiment.

Language and Literacy
Write a report on the outcomes of an investigation.

ASSESSMENT FOR LEARNING OPPORTUNITIES
Deepen Participation
Give pupils time to think by asking them not to raise their hands when a question is posed. Pupils could make a note of their ideas while waiting for the opportunity to share their ideas. This extends participation in questioning.
Activity 9
Stains

Suggested Learning Intentions
We are learning to:
• design and carry out a fair test;
• investigate how clothes are cared for; and
• come to conclusions about the outcomes of experiments.

Explain to the class that when manufacturing materials, it is important to consider how to remove dirty marks and stains from the fabric. Arrange the class into groups and ask them to think of ways they get their clothes dirty. Ask the children what their parents/carers do to get the dirt out of their clothes. Sometimes the marks do not come out of a textile, and these are called stains. Make a list together on a flipchart page of things that stain. Use the Dot Voting* technique to find out the ways in which the children most stain their clothes.

How Can We Get Rid of Stains?
Split the class into groups to research ways that clothes can be cleaned. Pose the problem that not all clothes can be placed in a washing machine. Ask the groups to try to find out which materials have to be dry-cleaned. Ask the class what might happen to these fabrics if they were placed in a washing machine.

Get the children to find out about different types of laundry detergents. These may include washing powders, liquid detergent or tablets. Talk to the children about the different types of washing powder that exist: biological and non-biological.

Explain that in biological powder, enzymes ‘eat’ the dirt.

Using strips of various fabrics with the same stain on, get the children to carry out an experiment to find out which type of detergent is the best at getting the stain out. Alternatively, use a set of handkerchiefs and soil them with various stains, for example, mud, coffee, ketchup, juice or felt tip pen. Wash them in a low temperature wash and bring them back into school to show how effective the washing product has been in removing stains. Be aware that some children may suffer from skin irritation due to some detergents so it is advisable to get children to wear gloves when handling detergents and seek parental permission.

-connected learning opportunities
The World Around Us
Find out about locations of dry cleaners in the locality.
Mathematics and Numeracy
Investigate temperature.
Language and Literacy
Write a report about scientific investigation.

- see Active Learning and Teaching Methods for Key Stages 1&2

assessment for learning opportunities
Share With a Partner
Children share with a partner three things they have learned about the textiles investigated and how they can be used. They also share something they would like to learn in the future.
Fabric Care Labels
Ask the class if they know how the manufacturer of an item of clothing can tell consumers how to clean their clothes. Look at the washing care labels and research why some clothes need to be washed at higher temperatures than others. Ask the children to think what information they might put onto a clothes label. They have explored some of the properties of clothes and these may be used as part of the label, for example, absorbent, reflective, opaque. Make symbols or art work for each property mentioned, using ICT if appropriate.

Colours
Ask the class to come up with reasons why tough stains can be removed by washing with detergent, but dyes are able to stay on clothes? Explain how usually something (for example, salt) is added to a dye to ‘fix’ it and prevent it from washing out. Consider also how designs may be attached to clothes. Tie-dying is one way of getting colour in a pattern on a textile, while screen printing is another way.

Arrange the class into groups to research a colour and how it might be recreated using natural products. Use the natural dyes to dye a handkerchief, making sure a fix is used to secure the dye. Give each group a natural dye-maker such as an onion, grass, blackberries, carrot or beetroot. Get the groups to chop up their item and mix it for ten minutes with a little warm water in a basin. They should then add a plain coloured fabric, white if possible, into the basin and leave it overnight.
Ask a child in the class to gently pull their jumper to see if it stretches. Try the same with a pair of trousers. Ask the class if they think the amount of stretch was the same. Explain that any difference is due to the fibres and how the yarn was woven and treated. Can the children think of an experiment that will allow pieces of material to be tested for stretchiness. Discuss their ideas on what needs to be considered to make a fair test.

Two things may be investigated when exploring the stretch of materials:

- the amount of stretch in the material when forces are applied; and
- whether the fabric returns to its original size when the stretching has finished.

Ask the class if they can think of items of clothing that need to stretch to be put on, for example, socks or the neck of a T-shirt.

Test it Out

One way of investigating the stretch in materials is by getting the children to gather samples of various textiles, making sure they are the same size as each other. Next they should note the measurement of the textile before the investigation. A set of weights that can be hung from the bottom of the piece of fabric using a weight holder.

Ensure that the same weight is applied to the bottom of each fabric. Measure the textile length with the weights attached and record. Measure the textile again when the weights are removed. A spreadsheet could be used to record the size of fabric before, during and after the weights were attached. Ask the children if a longer or shorter length when the weights were attached shows that the textile was stretchy. Ask the children how they will know from their results if a fabric did not return to its original size, and how they would find out if the textile was stretched too much.

