

Scientific Enquiry Materials

KS2

HEALTHY LIVING



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Levels 3–5

Resources

- ▶ Enquiry Sheet – My research
- ▶ betreatwise.org.uk



Links to skills in the Science PoS

They should be encouraged to choose their own success criteria and decide how they will find out information relevant to their enquiry. They should discuss different interpretations of the evidence collected and form considered opinions. They will be encouraged to evaluate outcomes against their own success criteria and suggest ways their approach could have been improved.

My research

Overview

This activity involves pupils in planning, carrying out and reporting a survey that examines children's lifestyles. They can choose to survey any relevant issue that particularly interests them. The enquiry could take place over several lessons.

Activity

Ask the pupils to think about and discuss children's health and their quality of life. Some examples to start them thinking might include regular exercise, their use of mobile phones, eating junk food, using the Internet, etc.

Ask the pupils to choose one issue they would like to research. Encourage as wide a range of issues to be explored as possible. They should agree the criteria that can be used to judge their research.

They could plan and carry out their research, interpret and present their data.

Encourage creative ways of sharing the information across the school, e.g. podcasts, PowerPoint, video stories etc.

Encourage pupils to evaluate each other's research and the information they have collected and suggest improvements to their investigations.

Suggested questions

How will you carry out your research?

What questions would you like to ask?

Can you think of a question about health and the use of mobile telephones?

If you were to do your survey again, what changes to your approach would you make?

Supplementary activities

Pupils could make a database of the areas of their life for which there are survey data.

Pupils could review all the data and identify issues which might have been overlooked. Ask them to think of further questions raised by the data.

Pupils could compare their results with results from other studies on the Internet.

Following the class discussion about children's health and their quality of life, think of some issues that you would like to explore further.

Choose one issue that you would like to research.

Think about how you will collect data and report what you found out.

the research I plan to carry out

my report

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Computer netiquette
- ▶ Internet access

**Links to skills in the Science PoS**

This activity is predominantly about reflecting on everyday use of computers and considering the hazards and risks to themselves and to others. They will be encouraged to form opinions about safe use of the Internet and agree safe practices which can be used within and outside school.

Computer netiquette**Overview**

This activity requires pupils to think about, find out and agree how they should use the Internet safely and to make a list of guidelines for younger pupils to use in school. They should develop guidelines for others by i) reviewing their own practices and ii) talking to their peers.

Activity

Ask the pupils to make a list of the ways they use computers on-line, e.g. email, texting, downloading music, chat rooms, search engines, blogs, podcasts etc. In pairs, they should think about and discuss what they do that is definitely safe and what they do that might not be safe. They could video each other talking about their use of computers and the Internet.

Ask the pupils to think of some of the ways they can keep safe while they use their computer.

They should agree the order of importance of the safety advice and make a set of guidelines to show younger pupils how they can keep safe on the Internet.

The URLs in the Teacher's Guide provide useful advice on Internet safety.

Suggested questions

What programmes do you use to chat with friends?

What do you enjoy about chat rooms?

How do you make sure you keep safe?

Is there anything you do that might not be safe?

What risks are there to using the computer and what are the benefits?

Is there any information you should not give out in a blog?

Do you ever share your password with anyone else?

Supplementary activities

Pupils could make videos for different audiences, e.g. parents, the school governors, siblings, about safe use of the Internet for the school. They could tailor their language for the intended audience.

Pupils could role-play safe and unsafe Internet behaviours to explore some of the risks and how they might handle them.

Pupils could make animations to show safe and unsafe uses of the Internet.

Make a list of the ways you use a computer on-line. Decide which of these is safe and which may not be safe.

Use the ideas you have thought about and discussed to make a set of guidelines about computer safety for younger children.

Guidelines for young children	
do	do not

Levels 2–5**Resources**

- ▶ Enquiry Sheet – Growing

Links to skills in the Science PoS

This activity places the emphasis on predicting how pupils might change as they grow older. Ideas will need to be based on scientific prior knowledge, and assumptions and understanding based on that knowledge. Sharing these predictions as a class will offer opportunities for reviewing the evidence for and against predictions.

