

**Nuffield Design & Technology  
working in the curriculum**



**How could a  
carrier make the  
job easier?**  
nine hours work

SECTION ONE  
**learning context**

**1**

SECTION TWO  
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SECTION THREE  
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## **design context**

Children will have lots of experience of carrying things for themselves and to help others. They will have stories of aching arms and sore fingers. They will have little difficulty in identifying with the problems of carrying and are likely to respond enthusiastically to the idea of developing a carrier that has been designed to make carrying easier and more comfortable. So the context of the task is that of carrying items in a way that meets the needs of a particular person. This person may be the child themselves or someone else. The purpose of the carrier and what it will carry can be decided by the person who will use the carrier.

## **learning purposes**

In this unit children will learn:

- ◆ about the problems of carrying;  
(Session 1)
- ◆ about the structure of paper carrier bags;  
(Sessions 2, 3 and 4)
- ◆ to investigate the performance of paper carrier bags;  
(Session 5)
- ◆ about the appearance and sustainability of carrier bags used for shopping;  
(Session 6)
- ◆ about other carriers used for shopping.  
(Session 7)

## SECTION 2

# tasks for learning

### the small tasks

#### the focused practical tasks

- 1 Looking at carrying 30 minutes
- 2 Investigating paper carrier bags 30 minutes
- 3 Investigating handles 30 minutes
- 4 Disassembling paper carrier bags 60 minutes
- 5 Testing paper carrier bags 60 minutes
- 6 Considering appearance and the environment 30 minutes
- 7 Investigating carriers for shopping 60 minutes
- 8 Creating a specification 60 minutes

### the big task

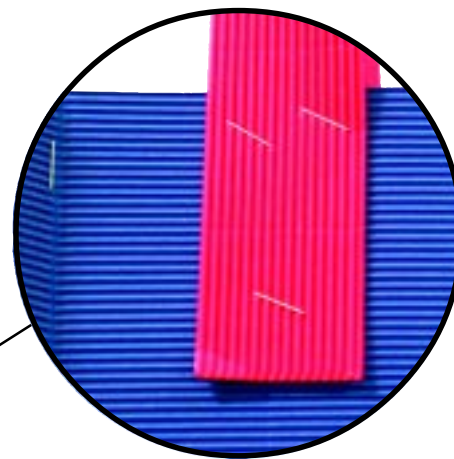
#### the design and make task

To design and make a carrier that meets the needs of a person (who may be the child) who has to carry particular items.

2 hours in 30-minute or 60-minute lessons

The evaluation 30 minutes

Unit review 30 minutes



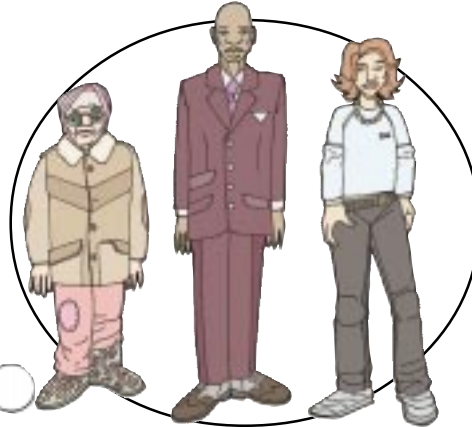
*just three pieces of card and 24 staples!  
The body of the carrier is made from a single piece of corrugated blue card creased and folded to give the required shape and held together by three staples at each seam. The handles are each made from a single strip of red corrugated card with each end of the handle attached to the body by three staples*

## SECTION 3 children's decisions

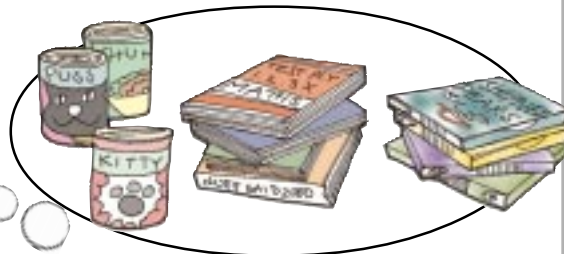
### design decisions

The children can decide on the following:

