

EDUCATION PACK

Fighting against food waste



Secondary

LOVE
FOOD
hate waste

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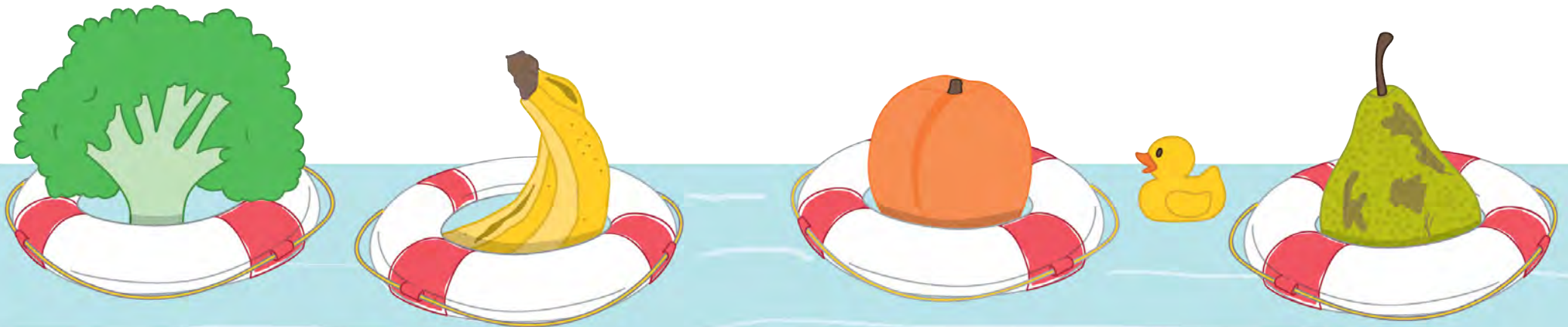
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INTRODUCTION

Welcome to the Love Food Hate Waste education pack for the Scottish curriculum. Love Food Hate Waste is here to help us all make the most of the food we love. By taking simple steps we can all reduce the food that we end up throwing away, saving ourselves money and reducing our impact on the planet. In Scotland, Love Food Hate Waste is run by Zero Waste Scotland as part of our drive to value resources and inspire change.

Through a variety of engaging and easy to use inter-disciplinary lessons, your learners are given a voice on a significant problem facing our world today. They are able to contribute directly in a positive and tangible way to the Global Goals for sustainable development from the United Nations and the Scottish Government pledge to reduce the food we throw away by 33%.

We are here to support your teaching and enhance learning. Along with curriculum links and engaging activities, this series of Education Packs include:

PRIMARY LESSONS

The first lesson of each age group will inform and inspire your learners, the second will have them loving and valuing food, while the third will give them all the practical know-how to hate waste and save food from the bin.

- [Food waste primary school resources](#)

SECONDARY LESSONS

Subject specific and stand-alone, these lessons are the perfect opportunity to embed Learning for Sustainability across the

curriculum and tackle a pressing global issue in a different context.

- [Download the Secondary Lessons Pack](#)

WHOLE SCHOOL LESSONS

Putting your learning into practice, the whole school lessons facilitate your engagement with food in the school setting and support you in sharing what you've learned with the wider community.

- [Download the Whole School Lessons Pack](#)

Thank you for joining us in the fight against food waste and we hope you enjoy taking your learners along on this journey to save food from the bin.

The Love Food Hate Waste team, Zero Waste Scotland.

lfhw@zerowastescotland.org.uk



CURRICULUM LINKS

Please refer to the National Improvement Hub for the [Curriculum for Excellence Benchmark](#).