Growing**Overview**

This activity requires pupils to consider how they might change in appearance as they grow older. Using photographs of themselves and other people as babies, they might find it useful to compare how they and other people have changed and will change in the future.

Activity

Ask the pupils to think about and discuss the way they look now and what they might look like in the future.

Encourage pupils to think of and record ways they could change as they get older. They could do this first as individuals and then share their ideas in pairs and in larger groups. They could take a photo and age themselves using photo editing software to digitally manipulate the image.

Ask the pupils to use the Enquiry Sheet to make a 'before' and 'after' montage of themselves using drawings or photographs. Encourage them to write a description of the changes.

Some pupils might make an animation to show how they might expect to change during their life.

Suggested questions

How do you know when you have changed?

What evidence could you collect to show you have changed?

When do you think each change happen?

How could you measure changes over time?

Which changes take a long time to notice and which changes are less easy to notice?

Supplementary activities

Pupils could sort the changes into those that are easy to quantify and those that are more difficult to quantify, e.g. height change is easy to quantify, while changes in food preferences are difficult to measure.

Pupils could sketch graphs to show some of the changes they have described. For example, changes in their height over 10 years. They should add the axes labels. They could write a short narrative to describe the changes shown in each graph. Pupils could be encouraged to think about changes such as personality or behaviour.

before	after
how I have changed	

Levels 2–5

Resources

- ▶ Enquiry Sheet – Investigating growing



individual differences should be handled with sensitivity

Links to skills in the Science PoS

Pupils will plan and carry out an investigation that considers the key factors to be controlled. They will be encouraged to make accurate measurements and to check the reliability of data collected. Their reflections on the method used and the outcomes should identify whether the approach was successful and how it might be improved in the future.

Investigating growing

Overview

This activity encourages pupils to plan and carry out an investigation about their growth. Pupils should decide the variables they are interested in comparing. Some ideas from pupils are offered as starting points but your pupils may well have their own ideas for questions.

Activity

Thinking about the height of Michael Jordan* and the size of his trainers could provide an engaging context to introduce this activity.

Ask pupils to work in pairs to think of a question about growing that they are interested in investigating. Share these question ideas, but also encourage them to think of their own questions.

- ▶ Do children with the biggest hand-span have the longest arms?
- ▶ Do the tallest children have the biggest feet?
- ▶ Do older children have the biggest heads?

Ask pupils to agree the success criteria for a good plan, then plan and carry out their investigation using the Enquiry Sheet.

Encourage pupils to review their own investigations by using the success criteria agreed at the outset to suggest ways in which their investigation was good and ways in which it could be improved.

Suggested questions

What will you measure?

Who will you measure?

What units will you use to make your measurements? How will you record your results?

How will you make sure your measurements are reliable?

If you were to repeat your investigation, what changes to your approach would you make?

Supplementary activities

Pupils could review the criteria used to evaluate their investigations.

* Michael Jordon – A 1.97m American basketball player with a shoe size of 13.

In pairs, decide a question you would like to investigate about humans growing.

.....

Use the questions below to help your group to plan your investigation.

- ▶ What parts of the body will you measure?
- ▶ How will you take your measurements?
- ▶ How many children will you measure?
- ▶ How will you make your measurements accurate?
- ▶ How will you make your measurements reliable?

When you have carried out your investigation present your results below.

Write two good points about your investigation and two ways it could be improved.

good points about the investigation	ways the investigation could be improved

Levels 3–5**Resources**

- ▶ Enquiry Sheet – What makes a 'good' conclusion?

**Links to skills in the Science PoS**

Pupils will consider where and how to find information in a graph. Through discussion and reflection they will make decisions about the validity of conclusions drawn.