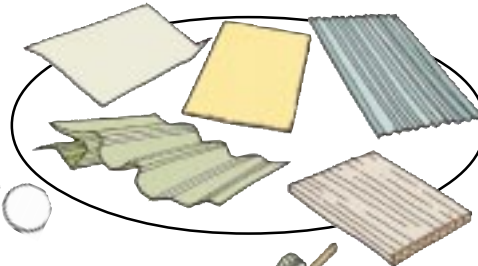
- ◆ who the carrier is for  
required learning in Session 6,  
design decision made in Session 8;



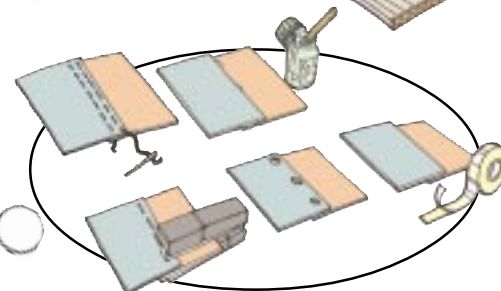
- ◆ what the carrier will carry  
required learning in Sessions 1,2 and 7,  
design decision made in Session 8;



- ◆ what the carrier will be made from  
required learning in Sessions 2–5 and 7,  
design decision made in Session 8;



- ◆ how the carrier will be constructed  
required learning in Sessions 4 and 7,  
design decision made in Session 8;



- ◆ how the carrier will work  
required learning in Sessions 1–3 and 7,  
design decision made in Session 8;



- ◆ how the carrier will be decorated  
required learning in Session 6,  
design decision made in Sessions 8 and 9.



## SECTION 4 teaching the unit

session  
one

### looking at carrying

#### Teacher input

Begin the lesson by carrying in a box without handles with some difficulty, changing the position with exasperation – on your shoulder, on your head, on your hip, in front of you.

Ask the children in the class to try out these methods and discuss the pros and cons. Ask the class to decide for each one:

- ♦ which parts of the body are being used to lift the loads;
- ♦ which parts are being used to support and balance the loads;
- ♦ which parts may get tired or sore.

suggested timing  
30 mins



## looking at carrying (continued)

### Pupil activity

Show the children four different carriers, for example:

- ♦ a plastic carrier bag; ♦ rucksack;
- ♦ a baby buggy; ♦ a woven basket.

Ask them to answer the following questions.

- ♦ What is likely to be carried in each?
- ♦ Is it heavy, bulky, fragile or precious?
- ♦ What materials are the carriers made from?
- ♦ How will each carrier be used?
- ♦ Which are suitable for long journeys?



### Resources

**Stimulus:** a box, carrier bag, baby buggy, rucksack, woven basket;

**Consumables:** paper;

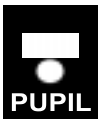
**Tools:** pencils.

### Health and safety check

Discuss the hazards and risks involved in carrying heavy or awkward loads and how the risks can be controlled by adopting correct procedures.

### Homework

Ask children to bring in a range of paper carrier bags – allow at least a week for a collection to build up. Explain that the bags will be taken apart to investigate how they are made. Try to encourage them to bring a range of bags with a variety of handles. A small sample of plastic carrier bags from a variety of retail outlets can also be useful. Try to get some from an up-market shop, such as Marks and Spencers, and from a cut-price supermarket chain. Most shops are quite amenable to requests for paper carrier bags if you explain the purpose of your request. Seasonal bags (e.g. for Christmas products) can be particularly useful for evaluation purposes.





## SECTION 4 teaching the unit

session  
two

### investigating paper carrier bags

suggested timing  
30 mins



#### Teacher input

Give a paper carrier bag to pairs of children, explaining that they are going to investigate the bag to see how it was made and what it was designed for.

Ask them to look closely at their carrier bag for clues about the materials the bag is made from and what product it was designed to hold.

Explain to the class that by looking carefully at the bags they will be able to answer the following questions.

- ◆ What materials are used to make the bag?
- ◆ Why is it the size that it is?
- ◆ Why is it the shape that it is?
- ◆ Why are there logos or signs on the bag?
- ◆ How were the logos made?
- ◆ Is the material cheap or expensive?