SECONDARY LESSONS	LITERACY LESSON	SCIENCE LESSON	MATHS LESSON	RME LESSON	HOME ECONOMICS LESSON
Expressive Arts				EXA 3-03a, EXA 3-04a, EXA 4-03a	EXA 3-03a, EXA 3-04a
Health and Wellbeing					HWB 3-30a, HWB 3-33a, HWB 3-36a
Literacy and English	ENG 3-03a / 4-03a, ENG 3-27a / ENG 4-27a, LIT 3-02a / LIT 4-02a, LIT 3-04a / LIT 4-04a, LIT 3-05a / LIT 4-05a, LIT 3-06a / LIT 4-06a, LIT 3-07a / LIT 4-07a, LIT 2-10a / 3-10a / 4-10a, LIT 4-13a, LIT 3-14a / LIT 4-14a, LIT 3-15a / LIT 4-15a			LIT 3-05a / LIT 4-05a, LIT 3-06a / LIT 4-06a	
Numeracy and Mathematics		MNU 3-08a, MNU 3-11a / MNU 4-11a, MTH 2-21a / 3-21a	MNU 3-01, MNU 3-03a, MNU 3-07a, MNU 3-08a, MTH 2-21a / 3.21a, MNU 4-07a, MNU 4-08a, MNU 4-20a		
Sciences		SCN 3-18a, SCN 3-19a			
Social Studies	SOC 3-08a, SOC 4-08				
Technology		TCH 3-10a			
Religious and Moral Education				RME 3-07a / RME 4-07a, RMS 3-08a / RME 4-08a, RME 2-06b, RME 3-06a, RME 3-06b, RME 3-02b / 3-05b, RME 4-02b / 4-05b	

LESSON 1: S1 / 2 LITERACY

1.1 IN A NUTSHELL

In this lesson learners consider how much food is wasted both in Scotland and on a global scale. They investigate the impacts of this waste and come up with their own campaign to fight against food waste, developing their literacy skills and exploring how language can be used to influence or persuade people.

1.2 CORE LEARNING

We are learning that language can be used to persuade or influence individuals to change their behaviour. We understand that food waste is an issue in Scotland and we are using a variety of persuasive techniques to save food from the bin. Success criteria:

- Explain the scale of food waste in Scotland and on a global scale. Appreciate the financial and environmental impact avoidable food waste has on people in Scotland.
- Engage with others and communicate in expressive, persuasive ways that encourage people to reduce levels of avoidable food waste.
- Develop a campaign to encourage people to reduce food waste.

1.3 PREPARATION

Ask learners to keep a food waste diary for one week prior to this lesson, detailing all the food that they end up throwing away.

Display the '[Secondary Literacy](#)' PowerPoint.

1.4 STARTER: FOOD WASTE SCANDAL

Show learners the 'Secondary Literacy' PowerPoint and highlight these facts:

- 600,000 tonnes of food is unnecessarily wasted in Scotland every year costing us £1.1 billion.
- On average we could save £460 per year per household by not wasting food at home.
- Reducing food waste has the same positive environmental impact as taking 1 in 4 cars off the road in Scotland.
- 1/3 of the food produced globally is lost or wasted.

Explain to learners that Scotland as a nation is committed to reducing the amount of food that is thrown away and aims to reduce food waste by 33% by 2025.



To set the scene further, you may wish to show learners this TED talk and video by food waste campaigner Tristram Stuart:

https://www.ted.com/talks/tristram_stuart_the_global_food_waste_scandal

https://www.youtube.com/watch?v=cWC_zDdF74s

1.5 MAIN: CAMPAIGN TO COMBAT FOOD WASTE

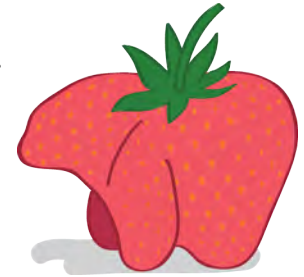
Split the class into groups. Ask each group to research what's being done to tackle food waste in Scotland and further afield. Ask them to then work together to develop a campaign to encourage people to reduce food waste. Their campaign could be in the form of a poster, advert, drama presentation, or video including activity on social media. Encourage them to think about what motivates people to take action and change their behaviour.

- Who are they trying to reach? Who is their audience?
- What are they trying to say? What are their key messages?
- How will they influence their audience?

Special attention should be given to the persuasive language that the campaign will use. If this is a new area of focus for your learners why not study some of the writing techniques that could be used? For instance:

- Repetition or rhyme
- Comparisons or simile
- Humour or emotive language
- Word choice e.g. using 'you' or 'our'
- Motivating factors like benefits to the reader or listener

Give each group one of the following topics to research and base their persuasive campaign on.



