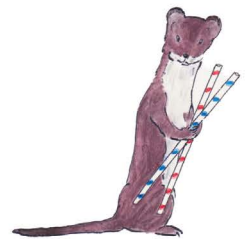
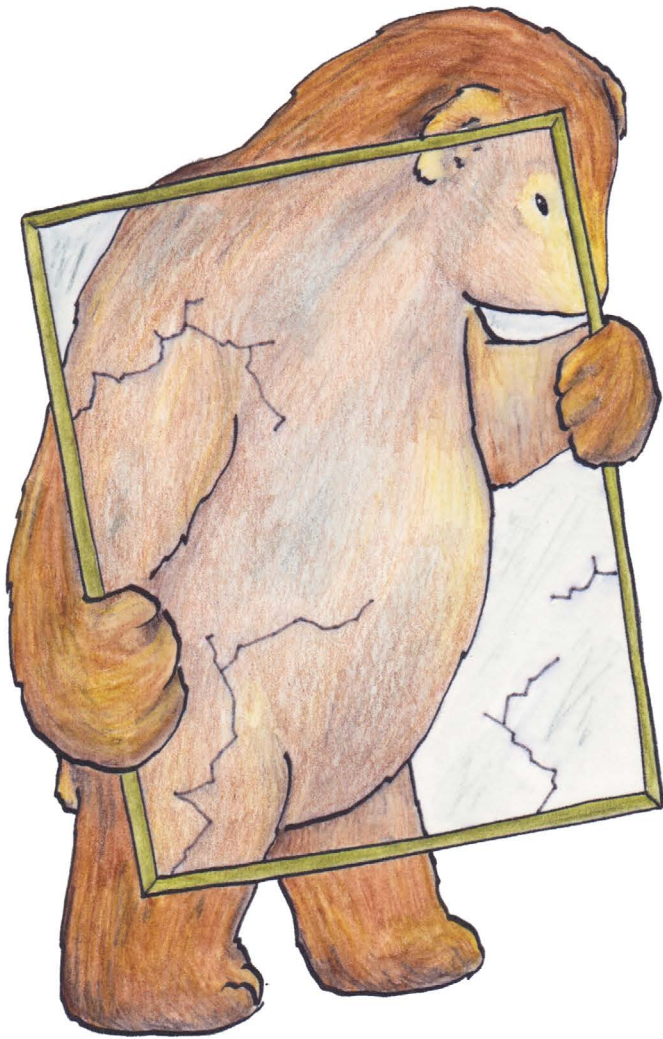


It might come in useful



Resource Pack

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Teacher notes

This book is written to support science teaching and learning at KS1. The story in the book is linked to specific learning outcomes from the National Curriculum for England and Wales but can, of course, be used with any science curriculum. The story has no satisfactory ending. The children are expected to use their science knowledge to solve the dilemma in which the characters find themselves.

Lesson Support

The story can be used to support some/all lessons in the unit. The children will find investigations more relevant and interesting if they are doing the research in order to help a character out. Four practical lesson ideas are available, with appropriate worksheets. No expensive or difficult-to-find resources are used for the practical lessons. The lesson plans cover learning the names and uses of everyday materials and the properties: flexibility and absorbency.

There are other investigations which the children could also carry out such as measuring the elasticity or structural strength of the materials. They could also learn about how some materials are manufactured.

The children may enjoy looking for Bear's friend Weasel who appears in the illustrations but is not mentioned in the text. Perhaps the children could write their own story featuring Weasel?

Topic Starter Activity

You may prefer to use this book as a starter activity to gauge children's knowledge before the topic gets underway. Read them the story and collect ideas for solutions to the problem. This way you will be able to see how much children know already and whether there are any misconceptions which need to be addressed.

Topic Assessment

The story can be used for assessment. At the end of the topic, read the story and use the assessment activity to find out how much the children have learnt and understood about the topic. Assessment can be done individually or collaboratively, either with a selection of objects from the story, or using picture cards.

Beyond Science

The books can be used beyond the science curriculum.

This story could stimulate a discussion about:

- Recycling: the children could learn how to recycle, rather than throw away, materials that are damaged or items that are no longer useful. Children and young people are often much better at recycling than older people – so the children could design a poster or information leaflet to encourage recycling.
- Innovation/inventiveness: Bear is innovative with his junk re-use. Use D&T lessons to make useful items from junk: e.g. pen pots from cardboard tubes, flower pots from plastic yoghurt pots or patchwork cushions from outgrown clothes.
- Make do & Mend: Link recycling and re-use to history and discuss how people made use of what was available during World War II.
- Helping others: Bear kindly helps Dormouse when her window breaks; discuss how the children could help their friends and family.

Lesson 1. What is it made from?

Enquiry type: Identifying & classifying

Each group will need:

A selection of materials (wood, plastic, card, glass, metal, rock, fabric), labels for each type of material, sorting hoops or trays, a selection of toys made from different materials for example: a soft toy, plastic Lego brick, wooden block, metal car.

If possible, try to get hold of a sample of each material rather than using an item made from the material (i.e. a lump of metal rather than a metal spoon).

Label each hoop or tray with a material name. Ask the children to sort the materials into the correct hoop or tray. If possible, have several different examples of each material to challenge children. Encourage children to explain how they know which material is which – are they guessing or are they using properties such as texture and colour?

Do a materials survey of the classroom or school. The children can all survey the whole room or you could split the class into groups with each group looking for just one particular material. Discuss the results of the survey. The children should notice some patterns; glass is always in windows and metals are often used as structural materials for table legs or shelving units. Encourage the children to explain why each material is used for each role.

Show the children the toys and ask which material is used to make them. How do the children know? Again, encourage the children to explain what criteria they use for working out what is metal, what is plastic and so on – this leads into Lesson 2.

The worksheet encourages children to identify some common objects and to decide what material they are (usually) made from.

Resources available: Worksheets (2 levels), slide introducing problem.

