

Scientific Enquiry Materials

KS2

RECYCLING



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Levels 2–5

Resources

- ▶ Enquiry Sheet – Rubbish
- ▶ keepwalestidy.org.uk
This activity links to unit 1 –
Something to chew on

Links to skills in the Science PoS

The emphasis of this activity is on pupils' use of prior knowledge to explain links between cause and effect. The sharing of ideas and linking their learning provide opportunities for reflection.

Rubbish

Overview

This activity provides pupils with the opportunity to think about and discuss what is meant by 'rubbish' and to record their ideas as a concept map.

Activity

Ask the pupils to think about and discuss what the term 'rubbish' means to them. In pairs, they could make a concept map* on the Enquiry Sheet to show their ideas. They could use drawings or words to explain the links between ideas. Ask each pair of pupils to share their ideas with the rest of the class.

Suggested questions

Can you suggest an example that helps to explain each link you have made?
Can you describe how some of your ideas relate to each other?
Can you describe in words what your concept map shows?

Supplementary activities

Pupils could think of places where they see rubbish that has been 'tipped'. Pupils could find out what is meant by 'fly tipping' and why fly tipping is a problem. Using the information found, they could make a video animation or podcast to persuade people not to fly tip. Pupils could take a camera around school and take photos of rubbish that has been dropped or left in the wrong place. Pupils could make a litter bug video animation to persuade people not to drop litter.

** A concept map is a diagram showing the relationship between ideas. Ask the pupils to draw arrows or lines to link ideas and attach labels to describe the relationship between ideas. See the Teacher's guide for a more detailed explanation.*

Think about what the word 'rubbish' means to you.

With a partner, make a concept map using words and pictures to show your ideas.

rubbish

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Getting rid of rubbish



carry out a risk assessment before carrying out this activity

Links to skills in the Science PoS

This activity emphasises pupils' use of prior knowledge in explaining links between cause and effect.

Getting rid of rubbish**Overview**

This activity requires pupils to think about and record their ideas about what happens to household rubbish after it is thrown away into a bin.

Activity

Pupils could think about, discuss and then make drawings or posters showing places where they can get rid of rubbish properly, e.g. some items can be taken to collection points at supermarkets, schools, etc. Encourage them to think about how and why the rubbish is sorted as it is thrown away.

Ask the pupils to think about and discuss what happens to rubbish after it is thrown into a bin. Ask them to draw and write their ideas in the cartoon strip style on the Enquiry Sheet to show what they think happens to the rubbish.

Some pupils may be able to show their ideas as an animation.

Suggested questions

How is rubbish taken from your house?

Where is it taken?

How often is it taken away?

Supplementary activities

Pupils could observe how different materials change when they are left for two days, e.g. crisp bag, biscuit, piece of apple, leaf.

Pupils could find out why some people throw certain items onto a compost heap and which household waste makes good compost.

Pupils could find out how to make compost from household waste and summarise their knowledge by writing some instructions on 'How to make compost from household waste'.

Some councils are making plans to collect household rubbish less frequently.

Pupils could collect evidence to argue 'for' and 'against' less frequent collections of waste. Remind them to think of counter arguments as they collect evidence.

Where do you think the rubbish we throw away from our houses and school goes?
Draw a series of pictures to show what happens to the rubbish.

household rubbish / waste	after that	after that
after that	after that	after that

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Where does that lorry go?
- ▶ Internet access
- ▶ new.wales.gov.uk

**Links to skills in the Science PoS**

This activity requires pupils to plan and develop questions to include in an interview. It emphasises reflection on the merits of particular questions.

Where does that lorry go?**Overview**

This activity requires pupils to think of questions they could ask an expert on waste disposal about the collection of rubbish from their house or school.

Activity

Try to arrange for some or all of the pupils to interview a person responsible for rubbish collection. If a visit is not possible, pupils might email a list of questions to the local agency or council.