1. Smart technology

Technology is influencing and disrupting the way we access and distribute food. There are a number of apps and innovative technological solutions that aim to help reduce food waste. Could apps or smart technology help to solve the global problem of food waste?

2. Food sharing initiatives

There are a number of organisations that save food from the bin by redistributing it. Why not investigate food sharing networks, initiatives and movements in Scotland and further afield? Examples include Fareshare or The Real Junk Food Project who 'feeds bellies not bins' and make meals for people from food that would otherwise have gone to waste.

3. Supermarkets and shoppers

Research how supermarkets communicate with shoppers about the food they buy. Do they make it easy or difficult to cut down on what we waste? Why do supermarkets reject certain produce that don't meet cosmetic standards? Learners may wish to consider 'ugly fruit and veg' boxes and any hints, tips and recipes offered by major supermarket chains.

4. Celebrity support

TV chefs like Jamie Oliver and Hugh Fearnley-Whittingstall use their influence to encourage people to look at issues around food. Investigate various celebrities' use of social media to inspire change. Do you think that celebrities and the media have the potential to change our approach to food waste?

5. Saving money

In Scotland food waste costs us £1.1 billion every year. We could save around £460 per year per household and £700 per year for a family of four by not wasting food. Do you think knowing about the financial impact of food waste could help people reduce the food they throw away?

6. Saving the planet

When we waste food we are also wasting all the resources that go into creating it (land use, water, labour, energy etc). When food waste goes to landfill, it produces greenhouse gases such as methane, which are harmful for the environment. Do you think that knowing about the negative impact that food waste has on the environment would encourage people to save food from the bin? This video may also provide inspiration:

https://www.youtube.com/watch?v=N7v8_DJct_l&t=135s

1.6 DESSERT: SUSTAINABLE HABITS

Ask each group to present their campaign to the rest of the class. Ask for the class to give peer to peer feedback and refer to any criteria outlined at the beginning of the lesson.

Ask them if they were surprised by anything that they learned? Which campaigns did they find most persuasive and why? Which persuasive language techniques did they use?

Ask learners to look at their food waste diaries and think about what food they threw away.

Remind learners that 59% of the food we waste in Scotland actually comes from our homes. Show them the 'Food saving actions' poster

and explain that there are some really simple ways to reduce food waste in our homes:

- Plan - knowing what meals we are having this week and how we'll use everything up.
- Check - looking in our cupboards and shelves before going shopping.
- Labels - the 'use by' date is important as it is about food safety, but the 'best before' date is just an indication of when food is at it's absolute best in terms of quality.
- Portion - not taking what we can't finish.
- Store - putting food in the right places to keep it fresher for longer
- Wrap - protecting food that needs a little extra help.
- Use up - turning food into other tasty meals.
- Freeze - freezing things we want to save for another day.

Tell learners that taking these small steps will help Scotland on the journey towards achieving the target of reducing food waste by 33% by 2025. Ask learners to look at their food diaries and see what food could have been saved from the bin knowing what they now know.

Show this video about Denmark which achieved its national food waste target.

<https://www.youtube.com/watch?v=B6mi-ZFCprs>

1.7 EXTRA HELPING: EMPOWERING YOUNG VOICES

If learners feel brave enough ask them to present their campaigns to local primary children. They could also video the campaigns that they've developed and share them on a blog or via the school website.