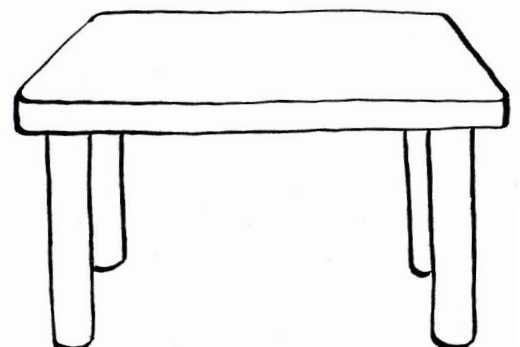
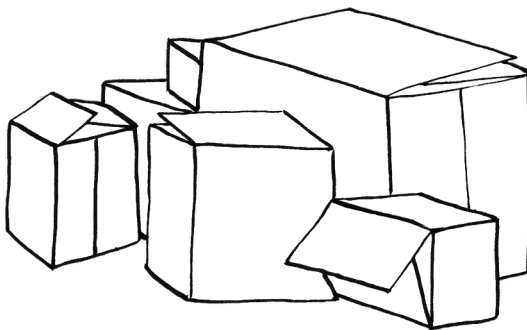
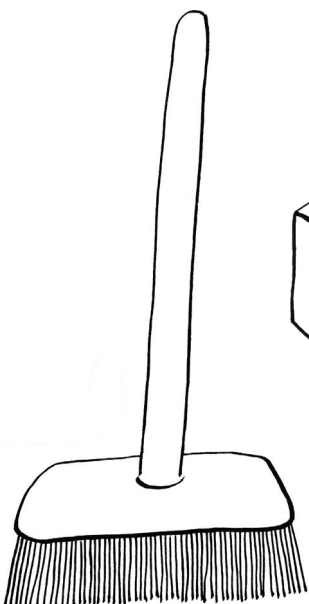
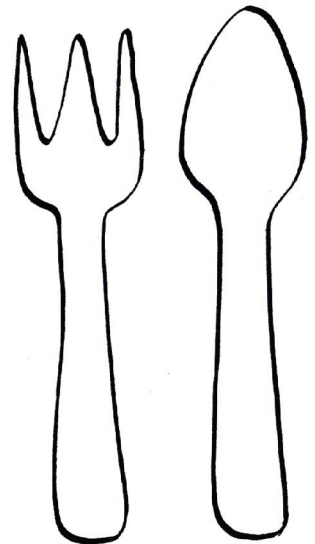
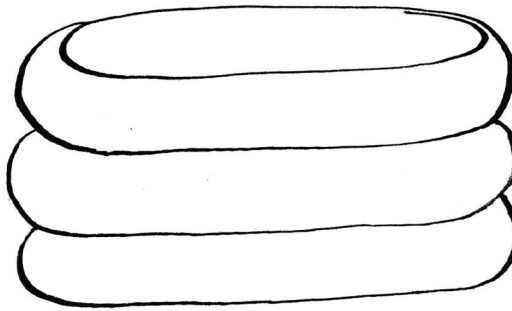
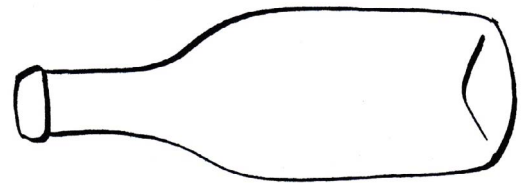
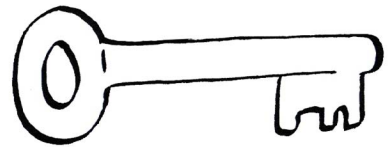
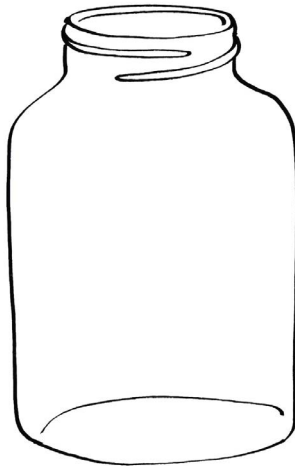
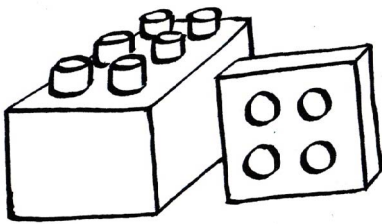
What is it made from? – worksheet 1

I can identify and name some everyday materials.

I can give examples of objects made from these materials.

Help Bear to sort his collection.

Decide what material each object is made from and then write the name of the material underneath the object.



What is it made from? – worksheet 2

I can identify and name some everyday materials.

I can give examples of objects made from these materials.