Ask pairs of pupils to think about, discuss and then write a list of questions that they would like to ask about the collection of rubbish from houses and schools. Encourage the pupils to think of open-ended questions. They should write their questions on strips of paper and then add them to a 'diamond ranking' grid* similar to the one on the Enquiry Sheet to show the importance of each question. Ask pupils to justify their rank order and clarify the different criteria they have used, e.g. ask them 'why do you consider that to be the most important question?'

The whole class could then discuss the questions generated by pairs of pupils and agree a set of class questions to be asked and the order in which they should be asked.

Suggested questions

What do you think are the most important things to find out from the person who collects our rubbish?

Do you think s/he might have ideas about how we can reduce the amount of rubbish we put into our bins?

Some people are fined for not recycling some of their rubbish. Do you think our visitor will know how people can be persuaded to recycle more rubbish?

Supplementary activities

Pupils could look in school and in the local library for information about rubbish collection and disposal.

Pupils could find out how much of each kind of material is recycled each year.

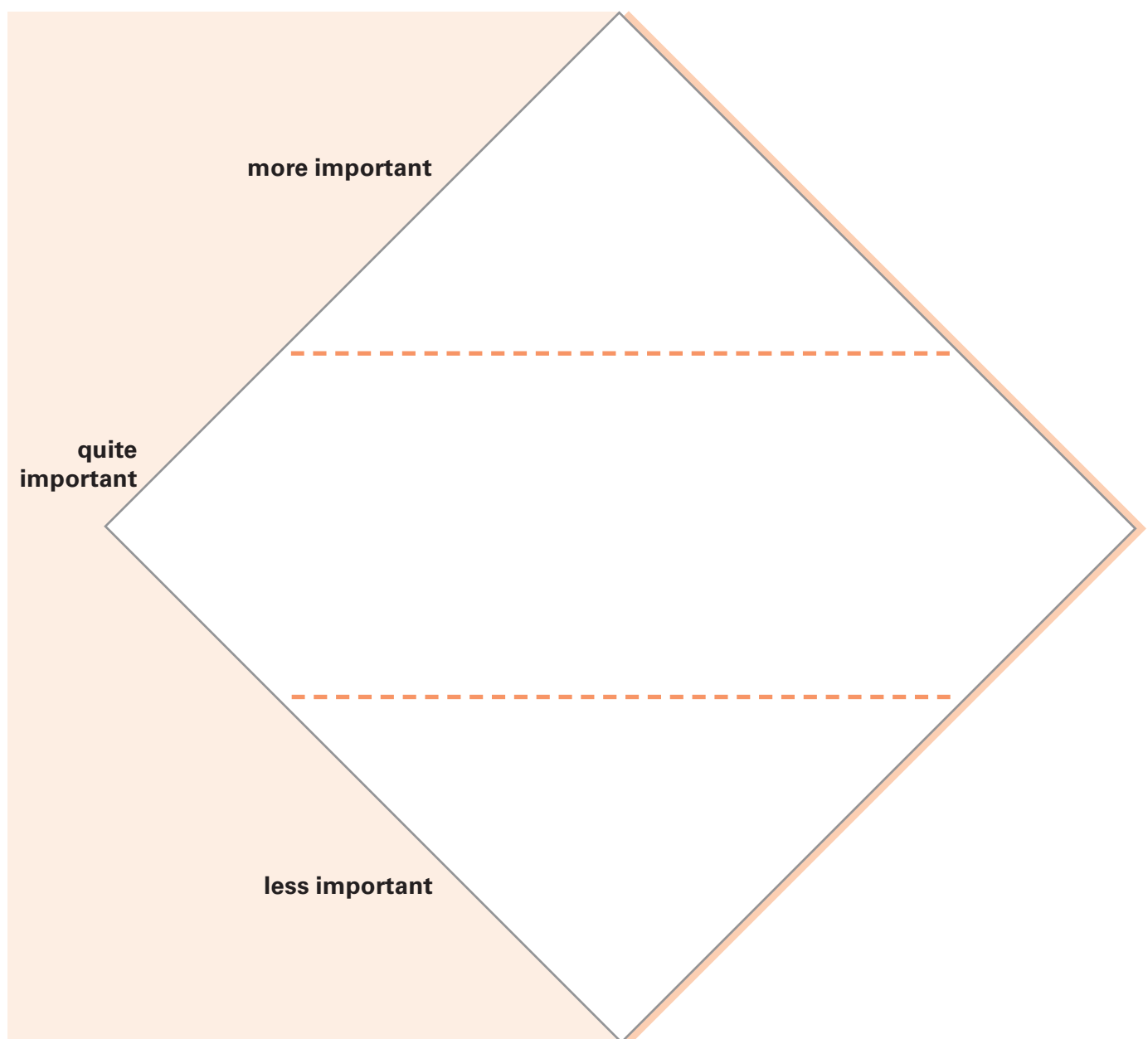
* *Diamond ranking is a strategy that promotes discussion or reflection about the relative importance of a range of factors.*