- ◆ What product would go inside the bag?
- ◆ What sort of person would use this bag?
- ◆ Are there any advantages/disadvantages in the choice of materials?

#### Pupil activity

Children can use 'Carrier bag overview' (available as a ready-to-copy sheet) to help them do close observational drawing of the bag and make notes about the bag based upon the questions.

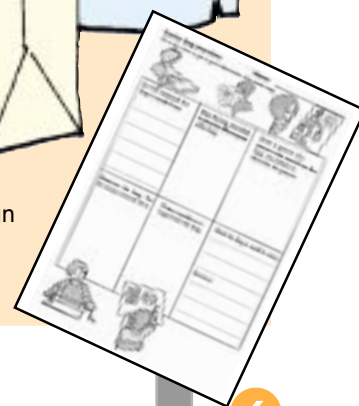


#### Resources

**Stimulus:** paper carriers;  
**Consumables:** 'Carrier bag overview';  
**Tools:** pencils.

#### Health and safety check

Discuss the hazards and risks involved in handling thin materials and how these risks can be controlled by taking care.



## SECTION 4 teaching the unit

session  
three

### investigating handles

suggested timing  
30 mins



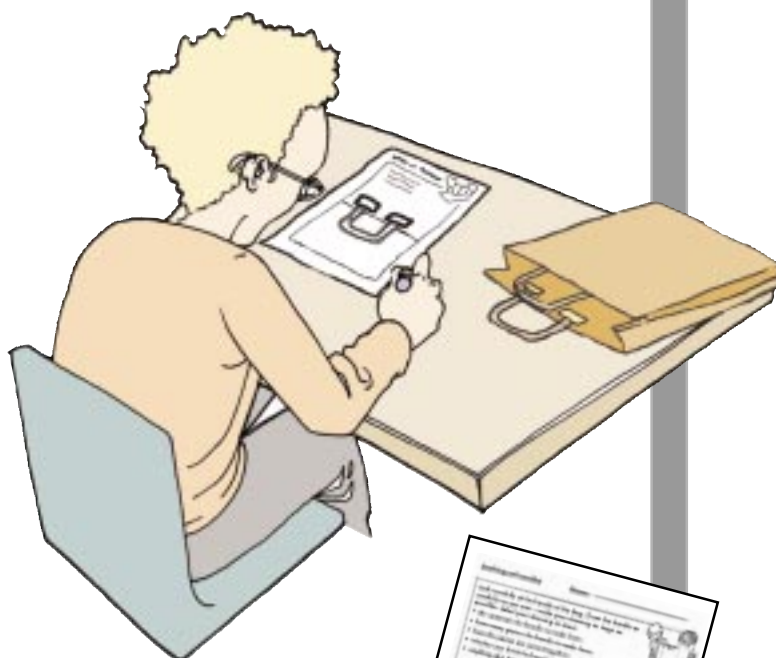
#### Teacher input

Ask children to look closely at the handles and do an exploded diagram of their bag. Use the following questions to stimulate thinking.

- ◆ Is the handle built into the bag? (Some bags have integral handles usually reinforced by card);
- ◆ What materials were used for the handle? (This can vary from folded paper, card, plaited threads, reinforced holes with metal eyelets);
- ◆ How many pieces are used to make the handle?
- ◆ How are the pieces joined together? (usually glued);
- ◆ Is the handle comfortable to use?
- ◆ Why is there a handle? (holding a number of bags at once, decorative value, ease of carrying)

#### Pupil activity

Children can use 'Looking at carrier bag handles' (available as a ready-to-copy sheet) to help them do close observational drawings of the handle and respond to the questions.



#### Resources

**Stimulus:** paper carriers;  
**Consumables:** 'Looking at carrier bag handles';  
**Tools:** pencils.

#### Health and safety check

Discuss the hazards and risks involved in bag handles that fail suddenly and how the risks might be controlled.



## SECTION 4 teaching the unit

session  
four

### disassembling paper carrier bags

suggested timing  
60 mins



#### Teacher input

Tell the class that they will be working in groups. Ask children to take the bag apart carefully along one of its seams and open it out. Running scissors between the seam and bag can help. Ask the following questions.