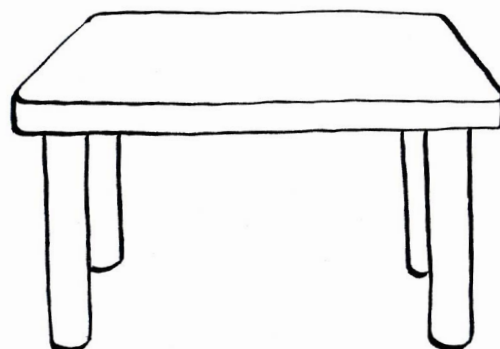
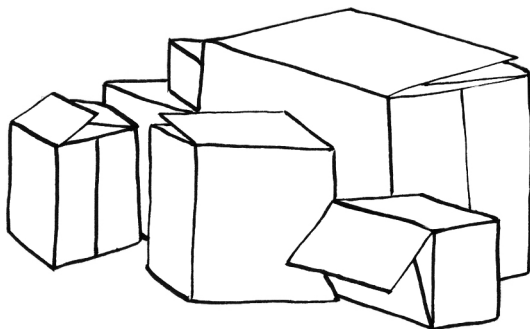
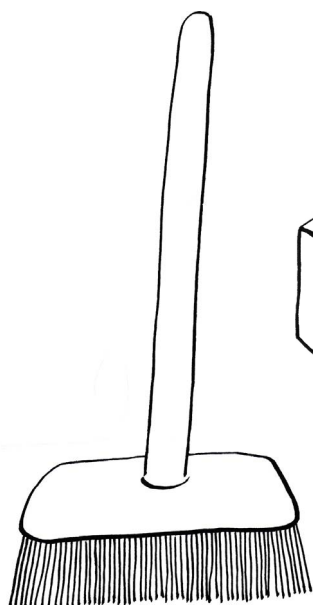
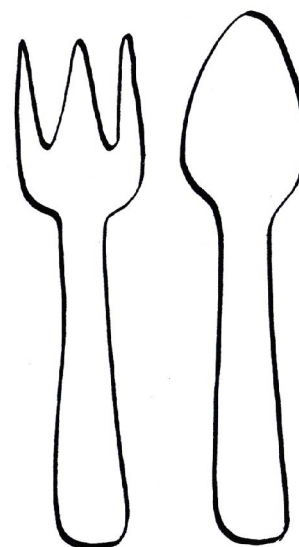
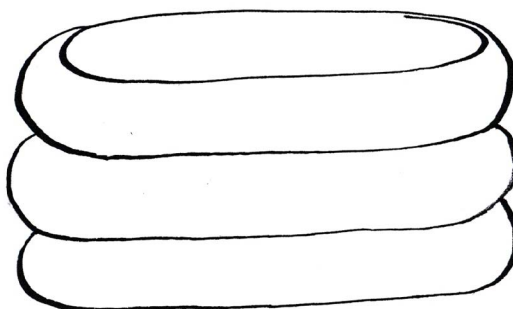
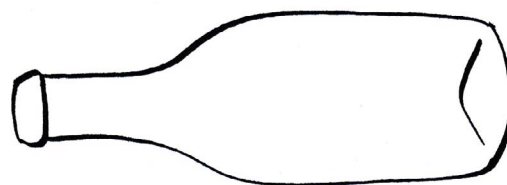
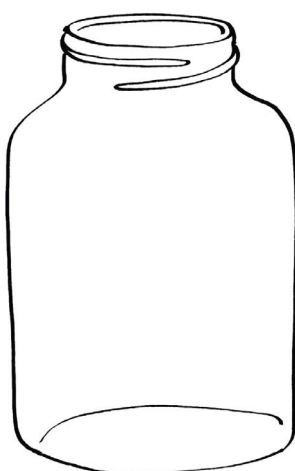
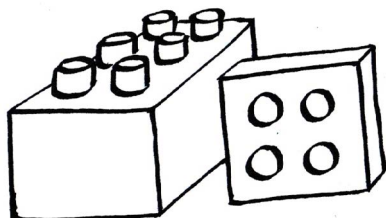
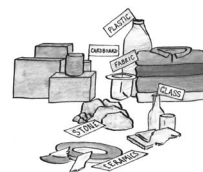
Help Bear to sort out his shed.

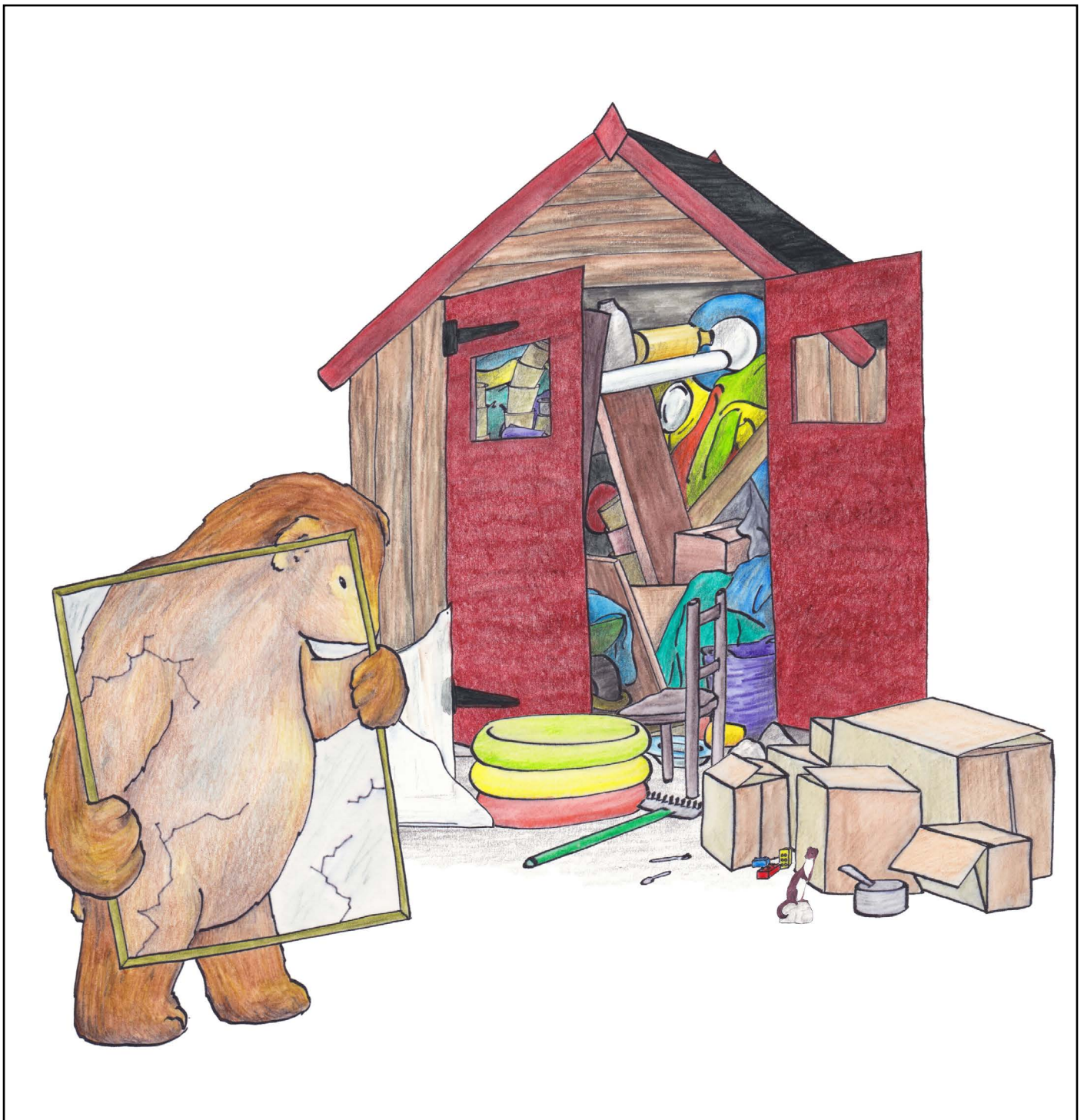
Colour glass things green.