Think about questions that you would ask a person responsible for rubbish collection that would help you find out more about the collection of rubbish from houses and your school.

Try and write different questions, e.g. 'How does...?', 'Why does...?', 'What if...?', etc.

Write your questions on strips of paper then add them to a 'diamond ranking' grid like the one below.

Put the questions that you consider to be more important at the top of the grid. Those that are quite important are placed in the middle, and the less important questions are placed at the bottom.



Levels 3–5**Resources**

- ▶ Enquiry Sheet – Should we use landfill sites?
- ▶ Internet access
- ▶ new.wales.gov.uk

**Links to skills in the Science PoS**

This activity requires pupils to plan to identify where to find relevant information and ideas. The emphasis is on using evidence to develop arguments and reflecting on ideas.

Should we use landfill sites?**Overview**

This activity requires pupils to find out about rubbish that is re-located to landfill sites in their local area and in the rest of Wales. Pupils make notes on the effects of landfill sites and develop arguments for and against the use of landfill sites.

Activity

Discuss with the pupils how a lot of rubbish is stored in landfill sites and ask them to use the Internet to search for information about landfill sites in the local area and in the rest of Wales.

As groups of pupils collect information they should write some of the effects of landfill sites on post-it notes. Their notes should include arguments for and against landfill sites.

Then, the pupils can record their ideas about the effects of landfill sites on a poster or Interactive whiteboard. They could stick their post-it notes showing arguments for landfill sites on one side and the arguments against on the other side.

The group's ideas could then be shared with other groups, leading to a whole-class collaborative poster containing 'for' and 'against' arguments.

Suggested questions

What information have you found about landfill sites?

Where are the landfill sites in Wales?

How big are these sites?

Why do you think landfill sites are used?

Do you think landfill sites are a good idea?

Why do you think this?

What other ways could be used to get rid of rubbish?

How could the amount of rubbish going to landfill be reduced?

Supplementary activities

Pupils could show the position of some landfill sites on a map of Wales and consider the area of Wales used as landfill.

Pupils could research what happens to landfill sites when they are full.

Pupils could collect images of landfill sites in use and those that have been filled and left for some years. Some pupils might even be able to visit a landfill site.

A lot of rubbish is re-located to landfill sites.

Use the Internet to find out about landfill sites in the local area and in the rest of Wales.

As you find information, make notes on the effects of landfill sites on post-it notes, that you can stick on an A3 poster.

Include arguments for landfill sites on one side of your poster and arguments against landfill sites on the other side. e.g.,

arguments for landfill sites

arguments against landfill sites

Share your ideas with another group.

You could put your ideas together to make a group or class poster.

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Talk about waste

Links to skills in the Science PoS

This activity requires pupils to work collaboratively to develop their ideas by using prior knowledge to answer questions. They consider different interpretations and form opinions. They develop and use success criteria to evaluate their questions.

Talk about waste**Overview**

This activity uses discussion to explore pupils' understanding of some of the different issues involved in waste management. Pupils should agree success criteria they would use to evaluate questions.