- ◆ How many parts is the bag made from? (Usually one sheet of paper to allow for mass production, printing of logo/design, folding by machine.)
- ◆ How many folds are there? (Most bags are very intricately folded.)
- ◆ How many seams are there?
- ◆ How are the seams joined together?
- ◆ How was the bag made?

#### Pupil activity

Ask the children to reassemble the bag. This can be trickier than it first appears!



session  
four

## disassembling paper carrier bags (continued)

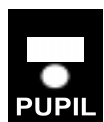
**Homework: Identifying needs**

Invite children to talk to an elderly relative about shopping now and in the past. Get children to devise a range of questions. These might include the following.

- ◆ Where do you shop?
- ◆ Where does your family shop?
- ◆ What things do you buy?
- ◆ Where did you shop in the past?
- ◆ How have shops changed?
- ◆ Which carrier bag did you use in the past?
- ◆ Which carrier bag do you use now?
- ◆ Do you have any problems with shopping?
- ◆ Do you have any problems with carrier bags?

This can be sensitive subject, so care needs to be taken in preparing children and their relatives. Information gained can be used to generate discussion about the needs of shoppers and how these are being addressed by supermarkets (or not, as the case may be).

Parallel work could be done with local supermarket managers, where they are asked in which way they cater for the needs of shoppers such as the elderly.

**Resources**

**Stimulus:** paper carriers;  
**Consumables:** paper;  
**Tools:** pencils, scissors.

**Health and safety check**

Revisit the discussion about controlling risks when handling thin materials.

## SECTION 4

# teaching the unit

session  
five

### testing paper carrier bags

suggested timing  
60 mins



#### Teacher input

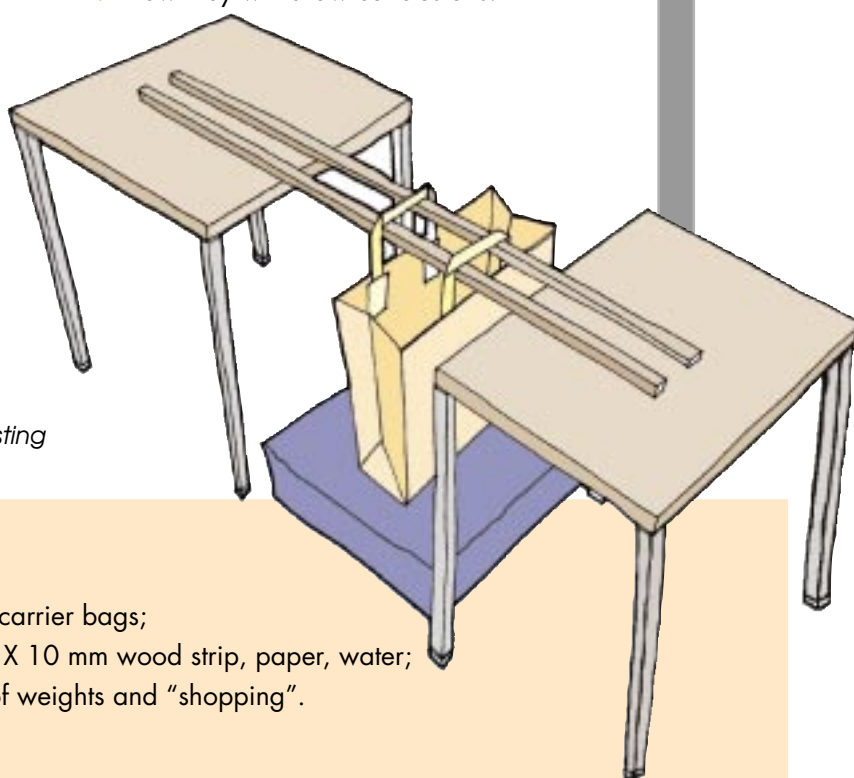
Ask children to come up with a test to determine how much the bag will hold. They will need to think about a safe way of loading their bags to test them to destruction. Paper carrier bags can be surprisingly strong and falling weights can damage children's feet. Ask the children to make predictions such as the following.