Colour wooden things brown.

Colour metal things red.

Colour plastic things blue.





It is messy inside Bear's shed. He needs to organise things better.
Help him to decide what materials these objects are made from.

Lesson 2. Properties, properties, properties!

Enquiry type: Pattern seeking

Each group will need:

A range of objects made from different materials, for example:

Glass: drinking glass, bottle (coloured glass), pair of spectacles, picture frame

Metal: spoon, paper clip, necklace/ring, coin

Plastic: tablecloth, bag, spoon, lunchbox (transparent), Lego brick

Wood: spoon, lolly stick, building block, stool/chair

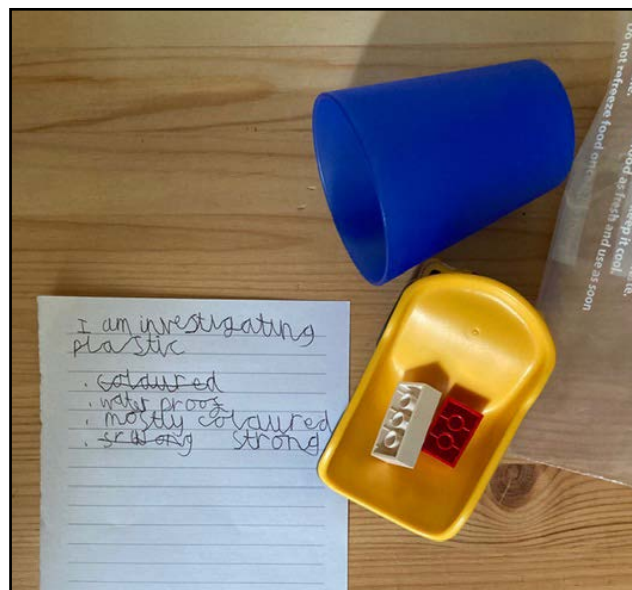
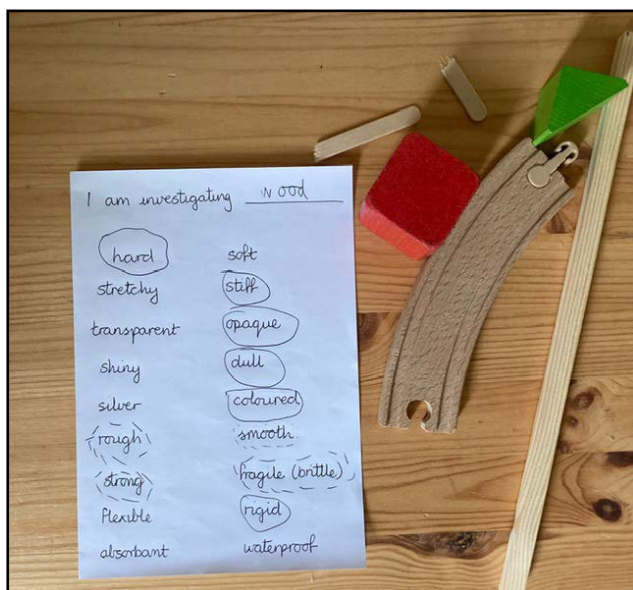
Fabric: towel, t-shirt, sheet/pillowslip, woollen scarf, soft toy

Paper: cup, book, hand towel, bag

If you can, produce several different examples of each material. It is best to have objects that the children can feel and manipulate, but, if necessary, use pictures.

Ask the children to investigate the objects and to decide which material each object is made from. Having done that, the children can look at all the objects made from the same materials and decide how they are the same and how they are different. For example, metals are nearly always shiny, cold to touch, hard, and silver. Glass is hard, shiny, heavy and transparent (or translucent). Some materials have so many different forms that it is hard to find a property that all examples share. For example, plastic is strong but otherwise objects made from plastic can be very different (texture, colour, hardness, flexibility). Encourage the children to move beyond describing what they see and to describe what they can feel instead.

The children can record their observations in their science books, or you could use the materials properties word list in this resource pack and ask the children to circle or highlight the words they feel best describe each material.



Working with the whole class, try to summarise the properties of each material. Once you have a summary, the children can test their ideas using a feely bag. Put a spoon (wooden, plastic or metal) or cup (plastic, paper or glass) in a bag. The children can take turns to put one hand into the bag and try to identify the object and the material it is made from using their sense of touch.

Resources available: Materials properties word list, slide introducing problem.

Materials properties word list

Today I am investigating _____

Today I am investigating _____

hard	soft
stretchy	stiff
transparent	opaque
shiny	dull (not shiny)
silver	coloured
rough	smooth
strong	fragile (brittle)
flexible	rigid
absorbant	waterproof
feels cold	

hard	soft
stretchy	stiff
transparent	opaque
shiny	dull (not shiny)
silver	coloured
rough	smooth
strong	fragile (brittle)
flexible	rigid
absorbant	waterproof
feels cold	



Bear is confused, how can he tell which material is which?