Activity

Generally, the main options for waste management include: reusing, reducing, recycling, composting, incinerating and landfill. This activity encourages pupils to find out about the options for waste management, to think about these options and share their ideas in group or class discussion. The Enquiry Sheet provides pupils with a set of eight questions designed to promote discussion. Ask pupils to add some questions of their own and discuss them in small groups. Encourage pupils to use their success criteria to evaluate the merits of different questions.

Suggested questions

What makes a good question?

Which of the questions do you want to research further?

Can you think of a question you would like to ask about getting rid of waste?

Supplementary activities

Pupils could investigate local schemes that are available to help with waste management issues, e.g. garden waste collection, free composting bins, home collection of paper and glass, etc.

Cut out the questions below.

Write questions of your own in the empty boxes.

In small groups discuss your answers to each of the questions.



What happens to the different things we throw away?

What do you count as rubbish?

What kinds of materials are burnt?

How could you reduce the amount of rubbish you throw away?

What does recycling mean?

Why are many of the things we buy in packages?

What is a compost heap?

What things that we throw away could be used again?

Levels 3–5**Resources**

- ▶ Enquiry Sheet – I wonder?

Links to skills in the Science PoS

Pupils are given the chance to develop their own ideas about a topic.

It emphasises reflection on the merits of particular ideas through evaluating outcomes and ordering ideas.

I wonder?**Overview**

In this activity pupils are required to write statements about reducing and recycling rubbish that they could investigate. They discuss their statements and place them in rank order.

Activity

Ask the pupils to read the three examples of 'I wonder' statements provided as a starting point on the Enquiry Sheet.

Then, ask the pupils to write six 'I wonder' statements of their own about reducing and recycling rubbish.

In pairs or small groups, they should discuss their six statements and then rank them in order from 1 to 6, starting with the one they think would be the most important to investigate. Pupils could do this on the Enquiry Sheet by simply numbering each statement. They could, alternatively, use a 'diamond ranking'* grid to present their statements in order.

Encourage pupils to justify the order in which they have placed each of their statements.

Suggested questions

What statements will you make?

Which of your statements do you think is the most important to investigate?

Why do you think this?

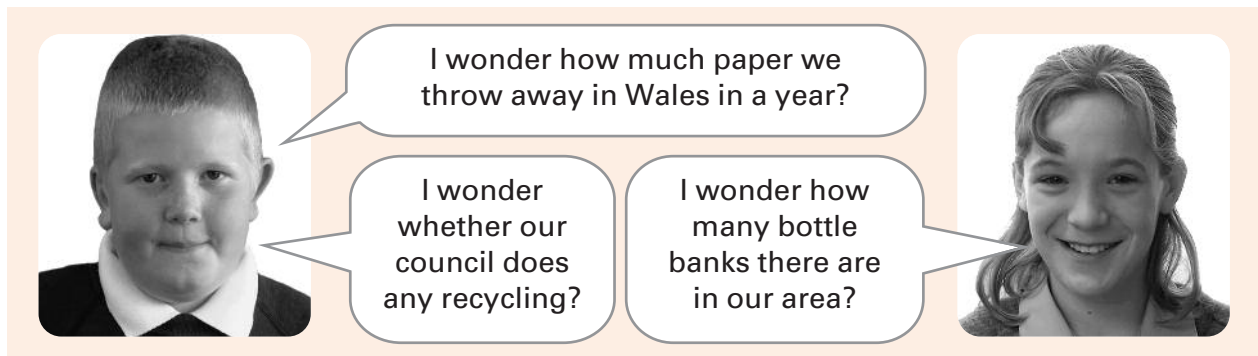
Is it possible to investigate all of these statements?

Supplementary activities

Pupils could investigate one of the statements made at the top of the Enquiry Sheet or the statement they decided was the most important to investigate.

* *Diamond ranking is a strategy that promotes discussion or reflection about the relative importance of a range of factors.*

Read these statements.



I wonder how much paper we throw away in Wales in a year?

I wonder whether our council does any recycling?

I wonder how many bottle banks there are in our area?

