Ages 8–11

Material Detectives

Investigate what things are made of — and what happens next.

FOR THE ADULT

Pupils investigate clean, empty packaging, keep a week-long count of classroom waste and follow an aluminium can on its journey back to a new can. The focus is on evidence: looking closely, recording carefully and suggesting better designs.

Time: Three or four sessions of 40–60 minutes, plus five minutes a day for the bin count

YOU WILL NEED

- 8–12 clean, empty, adult-checked packaging items (card boxes, plastic pots, cans with smooth rims, paper bags)
- Printed detective log and tally sheet
- Magnifying glasses (optional)
- A clear bag for the classroom bin count — handled by an adult
- Scissors and glue for the sequencing cards
- Disposable gloves for the adult handling the bag

LEARNING GOALS

- Identify common packaging materials and describe their properties
- Collect and present data about classroom waste using a tally chart
- Explain the main steps in recycling a metal can
- Suggest design changes that would reduce waste or make recycling easier

SAFETY FIRST

- Only use packaging an adult has checked is clean, dry, empty and free of sharp edges
- No glass, batteries, aerosols, medicines, cleaning-product bottles or food-soiled items
- For the bin count, pupils look and count — only an adult wearing gloves handles the bag
- Wash hands after every session

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Material detective log

- Choose one clean packaging item at a time.
- Look closely, feel it, bend it gently. Read any symbols on it.
- Fill in one row for each item. Use the example to help you.
- Remember: recycling rules depend on where you live — write 'check' if you are not sure.

Item	Main material(s)	Could we avoid it?	Could it be reused? How?	Recyclable here? (yes / no / check)	My better design idea
Yoghurt pot	*Plastic pot, foil lid*	*Buy a big pot and use a bowl*	*Seed pot for planting*	*Check*	*One material only, no foil lid*

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Material detective log — think about it

Which item was hardest to recycle? Why?

Which material came up most often?

Pick one item. How would you redesign it so it makes less waste?

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Classroom bin count

- At the end of each day an adult empties the classroom bin into a clear bag.
- Look through the bag (do not touch!) and count each type of item.
- Use tally marks, then add up the totals on Friday.

Type	Mon	Tue	Wed	Thu	Fri	Total
📄 Paper and card						
🧴 Plastic packaging						
🍎 Food scraps						
🥤 Drinks cans and cartons						
🖍️ Pencil shavings and art scraps						
❓ Other						

Which category had the most items?

Draw a bar chart of your totals.

Which items could have been avoided or reused?

What one change could our class make next week? Count again and compare.

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Journey of an aluminium can

- Cut out the six cards.
- Put them in the right order to show how a used can becomes a new can.
- Stick them down and add an arrow between each step.

✂ Cut out the cards, then put them in order.



The cans are squashed into big blocks called bales.



At a factory the cans are shredded and melted, then the metal is rolled into thin sheets.



Someone finishes a drink, rinses the can and puts it in the recycling.



Machines sort it. Magnets pull out steel; a spinning magnetic field pushes aluminium cans away from the rest.



The sheets are made into new cans, filled and sent back to the shops.



A collection truck takes the recycling to a sorting centre.

TALK ABOUT IT

- Why does the can need to be empty and clean?
- Aluminium is not magnetic. How do machines still separate it?
- Is recycling the best choice, or could we use a refillable bottle instead?

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Detective quiz

- Circle one answer for each question.
- Check your answers with the key at the end.

1. What is the BEST way to deal with waste?

A. Recycle it | B. Avoid making it in the first place | C. Bury it | D. Burn it

2. Which material can be recycled again and again without wearing out?

A. Paper | B. Aluminium | C. Crisp packets | D. Tissues

3. Why should packaging be clean before it goes in the recycling?

A. So it looks nice | B. Food and liquid can spoil other recycling | C. It makes the truck lighter | D. It doesn't matter

4. Paper fibres get shorter each time they are recycled. What does that mean?

A. Paper can be recycled forever | B. Paper can only be recycled a limited number of times | C. Paper can't be recycled | D. Paper gets longer

5. What happens to food scraps in a compost heap?

A. They turn into plastic | B. Tiny living things break them down into compost | C. They stay the same | D. They turn into metal

6. Where should old batteries go?

A. The classroom bin | B. A special battery collection point, taken by an adult | C. The recycling bin | D. The compost

7. Which of these is an example of REUSE?

A. Melting a can | B. Refilling your water bottle | C. Shredding paper | D. Throwing away a box

8. Why do some packages make recycling hard?

A. They are made of several materials stuck together | B. They are too colourful | C. They are too light | D. They are square

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Notes for teachers and parents

- Science: properties of materials, changes of state (melting metal), and decomposition by micro-organisms.
- Maths: tally charts, totals, bar charts and comparing two weeks of data.
- Design & technology: the 'better design idea' column is a ready-made design brief — choose the best idea for a mock-up.
- Run the bin count for two weeks with a change in between (for example, a class reuse pledge) to make it a fair-test investigation.
- Recycling symbols and accepted items differ by area. Keep 'check locally' as a valid answer and contact your waste collector or building management to confirm.
- Safety: pre-check every packaging item yourself and remove anything sharp, glass or soiled before the lesson.

TAKE IT FURTHER

- Write to a company suggesting your best packaging redesign.
- Make a class display: 'Our bin, Monday to Friday'.
- Visit, or invite a speaker from, a local recycling or sorting facility.

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Answer key

JOURNEY OF AN ALUMINIUM CAN — CORRECT ORDER

1. 🥤 Someone finishes a drink, rinses the can and puts it in the recycling.
2. 🚛 A collection truck takes the recycling to a sorting centre.
3. 🧲 Machines sort it. Magnets pull out steel; a spinning magnetic field pushes aluminium cans away from the rest.
4. 🧱 The cans are squashed into big blocks called bales.
5. 🔥 At a factory the cans are shredded and melted, then the metal is rolled into thin sheets.
6. ✨ The sheets are made into new cans, filled and sent back to the shops.

DETECTIVE QUIZ

#	Answer	Why
1	B. Avoid making it in the first place	Reducing comes first: the greenest waste is the waste we never make.
2	B. Aluminium	Metals like aluminium can be melted and reused many times.
3	B. Food and liquid can spoil other recycling	Dirty items can contaminate a whole load, so less gets recycled.
4	B. Paper can only be recycled a limited number of times	Fibres wear out, so paper can be recycled several times, but not for ever.
5	B. Tiny living things break them down into compost	Bacteria, fungi and worms break food down into compost that feeds soil.
6	B. A special battery collection point, taken by an adult	Batteries can cause fires in bins and trucks, so they need special collection.
7	B. Refilling your water bottle	Reuse means using the same item again for its job.
8	A. They are made of several materials stuck together	Mixed materials, like foil stuck to plastic, are difficult to separate.

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