Lesson 3. Fold it

Enquiry type: Identifying and classifying

Each group will need:

Tissue paper, paper, card (thin and corrugated), fabric (thin and thick), plastic (bag and tablecloth), wood (lolly stick), metal (aluminium foil), brick or stone. Provide the children with a small sample of each material.

Using the whiteboard slide or the picture in the book, ask children to suggest how Bear could tidy his shed. Eventually someone will suggest folding or rolling things up. Choose this idea to research further. Will folding all Bear's things be possible? Will things be changed or damaged if they are folded or rolled? Are there some materials which can't be folded or rolled?

Introduce, or recap the meaning of, the words: **flexible**, **rigid** and **brittle**. You can show what brittle means by folding a biscuit – it will snap or break into small pieces as you try to bend it.

Children can investigate various materials and decide which fold easily (flexible) and which are difficult or impossible to fold (rigid). To add an extra challenge, the children can identify which materials are **changed** by folding, for example some materials may crack (brittle) or become permanently creased. The children can use the worksheet to record all their observations and then can classify the materials as flexible, rigid or brittle. You could summarise the children's results by using rings to sort the various materials into various categories. This is a really simple way to spot patterns in properties. For example, in the first photograph below, the paper/card items appear in just one ring, while the plastic items appear in both rings. A conclusion can be drawn that all paper/ card items can be folded while some but not all plastic items can be folded.





Some types of everyday materials are too impractical or dangerous for children to work with, but they could watch an adult demonstrating: try folding thick plastic (a washing up bowl), thin but brittle plastic (a plastic knife) and a metal baking tray/spoon. You could also fold thin glass (a microscope slide) – use extreme caution: wear thick gloves and eye protection and film yourself doing it to show the children.

If time allows, bring the discussion back to why we use a particular material for making an everyday item. Could fabric, which is flexible, be used to make a table? Why not? Why don't we wear wooden clothes?

Resources available: Worksheet (2 levels), slide introducing problem.

Properties, properties, properties! – worksheet 1

I can investigate materials' properties.

I can say whether materials are flexible, rigid, or brittle.

Test some materials to see whether they can be folded or not



Material name	Can I fold it?	Does it stay folded?	How does it change when I fold it?
Paper	Yes	Yes	It gets creases in it

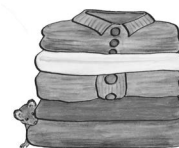
Which materials were flexible?

Properties, properties, properties! – worksheet 2

I can investigate materials' properties.

I can say whether materials are flexible, rigid, or brittle.

Which materials can you fold up?



Material name	Can I fold it?	Is it flexible?
Paper	Yes	Yes



Bear's shed is very messy.
Could he store some of these things more tidily?

Lesson 4. Mop it Up!

Enquiry type: Fair testing, Observation over time

Each group will need:

Shallow dish filled with water, 30 cm ruler, cups or wooden blocks, tape or pegs, permanent marker pen. Materials to test: kitchen towel, fabric (cotton and felt), paper, tissue, wood (lolly stick), plastic bag, foil and any other materials that the children have suggested.

Introduce the word 'absorbent' and demonstrate what this means by using a cloth to mop up some water. Ask the children what materials they think would be best at absorbing water. How could they test their predictions? How could they make sure that their experiment is fair? Discuss what factor they are changing (the material) and which factors they must keep the same. The most important factors to keep the same are: depth of water, how long each material is left in the water, how deep each material is dipped into the water and the state of each material at the start – they should all be dry. The worksheet reinforces this concept; asking the children to identify what is not fair about Bear's experiment.

Understanding fair testing is complex, particularly for children in KS1. Use worksheet 1 for any children who seem secure about the concept, and worksheet 2 for those who may be struggling. Alternatively, you could use the slide showing Bear's experiment and have a whole-class or group discussion about fair testing and working scientifically.

Absorbency test

- 1) Cut equal sized strips of each material and peg or tape them to a ruler.
- 2) Balance the ruler on cups or wooden blocks so that the bottom edge of each material is dipping into the dish of water.

Note: to make things clear for these photographs, some food colouring was added to the water – this is not necessary in the classroom (food colouring moves more slowly up some materials than the water which can confuse the results)!





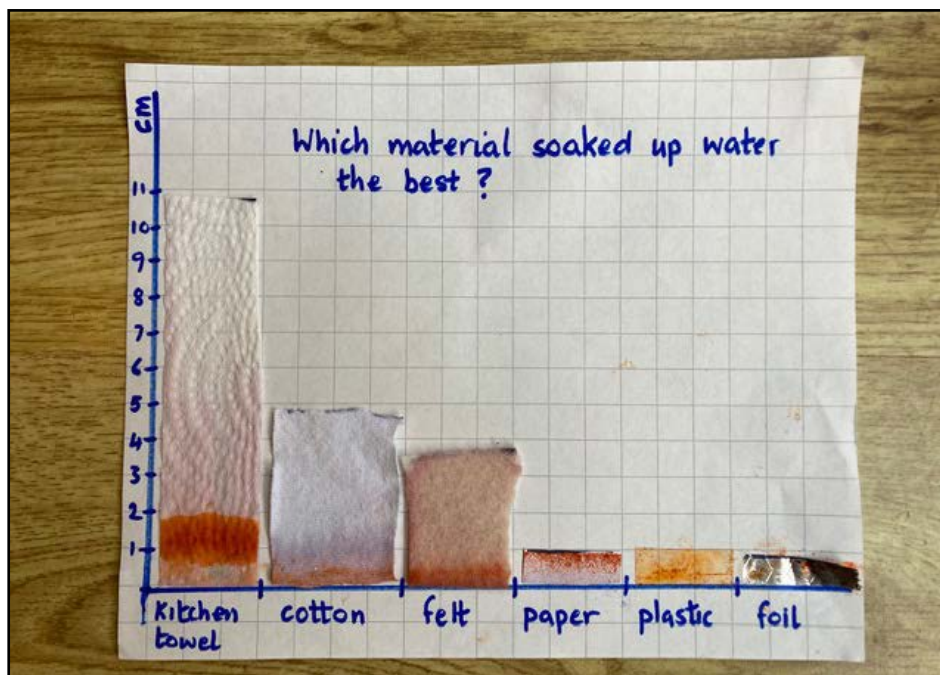
- 3) Leave for about 20 minutes and observe how the water starts to move up some of the materials.
- 4) Once the water has risen to the top of one of the materials, use a permanent marker to indicate how high the water has risen through each material.