Make a list of some of your own 'I wonder' statements to do with reducing and recycling rubbish.

I wonder...?	I wonder...?
I wonder...?	I wonder...?
I wonder...?	I wonder...?

In pairs or groups, talk about your statements and decide which ones would be the most important to investigate.

Rank your statements in order from 1 to 6, starting with the one you think would be the most important to investigate.

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Waste paper

**Links to skills in the Science PoS**

Pupils consider different methods for recording results and make measurements using standard measures. They develop their ideas by making comparisons and reflect on their results by using them to make predictions.

Waste paper**Overview**

In this activity, pupils are required to collect and weigh all the paper that would usually be thrown away in a school day by each class in school. They design a recording sheet to record their results and use the results to make predictions.

Activity

Ask pupils to take an empty carrier bag into each class and invite them to put all the paper products they would usually throw away in a day into the bag. Then, ask them to design a way of recording the mass of paper waste from each class on the Enquiry sheet. At the end of the day, ask them to tie the handles of the bag together, and weigh the bag of waste paper products collected from each class and record their results.

Ask the pupils to think about and discuss their results before using them to inform their predictions on the final part of the Enquiry Sheet.

Pupils should use their results and predictions to present evidence of a problem that might exist regarding waste paper, e.g., to their school council. They should decide how they will make a strong case, e.g. photos of all the bags of paper, video clips of pupils putting paper in the bin.

Suggested questions

What units will you use to measure the amount of paper you have thrown away in a school day?

How much paper do you think the school throws away in a school day?

How would you present the waste paper problem to your school's council?

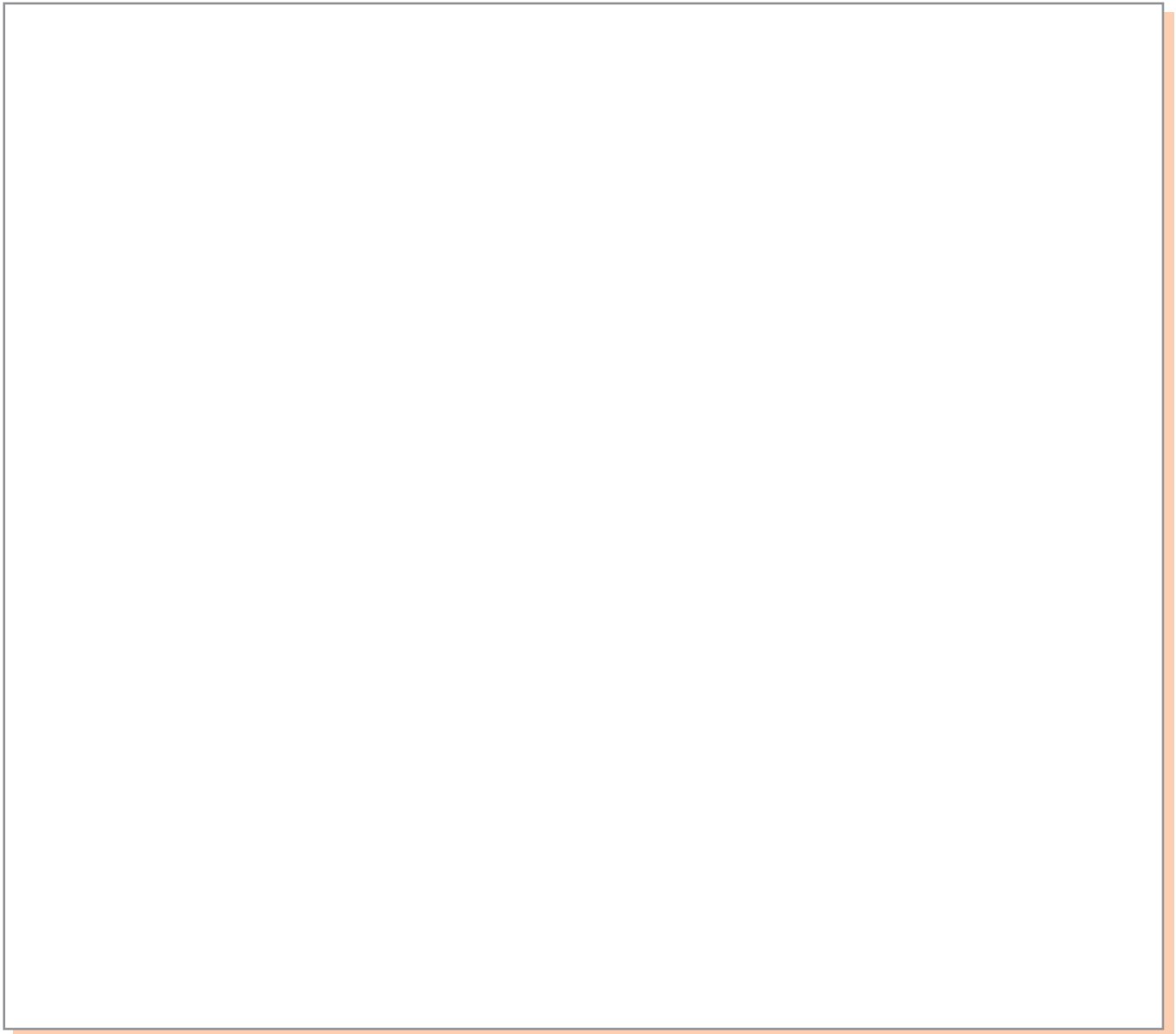
How would you persuade pupils to reuse paper rather than throw it away?