- ◆ Where will the bag break?
- ◆ Will a wet carrier bag hold more or less than a dry one?
- ◆ What causes the bag to split?

#### Pupil activity

Tell the class that they should work in groups of four. Explain that they should think about each of the following:

- ◆ predicting the result of the test before they carry it out;
- ◆ ensuring that it is a fair test;
- ◆ making any measurements accurately;
- ◆ how they will record their results;
- ◆ how they will draw conclusions.



*one suggested set up for testing*

#### Resources

**Stimulus:** selection of paper carrier bags;  
**Consumables:** quantity of 10 mm X 10 mm wood strip, paper, water;  
**Tools:** pencils, selection of weights and "shopping".

#### Health and safety check

Revisit the discussion about controlling risks when bag handles fail suddenly and extend this to consider other possibilities of sudden failure in the test.

## SECTION 4

# teaching the unit

session  
six

### considering appearance and the environment

suggested timing  
30 mins



#### Teacher input

Using a range of carrier bags, plastic and paper, explore the children's understanding about marketing strategies and a sustainable world.

Questions that could be considered are as follows.

- ◆ Why is there a logo on the bag?
- ◆ Why do shops give free bags to shoppers?
- ◆ Are there some bags that it is better to be seen with than others?
- ◆ What happens to these bags after shopping?
- ◆ What have some supermarkets done to cut down on the number of bags used? Why have they done this?
- ◆ What do you use carrier bags for?
- ◆ What do your parents use carrier bags for?
- ◆ Which carrier bags are kindest to the environment?

#### Pupil activity

In small groups the children could draw a small picture of the carrier bag and logo in the middle of a large sheet of paper and then annotate all the way around the picture with their thoughts following the discussion. These could then be displayed for all to see.



#### Resources

**Stimulus:** selection of paper and plastic carrier bags;

**Consumables:** paper;

**Tools:** pencils.

#### Health and safety check

Discuss the hazards and risks involved in working as a group and how the risks can be controlled by the way the children behave and treat one another.