The water rises highest in the material with the best absorbency (kitchen towel). Some materials will not absorb any water at all; they will be wet where they dipped in the water, but that is it (plastic, foil and paper). The children can divide the materials into those that absorb water and those that do not, or they can look at how high the water rose in each material and put them in order from best to worst absorber. The children can then decide what will be the best material to use to mop up the leak from Otter's paddling pool.

If you wish to challenge the children more, then include toilet paper in the test. It absorbs water really well but falls apart when wet. It is manufactured to be like that to avoid clogging up sewers. Ask the children to work out why toilet paper would not be the best choice for mopping up a spill.

If you allow the materials to dry the children can use them to make a bar chart showing which material was most absorbent. Cut the material at the line marking the height of the water and stick onto a suitably prepared chart.



Resources available: Worksheet (2 levels), slide introducing problem, fair testing picture

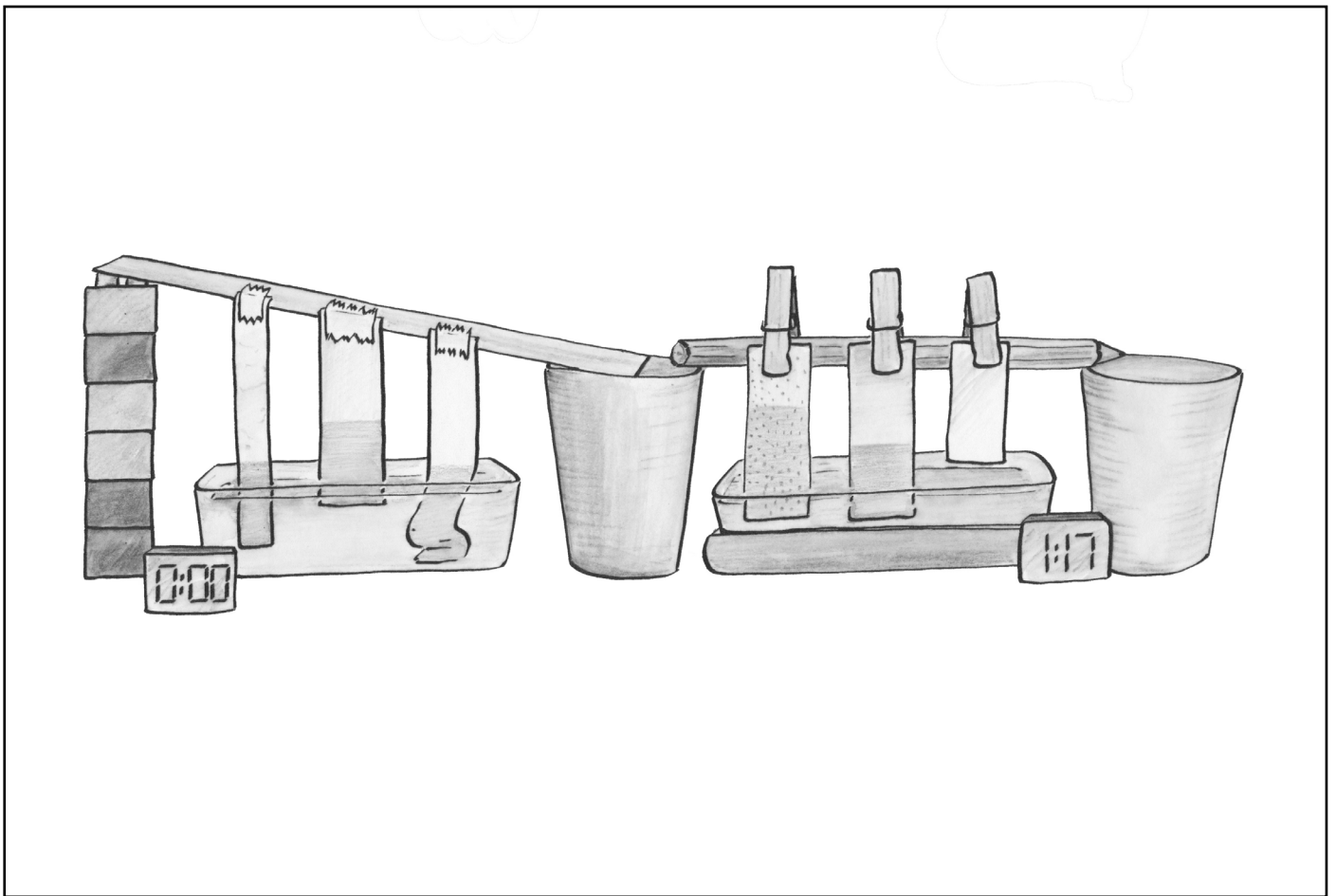
There are lots of things that Bear could have done better when he set up his experiment, but only a few will really affect the results. This is an opportunity to talk with the children about what the important parts of the experimental set-up are. Bear's errors are summarised below.