1.8 CURRICULUM FOR EXCELLENCE EXPERIENCES AND OUTCOMES

Literacy and English

- ENG 3-03a/4-03a: Having explored and analysed the features of spoken language, I can use these, adopting an appropriate register to suit my purpose and audience.
- ENG 3-27a / ENG 4-27a: I can engage and/or influence readers through my use of language, style and tone as appropriate to genre.
- LIT 3-02a: When I engage with others, I can make a relevant contribution, encourage others to contribute and acknowledge that they have the right to hold a different opinion. I can respond in ways appropriate to my role and use contributions to reflect on, clarify or adapt thinking.
- LIT 4-02a: When I engage with others I can make a relevant contribution, ensure that everyone has an opportunity to contribute and encourage them to take account of others' points of view or alternative solutions. I can respond in ways appropriate to my role, exploring and expanding on contributions to reflect on, clarify or adapt thinking.
- LIT 3-04a: As I listen or watch, I can:- Identify and give an accurate account of the purpose and main concerns of the text, and can make inferences from key statements- Identify and discuss similarities and differences between different types of text- Use this information for different purposes.
- LIT 4-04a: As I listen or watch, I can:- Clearly state the purpose and main concerns of a text and make inferences from key statements- Compare and contrast different types of text- Gather, link and use information from different sources and use this for different purposes.
- LIT 3-05a / LIT 4-05a: As I listen or watch, I can make notes and organise these to develop thinking, help retain and recall information explore issues and create new texts, using my own words as appropriate.
- LIT 3-06a / LIT 4-06a: I can independently select ideas and relevant information for different purposes, organise essential information or ideas and any supporting detail in a logical order, and use suitable vocabulary to communicate effectively with my audience.
- LIT 3-07a: I can show my understanding of what I listen to or watch by commenting, with evidence, on the content and form of short and extended texts.
- LIT 4-07a: I can show my understanding of what I listen to or watch by giving detailed, evaluative comments, with evidence, about the content and form of short and extended texts.
- LIT 2-10a / 3-10a/4-10a: I am developing confidence when engaging with others within and beyond my place of learning. I can communicate in a clear, expressive way and I am learning to select and organise resources independently.
- LIT 4-13a: Before and as I read, I can apply strategies and use resources independently to help me read wide variety of texts and/or find the information I need.
- LIT 3-14a / LIT 4-14a: Using what I know about the features of different types of texts, I can find, select, sort, summarise, link and use information from different sources.
- LIT 3-15a / LIT 4-15a: I can make notes and organise them to develop my thinking, help retain and recall information, explore issues and create new texts, using my own words as appropriate.

Social Studies

- SOC 3-08a: I can identify the possible consequences of an environmental issue and make informed suggestions about ways to manage the impact.
- SOC 4-08a: I can discuss the sustainability of key natural resources and analyse the possible implications for human activity.

LESSON 2: S1 / 2 SCIENCE

2.1 IN A NUTSHELL

In this lesson learners are encouraged to investigate why some fruit and vegetables turn brown once the skin is cut. They will learn that this is the result of a chemical reaction, which can be prevented using a variety of simple methods. Learners will identify effective ways of storing cut fruit that will help them to reduce unnecessary food waste.

2.2 CORE LEARNING

We are learning that some fruit and vegetables turn brown when their skin is exposed and we are investigating how to prevent this.

Success criteria:

- Participate in an investigation into different ways of slowing down the chemical reaction that causes fruit and vegetables to turn brown when cut.
- Discuss and draw conclusions from the results of this investigation.
- Explain that some fruit and vegetables turn brown when cut because a chemical reaction takes place.

- Understand how to store food correctly in order to avoid food waste.

2.3 PREPARATION

- Display the '[Why do cut apples go brown?](#)' experiment instructions.
- Apparatus needed for the investigation:
 - 1 apple per pair
 - Knife
 - Lemon juice
 - Clingfilm
 - 4 Petri dishes
 - Pipette
 - Labels
 - Marker Pen
 - Stop clock or timer
 - Fridge
 - Camera
 - Safety goggles



2.4 STARTER: WHY FRUIT TURNS BROWN

Show learners the following video:

https://www.youtube.com/watch?v=ajay1tq_roU

In this video, someone has taken a bite out of an apple. Ask learners:

- Have you ever taken a bite out of an apple and then left it to go brown?
- Why do you think the apple turns brown once a bite has been taken?

Explain to learners that we will be investigating why an apple turns brown when it's skin is broken/cut and the flesh is exposed.