What makes a 'good' conclusion?**Overview**

This activity encourages pupils to think critically about conclusions drawn from a graph showing the changes in head circumference as a child gets older. They will decide whether or not their own conclusions are supported by evidence in the graph.

Activity

Ask the pupils to look at the graph on the Enquiry Sheet. Ask them to think about and decide what makes a 'good' conclusion.

Ask them to think of as many different conclusions as they can draw from the graph and to write them on pieces of paper.

Ask them to exchange their list of conclusions with a partner.

They should sort the conclusions into three groups.

- ▶ 'supported by data (information) in the graph'.
- ▶ 'not supported by data in the graph'.
- ▶ 'not sure'.

Encourage pupils to review and check each others' judgements.

Where there is disagreement about a judgement, encourage pupils to discuss their reasoning with each other and to agree whether or not to move conclusions from one group to another.

Finally, encourage pupils to reflect on what makes a 'good' conclusion.

Suggested questions

What do you think has been investigated?

Can the axes labels help you interpret the graph?

Can you tell the story of each of the lines on the graph?

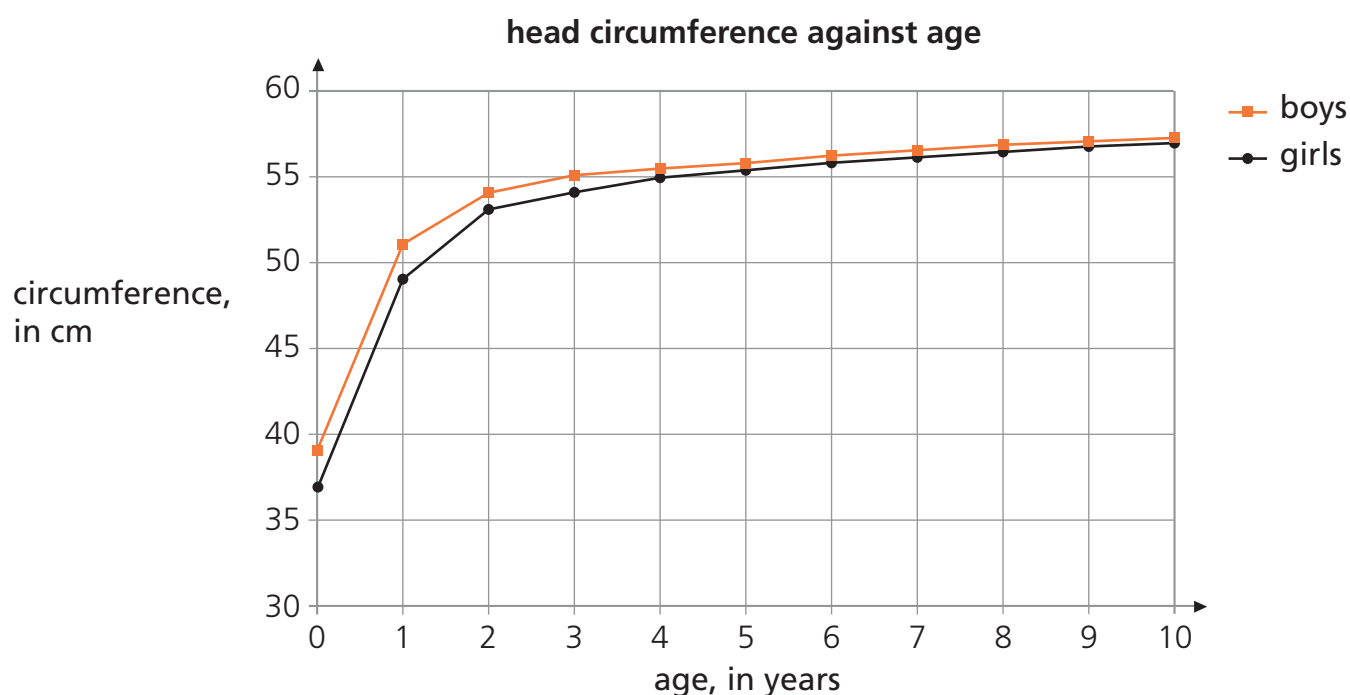
How many different conclusions can you draw from the information in the graph?