Fair testing errors – will affect the result	Other errors – result should be unaffected
Sizes (width and length) of the samples are different. <i>This could affect how quickly the water travels up the sample.</i>	The supports are at two different heights, so the ruler is sloping. <i>As the samples are all hanging vertically, this will not affect the results.</i> <i>**If the samples were not hanging vertically, then this error becomes more important, particularly if only a part of the end of the sample is dipping into the water.</i>
Length of sample dipped in water varies/depth of water varies. <i>The samples dipped deeper into the water have a "head start" and even if they absorb no water at all during the experiment it would look as though they have.</i>	Samples are either pegged or taped onto the ruler/pencil. <i>Children may think one of these fastenings is not secure.</i>
One sample is not touching the water at all. <i>We cannot draw any conclusions about how well it absorbs water.</i>	The supports are made from different things. <i>The children may consider that stacked cups are less stable than the plastic blocks and that the apparatus may collapse during the experiment.</i>
The left-hand timer has not been started. <i>As we do not know whether all samples were dipped into the water at the same time, we cannot assume the time shown on the right-hand timer is correct for all samples.</i>	Some of the samples are fastened to a ruler and some to a pencil. <i>The children may suggest that the pencil can roll off the supports – so it perhaps wasn't a good choice.</i>
One of the water dishes is deeper than the other and one is standing on a book. <i>This is only a problem if the samples are immersed by different amounts as a result.</i> <i>**You may have to explain to the children that the size of the dish is not important unless it affects the how much of the sample is immersed in the water.</i>	

Mop it Up! – worksheet 1

I can explain whether an experiment is fair.

Bear has set up an experiment to find the best material for mopping up water. He hasn't been very scientific. What has Bear done wrong?
Draw a ring around any mistakes.

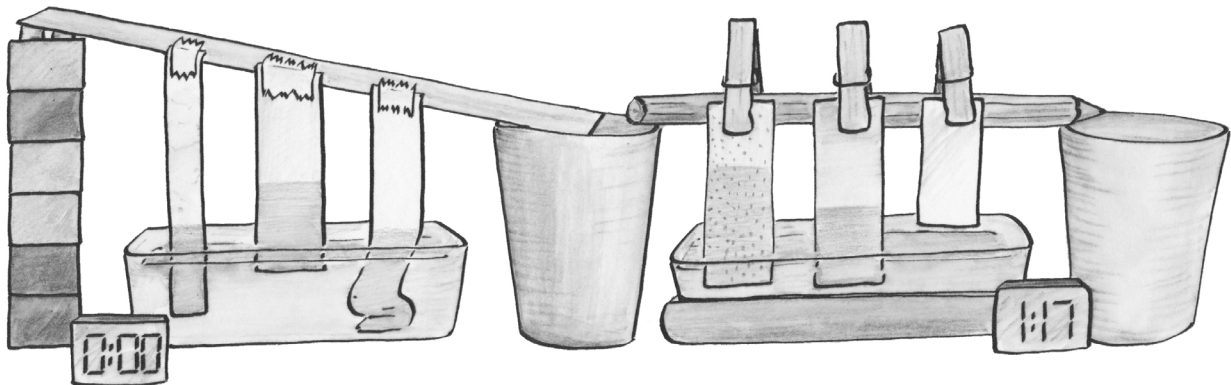


This is not a fair test. Can you explain why?

Mop it Up! – worksheet 2

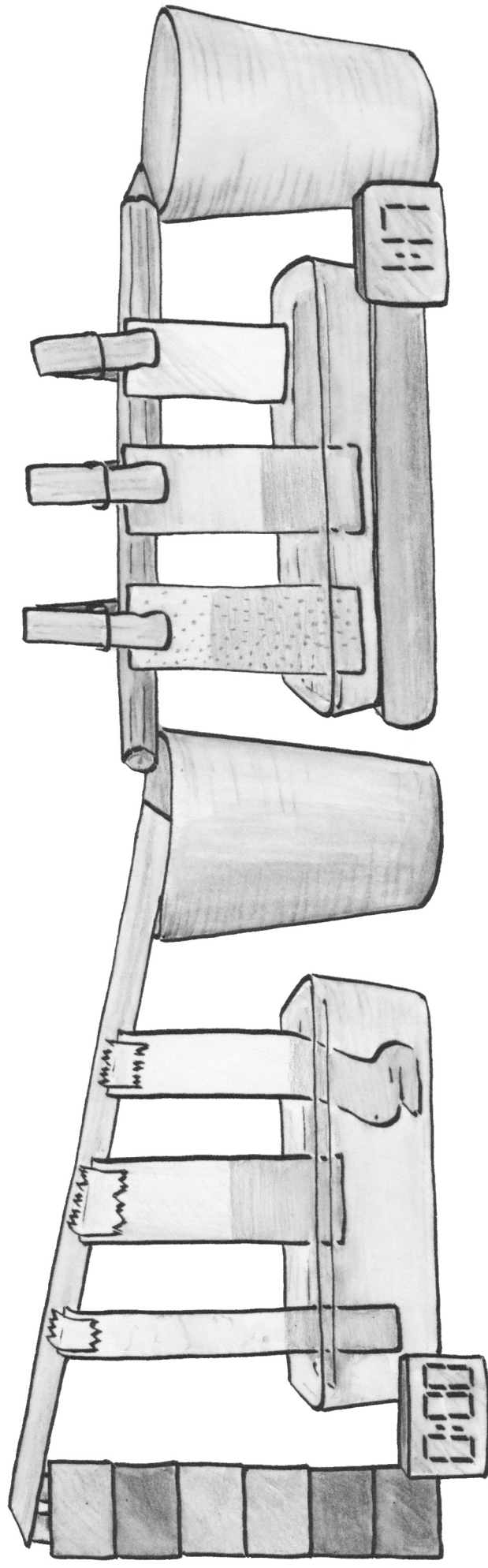
I can explain whether an experiment is fair.

Bear has set up an experiment to find the best materials for mopping up water. Is it a fair test? Use the checklist to help you decide.



A Fair Test

- ☐ All samples of materials must be the same size
- ☐ All materials must dip into the water
- ☐ The same length of each material must be in the water
- ☐ The materials must be tested for the same amount of time





Otter's paddling pool has split and there is water everywhere!
What materials could Bear and Otter use to mop up the water?