Supplementary activities

Pupils could start a poster campaign to help schools to reuse paper or reduce the amount of paper used.

Pupils could find out if it is possible to sell the waste paper to raise school funds.

Design a recording sheet on which you can record the mass of waste paper thrown into the bin in one day, in each class in school.

A large, empty rectangular box with a thin black border, intended for the student to design a recording sheet. The box is positioned in the center of the page, below the instruction text and above the next paragraph. It has a white background and is surrounded by a light orange border on the right and bottom sides.

Weigh each carrier bag of waste paper and record the result on your recording sheet.

- a) What is the mass of waste paper your school would have thrown away on the day you collected the waste paper in carrier bags?
- b) Predict what mass of waste paper your class might throw away in one week and in one month.
- c) Predict what mass of waste paper your school might throw away in one school year.

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Don't just throw it away

**Links to skills in the Science PoS**

This activity invites pupils to use gathered information to plan a persuasive presentation. They are also required to use their own ideas to plan and make something. Pupils develop their ideas and are given the opportunity to choose the format in which their ideas are communicated.

Don't just throw it away**Overview**

This activity requires pupils to make a record of things being re-used in school. They use items from the school re-using centre to create a piece of art, which they photograph.

Activity

The Enquiry Sheet contains some activities that encourage pupils to think about re-using things.

Ask pupils to think about and discuss some of the things in school that are being used again in a different way, e.g. a jam jar being used to hold paint brushes. Pupils could make a podcast, video film or poster to show some of the things in school that are being used again in a different way. They could use their work to persuade other pupils or parents to think about whether things can be re-used. Set up a class re-using centre in which pupils place items from home that would otherwise have been thrown away, e.g. cereal boxes, plastic containers, etc. Groups of pupils could plan and carry out a project to re-use materials and perhaps sell the new products, to raise extra funds for their class or for charity. Pupils could stick a photograph of their end product on the Enquiry Sheet.

Suggested questions

What things in the classroom are being re-used?
 How will you persuade other people to re-use things?
 In what ways could you re-use the things in the re-using centre?
 Plan and carry out a project that re-uses these materials. Could you sell your new objects at the school fair? What would you do with any money that you raise?

Supplementary activities

Pupils could think about how other items at home and school could be re-used. Pupils could research how some artists and designers re-use materials. Pupils could tell the class about examples of re-usage they have in their homes.