What do you think makes a 'good' conclusion?

Supplementary activities

Pupils could sketch different graphs and then exchange graphs, add their own axes labels and write the story of the graph.

Pupils could think of as many different appropriate axes labels as they can for one graph provided for them by the teacher.



Think of some success criteria for a 'good' conclusion.

Write as many different conclusions as you can draw from the graph.

Exchange your list of conclusions with a partner.

Put the conclusions that you think are **supported** by information in the graph in one group, and put those that are **not supported** in another group.

Are there any conclusions that should be in a group called **not sure**?

Where you disagree with your partner, ask your partner to explain their reasons.

Listen to your partner's reasons. Decide together which conclusions are supported by the graph.

Levels 3–5

Resources

- ▶ Enquiry Sheet – Diet and exercise
- ▶ betreatwise.org.uk
- ▶ new.wales.gov.uk
- ▶ nutritionnetworkwales.org.uk



Links to skills in the Science PoS

This activity lends itself to the use of survey as a way of investigating the claims. Pupils decide on the questions to be asked and where and how they will find out relevant information. They will form opinions about the data gathered and use it as evidence to evaluate the claim. Pupils should review each other's reports using the agreed criteria.

Diet and exercise

Overview

This activity presents pupils with two claims. One is critical of children's diet; the other, their use of the car to travel to school. They are to plan and carry out an investigation of one of these claims. Allowing pupils to decide their own success criteria is an important part of the activity along with the encouragement of pupils to use their criteria to evaluate each other's reports.

Activity

Tell the pupils that people have different ideas about diet and exercise.

Explain to the pupils that they are going to plan and carry out an investigation of one of the claims: **Either** claim A: 'Many children do not eat the recommended amounts of fruit and vegetables.' **Or** claim B: 'Many children are brought to school in a car.'

Ask each group to choose one of the claims to investigate and to write a plan for their investigation. Their first step will be to turn the claim into a form that can be investigated.

Pupils should carry out their investigation and present their results as a newspaper report that includes i) the claim as a headline and ii) a description of their research and findings.

Pupils should review and comment on each others' reports and consider the possible impact on children's health suggested by their findings.

Suggested questions

Does your investigation provide data that supports the claim being made?

What questions will you ask?

How many children will you ask?

How will you choose the children that take part in your investigation?

How will you record the data you collect?

Supplementary activities

Pupils could draw bar charts to show the information they collected in their investigation.

They should decide whether or not the results of their investigation support the claim that was investigated. They should use their results as evidence in their argument.

Pupils could find evidence for other claims in newspapers or magazines such as eating junk foods, or healthy school dinners.

Pupils could interview parents and grandparents and reflect on how, for instance, diet and transport have changed since they were children.

Claim A:

'Many children do not eat the recommended amounts of fruit and vegetables.'

Claim B:

'Many children are brought to school in a car.'

Decide within your group which claim to investigate and the success criteria for your investigation.

Write a plan to show how you will carry out your investigation.

Carry out your investigation.

Record your results as a newspaper report.

Include:

- ▶ a title showing the claim you investigated
- ▶ a description of your research and findings.

Ask other pupils to read and comment on your report.

They should tell you what they like and how they think it could be improved.

Think about and discuss the possible effects on children's health suggested by your research.

Levels 2–5

Resources

- ▶ Enquiry Sheet – Food diary
- ▶ Internet access
- ▶ 5aday.nhs.uk
- ▶ nutritionnetworkwales.org.uk



parental permission may be needed for this activity

Links to skills in the Science PoS

The important part of this activity is the careful recording of the range of food that is eaten and then the critical reflection on whether or not the diet as a whole is wide-ranging or narrow.

Food diary

Overview

This activity invites pupils to record the food they eat in a week. They can choose their preferred way of keeping a record. They should be invited to think critically about their diet as a whole. This activity provides a good opportunity to discuss the reliability of data and how it can be improved.