Assessment

Bear can't decide whether to sort things by material or property. Show the children a selection of items made from different materials (see table below for suggestions). Ask children to sort them into boxes or onto shelves by material or, to extend further, by property – the properties chosen can be decided by the children who must then explain their rationale.

This is best done as a practical exercise as touch is such an important sense for identifying materials and understanding properties. If it is not possible to do this as a practical activity, then ask the children to sort the picture cards instead.

To simplify the task, use only the objects on the first sheet of the picture card resource.

Suggested items to sort:

Plastic	Cutlery, flower/yoghurt pot, plate, cup, toy, document wallet
Wood	Off-cuts, lolly sticks, spoon, chair, toy, broom
Metal	Cutlery, foil, toy, coins, baking tray, nuts/bolts/nails
Fabric	Towel, sheet, clothes, toy
Paper/card	Newspaper, paperback book, cardboard box, wrapping paper, paper towel
Glass	Drinking glass, clip frame-style picture frame, marbles, jam jar
Stone	Pebbles, brick

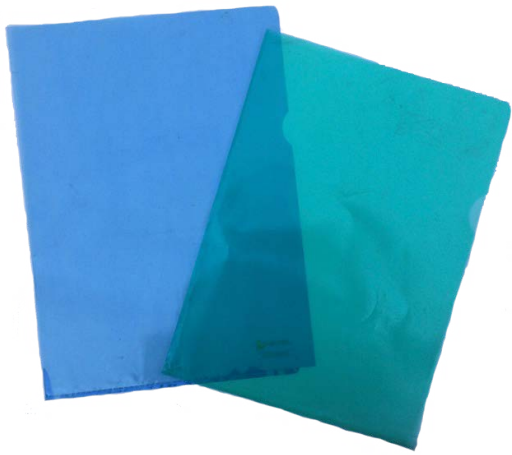


If you have a suitable set of shelves, you can convert them into a Carroll diagram for sorting the

objects. Choose two criteria for sorting and encourage the children to put the items into the correct place. What do they notice?

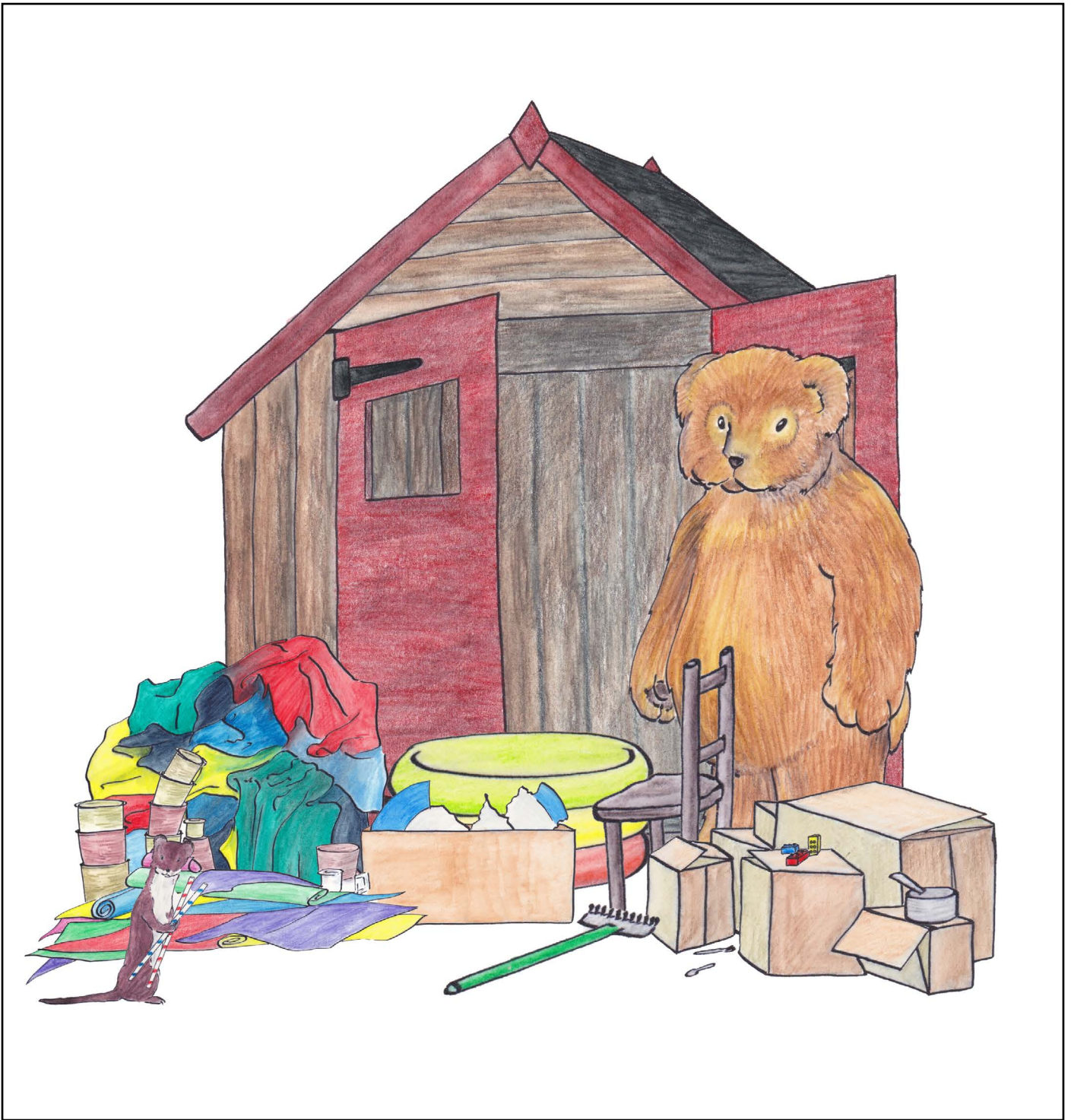


Resources available: Slide introducing problem, picture cards (3 sheets)









It is time for Bear to sort out his shed.
Can you help him to organise his materials properly?