Shrinkage

When washing fabrics, some have to be washed carefully to avoid shrinking. Discuss with the class how a fair test might be created to investigate which materials suffer from shrinkage the most. One way is to use pieces of fabric the same size as each other and measure them before placing them into a washing machine. Put them in at a high temperature wash. When the textiles are dry, bring them into school and measure the fabrics. Discuss with the class how they might report the results of the investigation. Investigate how textile technologists try to prevent a fabric from shrinking much.

CONNECTED LEARNING OPPORTUNITIES

Mathematics and Numeracy
Investigate data handling by creating suitable graphs.

Using ICT
Use spreadsheets.

The World Around Us
Explore the history of weaving and mass production of clothes.

ASSESSMENT FOR LEARNING OPPORTUNITIES

3-2-1
Ask the children to work in pairs to discuss:

- 3 things they have learned;
- 2 questions they want to ask; and
- 1 thing they already knew from the activity.
Activity 11
Safety Fabrics

Suggested Learning Intentions
We are learning to:
• work in a group to find out about people who wear high visibility clothing;
• identify how clothing might incorporate high visibility textiles;
• consider the dangers of fire;
• find some situations in which fire retardant textiles are used; and
• know where to look for good sources of information.

High Visibility
Use a suitable search engine to show the children a picture of a worker wearing a high visibility vest. Ask the children to work in groups to list as many jobs that they know of where people use these vests or coats. Are there any similarities between the jobs? Discuss with the class the reasons why some people need to wear this type of clothing to work.

Ask the children for other examples of high visibility clothing. Do they have any clothes with reflective strips? You could test this out by darkening the room and looking at children's trainers and jackets. The reflective strips found in the high visibility clothing are called retroreflective. Organise the class in groups to research when people might wear high visibility and retroreflective strips in their clothing when not at work. Ask the class for ideas where they might see retroreflective material used on vehicles, for example, car and lorry number plates, police cars, ambulances.

If appropriate, discuss why car seats are made from fire retardant fabrics and ask the class to research why this is the case. Can they find other places where flame retardant fabrics are used? There are likely to be some fire retardant textiles used around the school, for example, curtains and carpets.

Explore the Safety Team section of the Northern Ireland Fire Service website to find out about ways that fabrics in the house may be set alight. Watch the Christmas 06 tv ad at http://firekills.direct.gov.uk/index.html. Ask the children what might have caused the fire. Ask them to think of a way that a fire might accidentally start in the living room of a house. Explain that because of fires starting in the home, materials are often now designed to slow the speed at which they ignite to try and allow people a greater chance of getting out before there are too many flames.

Ask the children to look in their living room for fabrics that might burn, for example curtains, carpets or a sofa.

Get the children to create a fire safety poster which illustrates some fire-prevention practices, such as not leaving candles unattended.

CONNECTED LEARNING OPPORTUNITIES
The Arts
Create a dramatisation showing what might happen if a worker did not wear a high visibility vest.

ASSESSMENT FOR LEARNING OPPORTUNITIES
Raise the Quality of Questions
To probe the understanding of the pupils, ask open questions. When asking children about the people who wear high visibility vests, consider questions that ask "What more can you tell me about the job that requires them to wear it?"
Activity 12
Using Textiles

Suggested Learning Intentions

We are learning to:
• consider the properties of different textiles;
• find out the best way of making a product by trying out different designs, plans and ways of doing things;
• select materials according to their properties;
• use advertising to promote a product; and
• discuss with others how to improve work.

Property Cards

Show the class the ‘Chloe Cotton’ card in Resource G. Explain to the children that the card is like a Top Trumps card, which shows the value of the various properties of cotton. Working in groups, get the children to decide what the ‘star rating’ should be for each of the properties listed for cotton, based on what they have learned about cotton during the theme. They should draw in the number of stars for each property.

In small groups, get the children to choose two more textiles and think of a name of a character to represent each. They should create two more ‘Top Trumps’ cards for these textiles, including properties and ratings for each. Review the work conducted during the investigations of the properties of the various materials to remind the children of the properties.

Evaluate each group’s efforts in a plenary session and ask the children if they agree with the ratings given by each group for each property of a textile.

Packaging!

Arrange the class into groups of four. Tell the groups they are going to design packaging for a product. The package will be used to store a piece of technology, for example an mp3 player, mobile phone or CD. Ask the groups to discuss and choose the product their packaging will be designed for. The groups could research what packaging is currently available for these purposes and what they are made from. They may need to consider whether the packaging needs to be waterproof or uses soft fabrics to prevent scratches on the product stored within. Encourage children to use all they have learned during the unit when choosing their textile. They should also consider:
• the colour and design of the packaging;
• how the pieces of fabric are joined together; and
• how to advertise the product.