## SECTION 4

# teaching the unit

session  
seven

### investigating carriers for shopping

suggested timing  
60 mins



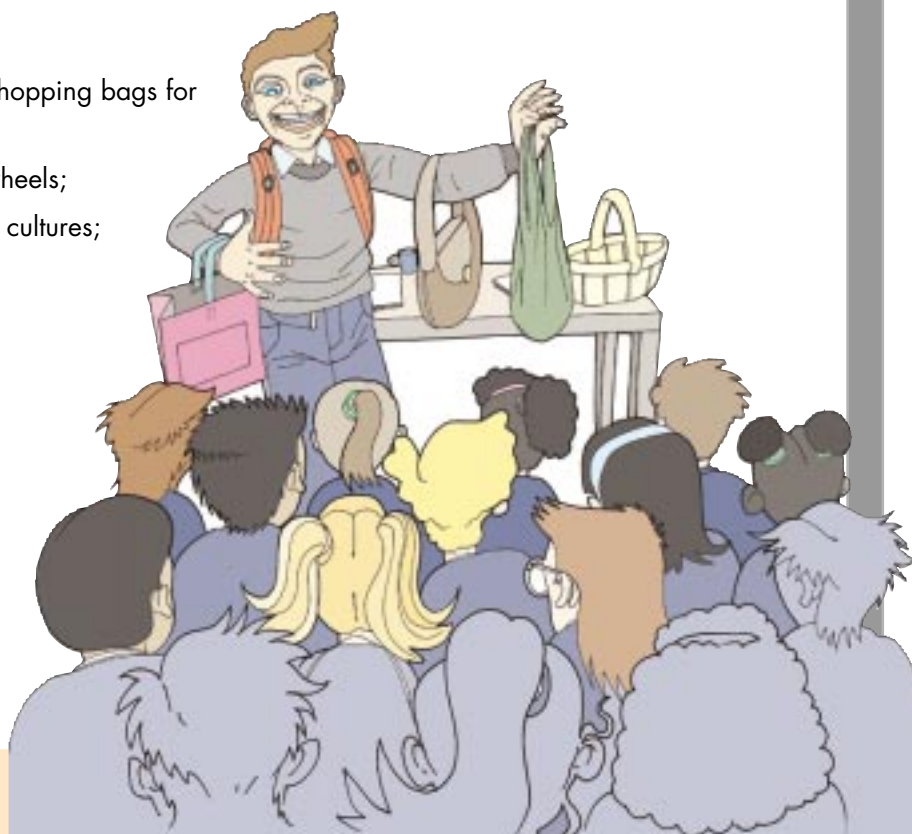
#### Teacher input

Explain to the class that they are going to answer questions that will help them investigate a range of carriers for shopping. Show the class the following items:

- ◆ plastic bags;
- ◆ paper carrier bags;
- ◆ wicker baskets;
- ◆ sturdy heavy plastic shopping bags for repeated use;
- ◆ shopping trolley on wheels;
- ◆ carriers from different cultures;
- ◆ cardboard boxes.

Ask children the following questions.

- ◆ Who might use this type of carrier?
- ◆ Which carrier is best for the environment?
- ◆ What are the advantages and disadvantages of each carrier?
- ◆ Do you like the carrier?



#### Resources

##### Stimulus:

selection of different types of bags and carriers;

##### Consumables:

paper;

##### Tools:

pencils.

#### Health and safety check

Revisit the discussion about controlling risks concerned with carrying loads and sudden failure.

## SECTION 4 teaching the unit

session  
eight

### creating a specification

suggested timing  
60 mins



#### Teacher input

Tell the class that now each one of them is going to use what they have learned about carrier bags and carriers to design a carrier. Tell them that they will need to make the following decisions:

- ◆ who it is for:
  - themselves or someone else;
- ◆ what it will carry:
  - shopping, books, clothes, sports kit, etc.;
- ◆ what it will be made from:
  - paper, stiff card, corrugated card, flexible plastic sheet, stiff plastic sheet in any combination;
- ◆ how it will be constructed:
  - using a net plus additional parts held together by any of the following – liquid adhesives (e.g. PVA), glue sticks, adhesive tapes, staples, stitching, rivets, and reinforced as appropriate;

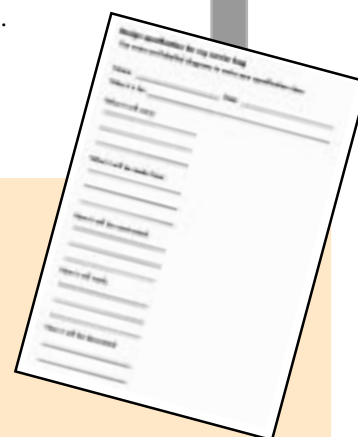
- ◆ how it will work:
  - through handles and straps, adjustable, perhaps with buckles, clips and Velcro;
- ◆ how it will be decorated:
  - through simple marker work, appliqué, block printing.

#### Pupil activity

Each child should write down these decisions as a series of headings and then make notes, sketches and/or models to develop a clear picture of their design.

Tell the children that when they have this clear picture of the design they will be able to make it.

There is a ready-to-copy 'Specification for my carrier bag' sheet that you may wish to use with some children.



#### Resources

- Stimulus:** worksheets from previous sessions;  
**Consumables:** 'Specification for my carrier bag' or paper;  
**Tools:** pencils.

#### Health and safety check

Discuss the hazards and risks involved in the use of the cutting tools and assembly tools that will be available when they make their carrier and how the risks can be controlled by taking care and using the correct procedures.



## SECTION 4 teaching the unit

sessions  
**9+10**

### the big task: making a carrier

suggested timing  
**2 hours**  
(2 x 1 hour  
or  
4 x 30 mins)

#### Pupil activity

Explain to the children that although they will be working to their own specification, they may still meet with problems in the making and need to change the design to solve the problems. If this happens they should make notes to explain what they did and why. The children can then develop their design ideas and move on to making their carrier.

- ◆ Explain how much they could charge for the finished bag and whether it would be possible to make a profit from the exercise.