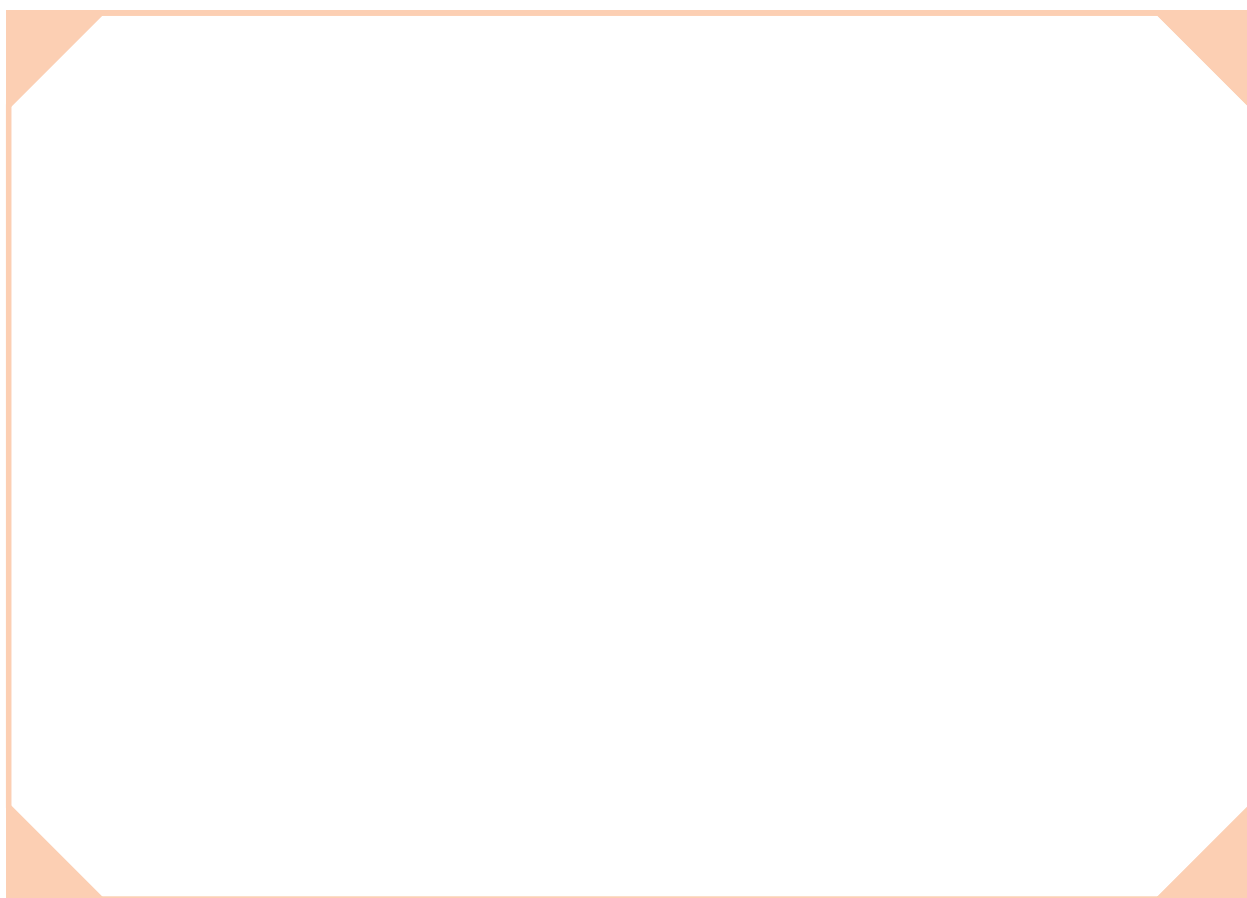
Make a podcast, video film or poster to show some of the things in school that are being re-used in a different way. Present your information to persuade other pupils or parents to think whether something can be re-used instead of thrown away.

Bring things to school to make a class re-using centre.

Choose **one** of these activities to carry out.