ASSESSMENT FOR LEARNING OPPORTUNITIES

Pupil Reflection
Develop pupils’ ability to look back at their work critically and constructively. Allow pupils to create a WILF (What I’m Looking For) sheet where they can mark themselves on meeting set criteria for making a product to hold an item of technology.

CONNECTED LEARNING OPPORTUNITIES

The Arts
Design packaging.

Language and Literacy
Create advertisements for a product.

Using ICT
Film an advertisement for a product.

Mathematics and Numeracy
Calculate the cost of materials and an appropriate price for a product. Discuss profit and loss. Measure materials to fit product.
**Resource A**

**What Are Clothes Made Of?**

<table>
<thead>
<tr>
<th>Clothing Item</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-shirt</td>
<td>cotton</td>
</tr>
<tr>
<td>dress</td>
<td>silk</td>
</tr>
<tr>
<td>jeans</td>
<td>wool</td>
</tr>
<tr>
<td>silk tie</td>
<td></td>
</tr>
<tr>
<td>wool jumper</td>
<td></td>
</tr>
<tr>
<td>wool coat</td>
<td></td>
</tr>
<tr>
<td>raincoat</td>
<td>polyester</td>
</tr>
<tr>
<td>fleece</td>
<td></td>
</tr>
</tbody>
</table>
## Resource B

### Why Is That Material Used?

<table>
<thead>
<tr>
<th>Clothing</th>
<th>Textile(s) Used</th>
<th>Reasons For Its Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firefighters Clothes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wetsuit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wellington Boots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer Jacket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-Shirt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw Material</td>
<td>Product</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>cotton plant</td>
<td>linen</td>
<td>swimming suit</td>
</tr>
<tr>
<td>sheep</td>
<td>cotton bud</td>
<td>dress</td>
</tr>
<tr>
<td>oil</td>
<td>silk thread</td>
<td>t-shirt</td>
</tr>
<tr>
<td>silk worm</td>
<td>plastic</td>
<td>jacket</td>
</tr>
<tr>
<td>flax plant</td>
<td>wool</td>
<td>jumper</td>
</tr>
<tr>
<td>Property</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Absorbent</td>
<td>Does not allow light to pass through.</td>
<td></td>
</tr>
<tr>
<td>Waterproof</td>
<td>Allows heat to pass through a material easily.</td>
<td></td>
</tr>
<tr>
<td>Heat insulator (thermal insulator)</td>
<td>Glows in the dark.</td>
<td></td>
</tr>
<tr>
<td>Heat conductor (thermal conductor)</td>
<td>Reflects light back with a small scattering of light.</td>
<td></td>
</tr>
<tr>
<td>Luminous</td>
<td>Does not allow liquid to pass through and will not soak it up.</td>
<td></td>
</tr>
<tr>
<td>Translucent</td>
<td>Burns easily.</td>
<td></td>
</tr>
<tr>
<td>Opaque</td>
<td>Reduces the transfer of heat through a material.</td>
<td></td>
</tr>
<tr>
<td>Flame retardant</td>
<td>Allows some light through but cannot be seen through easily.</td>
<td></td>
</tr>
<tr>
<td>Combustible</td>
<td>Inhibits the spread of fire.</td>
<td></td>
</tr>
<tr>
<td>Retroreflective</td>
<td>Able to soak up a liquid.</td>
<td></td>
</tr>
</tbody>
</table>
Resource E
Situation Cards

Situation 1
Mike has ripped his coat. Think about the properties that may be required for a coat and select suitable materials that may be used to manufacture a new coat for him.

Situation 2
Kieran is a paramedic who works in an ambulance. Think about the properties needed for an outfit for him and select suitable materials to manufacture his uniform.

Situation 3
Henry works on a lifeboat rescuing people. Think about the properties he might need in his clothing to work on a boat at sea. Select suitable materials to manufacture his uniform.

Situation 4
Patrick needs curtains for his bedroom. He wants to make sure that light does not get through. Think about other properties the curtains may need and select suitable materials for the curtains.
## My Insulation Investigation Results

<table>
<thead>
<tr>
<th>Temperature of Water (°C)</th>
<th>Number of Minutes</th>
<th>Cotton</th>
<th>Silk</th>
<th>Nylon</th>
<th>Wool</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
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<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Resource G
Top Trumps

Chloe Cotton

Absorbent
Stretches
Waterproof
Heat Insulator
Suggested Additional Resources

Useful Resources

Television Programmes

See You, See Me
Design : Designing Your Clothes

Around Scotland
Technology : Things We Wear

Around Scotland
Design IT : Designing for Feet

The programmes below were produced by the BBC and can be ordered through the Southern Education and Library Board A/V catalogue (catalogue codes given below).

Primary Focus
TK 1161 Textile Industry
TK 1216 Linen

The Experimenter
TK 0540 New shorts

Science Zone
TH 0370 Peak Performance

Useful Websites

Skillfast-uk
http://www.skillfast-uk.org/
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