#### Extension work

Children who finish early or who need an extra challenge could be asked to do the following.

- ◆ Design a paper carrier bag for the school fête to be used for carrying purchases and prizes.
- ◆ Explain how much this would cost to make.
- ◆ Explain how to set up a manufacturing system in the classroom.



#### Resources

**Consumables:** paper, stiff card, corrugated card, liquid adhesives (e.g. PVA), flexible plastic sheet, stiff plastic sheet, glue sticks, adhesive tapes, staples;

**Tools:** staplers, needle and thread, paper punch, paper fasteners, click rivets.

#### Health and safety check

Revisit the discussion about controlling risks when using the tools, materials and components available for making their carriers.

## SECTION 4

# teaching the unit

session  
eleven

### evaluating the final product

suggested timing  
**30 mins**



#### Teacher input

Positive aspects of the child's designs must be valued but the children must also learn to be critical – working in groups during their evaluation should make this easier. For each child, the evaluation of the final product should be done with reference to the specification and this will make it clearer to children when it may be the design that needs improving and when it may be the quality of the making.

#### Pupil activity

Tell the children to work in groups of four. They should look at the specification for each carrier, take turns looking at it and using it and then answer the following questions about each bag.

- ◆ How well did it do what it was designed to do?
- ◆ How much did it look like the way it was designed to look?

- ◆ How much would it appeal to those it was designed for?

Tell the children that they may find it useful to record these findings in table form. Once the children have the comments of everyone in the group about their bags, they can each write a few sentences answering the following questions.

- ◆ Can it be made safer?
- ◆ Can it be made to work better?
- ◆ Can it be made to look better?
- ◆ Can it be made to last longer?

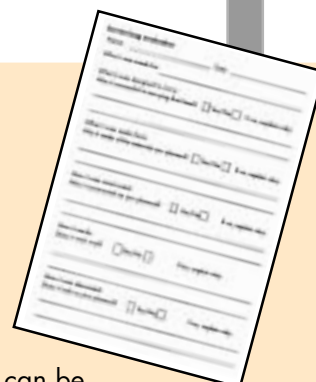
There is a 'Carrier bag evaluation' available as a ready-to-copy sheet that you may wish to use with some children.

#### Resources

**Stimulus:** the children's products;  
**Consumables:** 'Carrier bag evaluation' or paper;  
**Tools:** pencils.

#### Health and safety check

Discuss the hazards and risks involved in using the carriers and how the risks can be controlled.



## SECTION 4 teaching the unit

session  
twelve

### unit review

suggested timing  
30 mins



#### Teacher input

Explain to the class that it is important to think about how to get better at design & technology and that they can do this by discussing the following questions.

- ◆ What did you learn about carriers?
- ◆ How did you learn that?
- ◆ Where could you find out more?
- ◆ Did anything surprise you about the way carriers are made?
- ◆ What did you find difficult about this project?
- ◆ What did you get better at?
- ◆ What did you enjoy most?
- ◆ What did you find easy?
- ◆ What did you find difficult?
- ◆ Did you help each other?
- ◆ What could have been done better?
- ◆ How could you make sure it was done better?

#### Pupil activity

The children should discuss the questions in groups and when they have finished you should ask each group to make a short report to the class. The class should agree a target based on these reports for improvement for their next design & technology unit.



#### Resources

**Consumables:** paper;  
**Tools:** pencils.

#### Health and safety check

Discuss whether the class used hazard recognition, risk identification and risk control to design and make safely.

## SECTION 5 resources and links

### vocabulary

Sessions 1	Session 2	Session 3	Session 4	Sessions 5-7
retail outlet, logos,	integral, observation drawing, structure	sensitive, stiffen, fibre	predicting, reinforce	plaiting, seam