Activity

Ask the pupils to make a record of the food they eat in a week. They could make a video diary, take photographs or use the Enquiry Sheet.

Pupils should review their diaries to explore whether their diets are varied and healthy or narrow and unhealthy.

In pairs, they should discuss how they could measure the amount of each type of food they eat in a week, and think about any specific ways they might change their diet.

Ask the pupils to think of four conclusions about their diet.

Suggested questions

What do you eat in a typical week?

How much of each food do you eat each week?

How would you measure the amount of each different type of food?

What do you know about the different food groups?

What is meant by, 'healthy diet'?

Supplementary activities

Pupils could make a video animation showing some of the ways they might expect to change and grow if they eat a healthy diet and ways they might change if they eat an unhealthy diet.

Make a food diary either on paper or using a video or still camera to show the food you eat during one week. Remember to estimate how much of each food you eat.

day	food
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

In pairs, look at your record of the food you have eaten.

Discuss whether you need to change your diet in order to be more healthy.

Think of four conclusions about your diet using the information you have collected.

Levels 2–5

Resources

- ▶ Enquiry Sheet – Diet
- ▶ Internet access
- ▶ betreatwise.org.uk
- ▶ nutritionnetworkwales.org.uk
- ▶ nutrition.org.uk
- ▶ tasting food



parental / carer permission
may be needed for tasting
food

Links to skills in the Science PoS

Using information and prior knowledge pupils will form considered opinions. They will compare the diets of different groups of people and reflect on how their learning might be used within and outside school.

Diet

Overview

This activity encourages pupils to explore the diet of particular groups of people. Using the internet and their own prior knowledge they will discuss how food might be useful to different groups of people.

Activity

Ask the pupils to use the Internet to find out why different foods may be useful for the body. They could summarise their ideas and findings on the Enquiry Sheet. Then, in pairs, ask pupils to find out why different groups of people need different diets.

They could use their findings to plan a week's menu for different groups of people, e.g, an adult and a baby.

Suggested questions

Why do you think people eat different kinds of food?

Why do children need a different diet to older people?

What types of food do different athletes need to eat as part of their diet?

Supplementary activities

Pupils could make a fruit smoothie, observing the changes to the fruit.

Pupils could use ICT to produce a three week menu for the Welsh rugby team on tour.

Pupils could make a poster for a restaurant aimed at a specific type of athlete.

Pupils could produce a menu and advertisement leaflet for a restaurant for children.

Investigate the different kinds of food that people eat.

Use the Internet to find out why these foods may be useful for the body.

food	useful for the body

Use the information you find to plan a week's menu for different groups, e.g, an adult and a baby.

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Measuring salt in food
- ▶ 100g of salt
- ▶ Internet access
- ▶ nutritionnetworkwales.org.uk
- ▶ salt.gov.uk



pupils should not put salt into their mouths

Links to skills in the Science PoS

The crux of this activity is that pupils plan and carry out their own method of enquiry. They should be encouraged to review the outcomes of those enquiries themselves and to consider any suggestions for improvement offered by others.

Measuring salt in food**Overview**

This activity requires pupils to think about different ways they could estimate the mass of a small amount of salt. They use the Internet to find the recommended daily intake of salt for a child.

Activity

Show the pupils a small amount of salt.

In groups, ask them to think about and discuss different ways they could find out the mass of this salt. They could use the Enquiry Sheet to record ideas.

Ask the pupils to use the Internet to find out what the recommended maximum daily intake of salt is for a child.

Provide each group with 100g of salt and set them the task of making a pile of salt that is roughly equivalent to the mass of the recommended maximum daily intake for a child.

Pupils could think of ways they could find out the mass of their pile of salt. If available, a digital balance could be used to weigh the pile of salt. Encourage pupils to suggest improvements to the methods they suggest.

Suggested questions

How could you find out the mass of the salt?