- a) Use some of these items to create some 'junk art', e.g. a collage. You could display this artwork to brighten up areas of your classroom or school.
- b) Use some of the items to make puppets or models that could be used for other school lessons.
- c) Use some of the items to make things that could be sold at a school fair, e.g. ornaments, jewellery, calendars, bookmarks, name tags, etc.

When you have completed your activity, take a photograph of what you made. Stick the photograph in this frame. You could make a photo story showing all the products made by the class using digital software, such as iPhoto.



Levels 3–5

Resources

- ▶ Enquiry Sheet – What exactly have I bought?
- ▶ items in a packet, e.g. biscuits, eggs, toys, batteries, etc.

Links to skills in the Science PoS

The activity gives pupils the opportunity to develop their ideas through collaborative work by making comparisons and forming considered opinions. Pupils are encouraged to reflect on ideas by suggesting amendments and improvements.

What exactly have I bought?

Overview

This activity invites pupils to think about and discuss how the things we buy are packaged. They make notes of their ideas and show how they would re-package an item of their choice.

Activity

Ask each pupil to bring to school something from home that is in a packet. It could be a toy, food stuff, CD, batteries, etc.

In groups, ask them to look at the things they have brought into school and the packaging used. They could discuss the materials being used as packaging and the necessity of the packaging. Encourage pupils to think about the advantages and disadvantages of packaging.

Ask the pupils to draw a picture to show the usual packaging of one object and another picture to show the new packaging they have designed. Invite them to record their ideas in the table on the Enquiry Sheet.

Suggested questions

How is packaging helpful?

How is packaging unhelpful?

How could you reduce the packaging on the item you have selected?

Supplementary activities

Pupils should develop an argument 'for' or 'against' the use of packaging and present this argument to the class. They could ask different people for their point of view: parents, teachers, other pupils. They should use any ways they can think of to present their arguments: PowerPoint, video clips, still images and audio recordings.

Your group will need some different objects in packets.

Think about:

- ▶ Why is packaging used?
- ▶ What materials are used in the packaging?
- ▶ How much packaging is used?
- ▶ How could the amount of packaging be reduced.

Make a list of your ideas to present as part of a class discussion.

Draw a picture to show how one item of food is usually packaged.

You can add some words to explain your drawing.

Think about how this item might be packaged differently in order to reduce waste.

Draw another picture to show the new packaging you have designed.

usual packaging	new packaging

Levels 3–5

Resources

- ▶ Enquiry Sheet – Stop wasting time – let's act!



Links to skills in the Science PoS

This activity requires pupils to use gathered information and prior knowledge to plan a persuasive presentation. They develop their ideas and reflect on them by considering how the presentation should be tailored for a specific audience.

Stop wasting time – let's act!

Overview

This activity requires pupils to work in groups to draw together the ideas in the whole theme. They are required to produce a presentation that will inform and motivate an audience to play a greater part in reducing waste and increasing recycling in the local community.

Activity

Tell the pupils they are going to put together a presentation. The purpose of the presentation is to make the audience aware of the issues involved in waste disposal and to persuade them that individuals can act to reduce rubbish and increase recycling in the local area.

In groups, ask the pupils to think about and discuss what they have found out about waste disposal and recycling and to share their ideas with the class. Ask them to make notes of their main ideas and to then consider how they will get their message across in a presentation. Pupils could record their ideas on the Enquiry Sheet.

Invite them to think of an interesting way to present their information, e.g. they could incorporate elements of drama, dance, singing, dialogue, art, etc, and use flash cards, posters, charts, video clips, etc. Finally, the pupils could make their presentation in front of their chosen invited audience.

Suggested questions

- What are the main issues surrounding waste disposal?
- How will you try and get your audience to understand that their individual actions can have an effect on the environment?
- How will you make your presentation interesting and exciting?

Supplementary activities

Pupils could video record the presentation and 'rap' and put some clips on the school website.

You are invited to make a presentation of your main findings so that people understand their individual actions can have an effect on the environment.

Make notes to show your main points.

our main points	how we will get our message across

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