### resources summary

	Stimulus materials	Consumable materials	Tools
<b>Session 1</b>	a box, carrier bag, baby buggy, rucksack, woven basket	paper	pencils
<b>Session 2</b>	paper carrier bags	'Carrier bag overview'	pencils
<b>Session 3</b>	paper carrier bags	'Looking at carrier bag handles'	pencils
<b>Session 4</b>	paper carrier bags	paper	pencils, scissors
<b>Session 5</b>	selection of paper and plastic carrier bags	quantity of 10 mm X 10 mm wood strip, paper, water	pencils, selection of weights and "shopping"
<b>Session 6</b>	selection of paper carrier bags	paper	pencils
<b>Session 7</b>	selection of different types of bags and carriers	paper	pencils
<b>Session 8</b>	worksheets from previous sessions	'Specification for my carrier bag' or paper	pencils
<b>Sessions 9 and 10</b>		paper, stiff card, corrugated card, liquid adhesives (e.g. PVA), flexible plastic sheet, stiff plastic sheet, glue sticks, adhesive tapes, staples	staplers, needle and thread, paper punch, paper fasteners, click rivets
<b>Session 11</b>	the children's products	'Carrier bag evaluation' or paper	pencils
<b>Session 12</b>		paper	pencils

## **links to other subjects**

### **Literacy**

There are many opportunities for speaking and listening in small and large groups in this module. When annotating a diagram for a bag there will be the opportunity to write in note form. This work could then be further developed to write a letter to persuade someone to use environmentally friendly carrier bags or other means of carrying shopping. This would link well with the literacy objectives in term 3.

### **Numeracy**

When doing this module the children will be measuring and drawing lines to the nearest millimetre, visualising 3D shapes from 2D drawings and identifying different nets for the shape of the bag they wish to design. The children will also be able to practise using a protractor to draw right angles, although other methods may also be used.

### **Science**

When testing the carrier bags the children will need to plan their investigation, identify how to make it a fair test and also identify the variables involved. They will be able to predict what will happen and then test, recording the results and drawing conclusions, which will help them when designing their own bags.

## Carrier bag overview

Name \_\_\_\_\_

Fill in this chart to get a good description of a carrier bag.



List the materials the bag is made from:

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Draw the bag. Use labels to describe different parts of the bag.

Draw a picture of a person who would use the bag. Use labels to describe the person.

Measure the bag. Put the measurements here:

Draw a pattern or logo from the bag.

I think the bag is used to carry

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because

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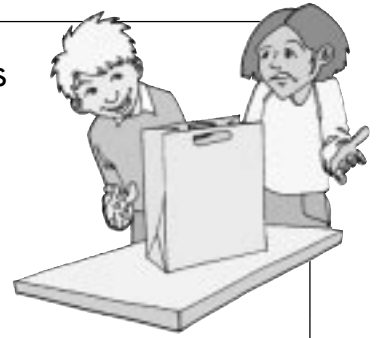




## Looking at carrier bag handles Name \_\_\_\_\_

Look carefully at the handle of the bag. Draw the handle as carefully as you can – make your drawing as large as possible. Label your drawing to show:

- the materials the handle is made from;
- how many pieces the handle is made from;
- how the pieces are joined together;
- whether you think the handle is comfortable to use;
- anything else that you think is important.



## **Specification for my carrier bag**

Use notes and labelled diagrams to make your specification clear.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Who it is for: \_\_\_\_\_

What it will carry:

---

---

---

What it will be made from:

---

---

---

How it will be constructed:

---

---

---

How it will work:

---

---

---

How it will be decorated:

---

---

## Carrier bag evaluation

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Who it was made for: \_\_\_\_\_

What it was designed to carry:

Was it successful at carrying that load? ☐ Yes/No ☐ If no, explain why:

\_\_\_\_\_  
\_\_\_\_\_

What it was made from:

Was it made of the materials you planned? ☐ Yes/No ☐ If no, explain why:

\_\_\_\_\_  
\_\_\_\_\_

How it was constructed:

Was it constructed as you planned? ☐ Yes/No ☐ If no, explain why:

\_\_\_\_\_  
\_\_\_\_\_

How it works:

Does it work well? ☐ Yes/No ☐ If no, explain why:

\_\_\_\_\_  
\_\_\_\_\_

How it was decorated:

Does it look as you planned? ☐ Yes/No ☐ If no, explain why:

\_\_\_\_\_  
\_\_\_\_\_

## **Acknowledgements**

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