How much salt should you eat in a day?

Supplementary activities

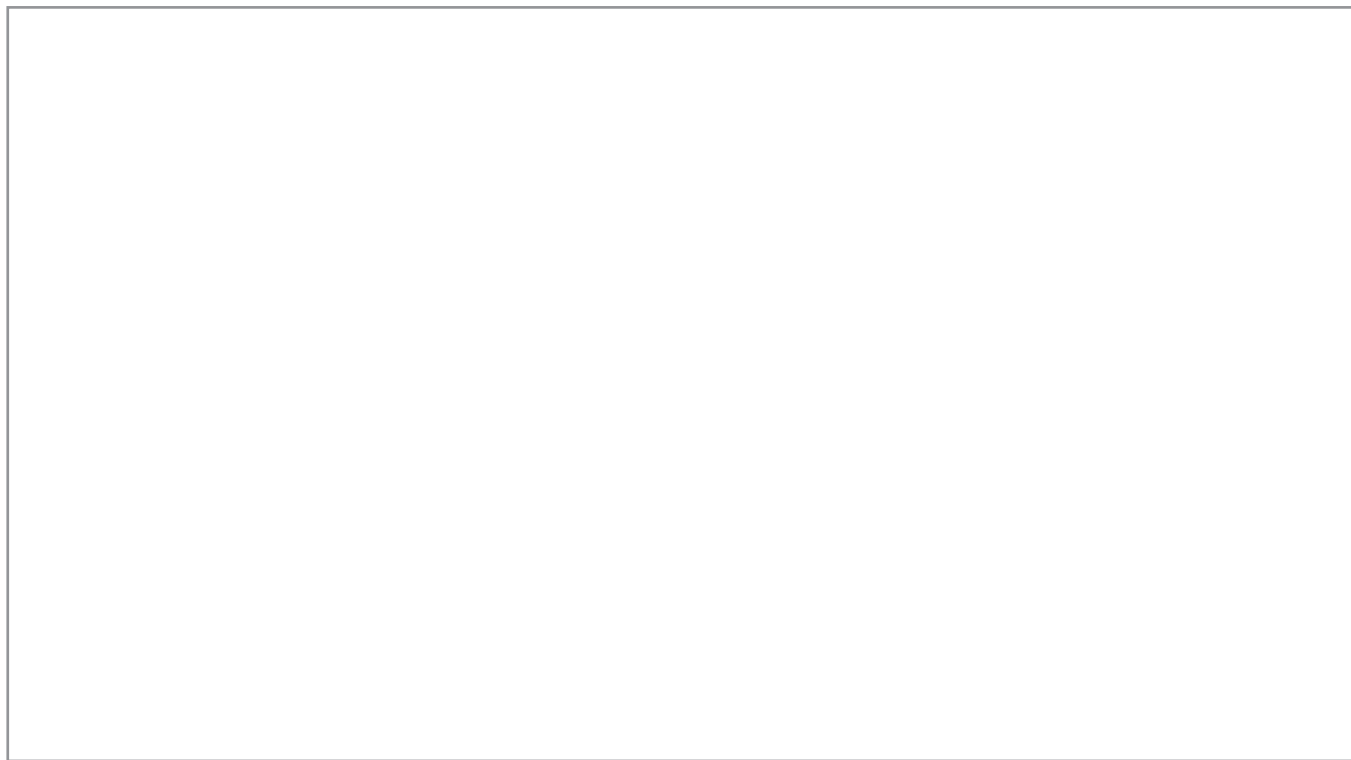
Using food labels, ask pupils to find out how much salt is likely to be in one serving of food.

Pupils could use the information collected to decide whether they eat too much or too little salt each day.

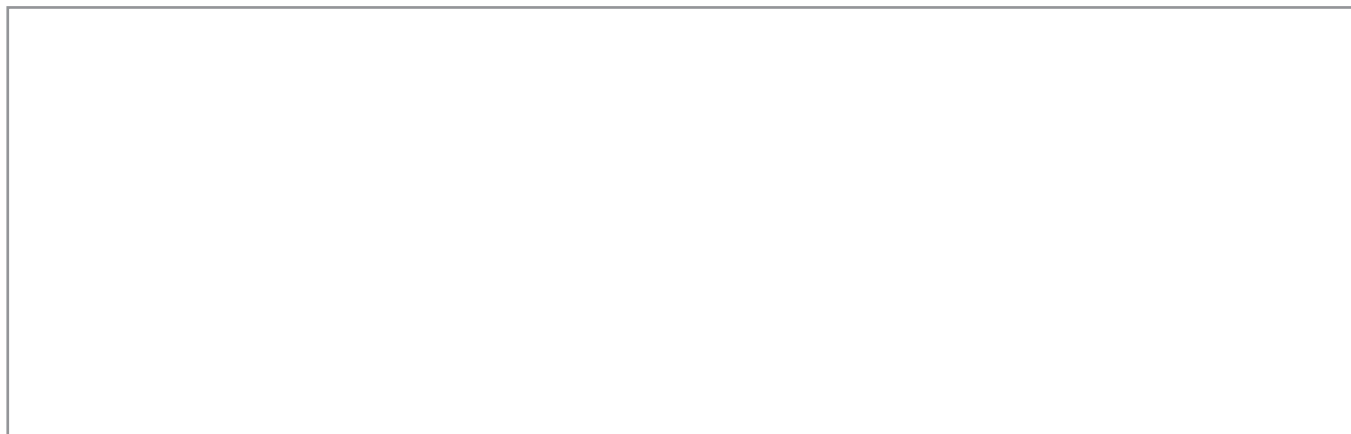
Pupils could use the Internet to find out how too much salt damages the body.

Pupils could think about and investigate the mass of sugar they eat each day.

In your group think about different ways you can estimate the mass of a small amount of salt.



Use the Internet to find the recommended maximum mass of salt that children should eat each day.



Your group has been given 100g of salt.

Use this salt to make a pile that is roughly the recommended mass of salt you should eat in a day.

Look at the ways that you thought of to measure a very small mass of salt. Agree on one way and use it to see how close your pile of salt is to the recommended daily maximum.

Levels 2–5**Resources**

- ▶ Enquiry Sheet – Salt in my food



pupils should not taste food

Links to skills in the Science PoS

There is a very clear focus on communicating direct experiences and of imposing some order on these experiences. Sharing these experiences will provide opportunities for different interpretations to be aired.

Salt in my food**Overview**

This activity emphasises pupils' own experiences of the salty taste of some foods. They are asked to think of favourite foods and order these according to their own view of how much salt might be in the foods.

Activity

Ask the pupils to think about and discuss their favourite foods and the foods they eat most regularly. Encourage them to share their ideas with the class and to draw and label some of the foods on the Enquiry Sheet.

Ask the pupils to put these foods in order from the one that tastes the most salty to the one that tastes the least salty. Encourage pupils to share their lists with each other and explain their reasoning.

Pupils could research the amount of salt in different foods using food labels or the Internet. They could compare their findings with the order they predicted.

Suggested questions

Which foods do you add salt to when you eat them?

What is the saltiest food you have ever tasted?

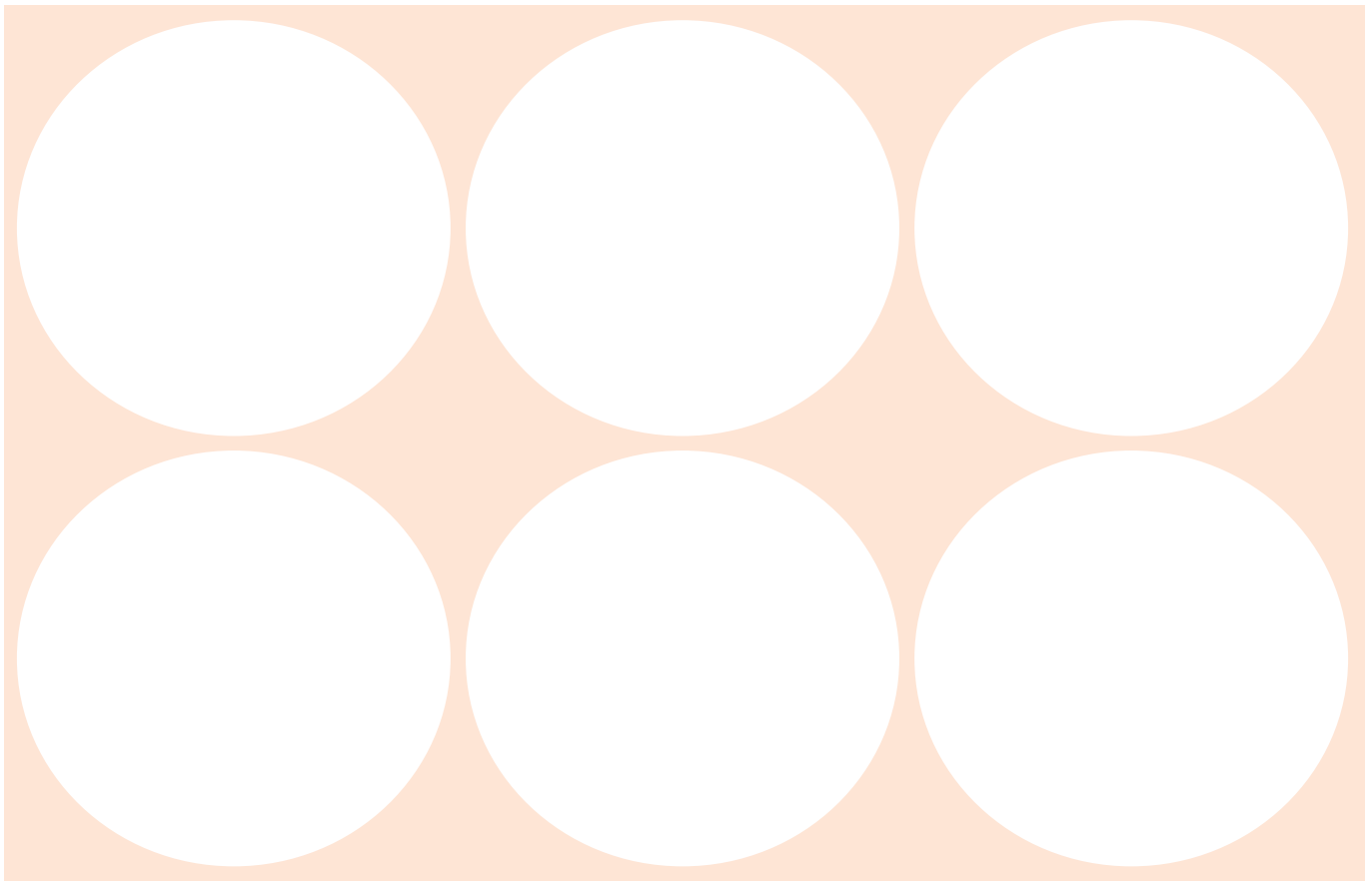
Which foods taste least salty?

What part of the tongue do you use to taste salt?

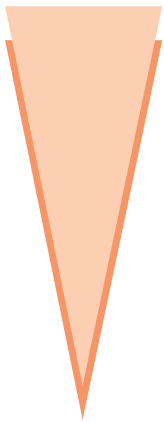
Supplementary activities

Pupils could consider the reliability of the senses as accurate measuring instruments.

Most food contains salt. Draw and label six foods that you eat regularly.



Put these foods in order from the one you think tastes most salty to the one you think tastes the least salty.

food	
 most salty least salty	

Talk to your partner about your ideas. Find out the amount of salt in these foods and compare your findings with your predictions.

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