- Ask learners if they would eat the apple once it had turned brown? If some answer no, ask them why not?
- Ask learners if they can think of other fruit and vegetables that turn brown in the same way once their skins have been cut? Some examples include bananas, pears, grapes, potatoes and aubergines.

Explain that browning can be caused by damaging fruit and vegetable skins at any point in the food journey from farm to fork. Browning can affect the taste, colour and value of these foods.

This type of browning doesn't put us off all food it's essential for the taste and colour of tea, coffee and chocolate!



2.5 MAIN: SCIENTIFIC INVESTIGATION

Tell learners that they are going to conduct an investigation into different methods that might stop an apple turning brown. At the end of the experiment they will present their findings on which method they think is most effective and why. Either print off or display the '[Why do cut apples go brown?](#)' sheet.

Remind learners that they will need to work quickly once the apple is cut so they should set up and prepare the experiment before they cut each apple. [1]

After the experiment review the findings with the class. Explain to learners that we can slow down the chemical reaction that causes browning to take place by doing any of the following:

- Reducing the apple's exposure to oxygen in the air - e.g. wrapping the apple in clingfilm.
- Making the surface of the apple more acidic and reducing the pH to less than 3 e.g. covering it in lemon juice. Vinegar (acetic acid) would have the same effect and this is used in the pickling method to preserve fruit and vegetables.
- Storing the apple in a cold temperature (at temperatures below 7°C) slows down the chemical reaction - e.g. in a fridge or freezer.

Ask learners to create a time lapse sequence of the different browning rates by taking photographs. They should then write up a short synopsis of the experiment and their conclusions.

Ask learners, what advice would you now give to someone who wanted to preserve cut fruit for a day?

[1] Safety note: Make sure learners know how to use a knife safely and that all knives are returned at the end of the lesson.

2.6 DESSERT: THE SCIENCE OF STORAGE

Tell the class that where we store different types of food can affect the chemical reactions that occur and cause the food to spoil faster.

Ask learners if they can think of any examples? Show learners the 'Food saving actions' poster and explain that apples are best kept in the fridge.

2.7 EXTRA HELPING: ENZYMIC BROWNING

If appropriate you may want to watch this video on enzymatic browning from Food and Drink Federation Scotland:

<https://www.youtube.com/watch?v=rEvQD8V9Des>



2.8 CURRICULUM FOR EXCELLENCE EXPERIENCES AND OUTCOMES

Numeracy

- MNU 3-08a: I can show how quantities that are related can be increased or decreased proportionally and apply this to solve problems in everyday contexts.
- MNU 3-11a: I can solve practical problems by applying my knowledge of measure, choosing the appropriate units and degree of accuracy for the task and using a formula to calculate area or volume when required.
- MNU 4-11a: I can apply my knowledge and understanding of measure to everyday problems and tasks and appreciate the practical importance of accuracy when making calculations.
- MTH 2-21a / 3-21a: I can display data in a clear way using a suitable scale, by choosing appropriately from an extended range of tables, charts, diagrams and graphs, making effective use of technology

Sciences

- SCN 3-18a: Having taken part in practical activities to compare the properties of acids and bases, I have demonstrated ways of measuring and adjusting pH and can describe the significance of pH in my everyday life.
- SCN 3-19a: Through experimentation, I can identify indicators of chemical reactions having occurred. I can describe ways of controlling the rate of reactions and can relate my findings to the world around me.

Technologies

- TCH 3-10a: I can practise and apply a range of preparation techniques and processes to make a variety of items showing imagination and creativity, and recognising the need to conserve resources.

2.9 'WHY DO CUT APPLES TURN BROWN?' WORKSHEET

Important: You will need to work quickly once the apple is cut so you should set up and prepare your experiment before you cut into the apple.

Now fill in this table and order the methods used to slow down the browning chemical reaction (1 = least effective, 3 = most effective).

TIME	AIR	WRAPPED	LEMON JUICE	FRIDGE
30 minutes				
1 hour (or end of first lesson)				
24 hours (or end of next lesson)				

1 = least effective 3 = most effective	WRAPPED	LEMON JUICE	FRIDGE
Which method is most effective at slowing down the chemical process of browning?			

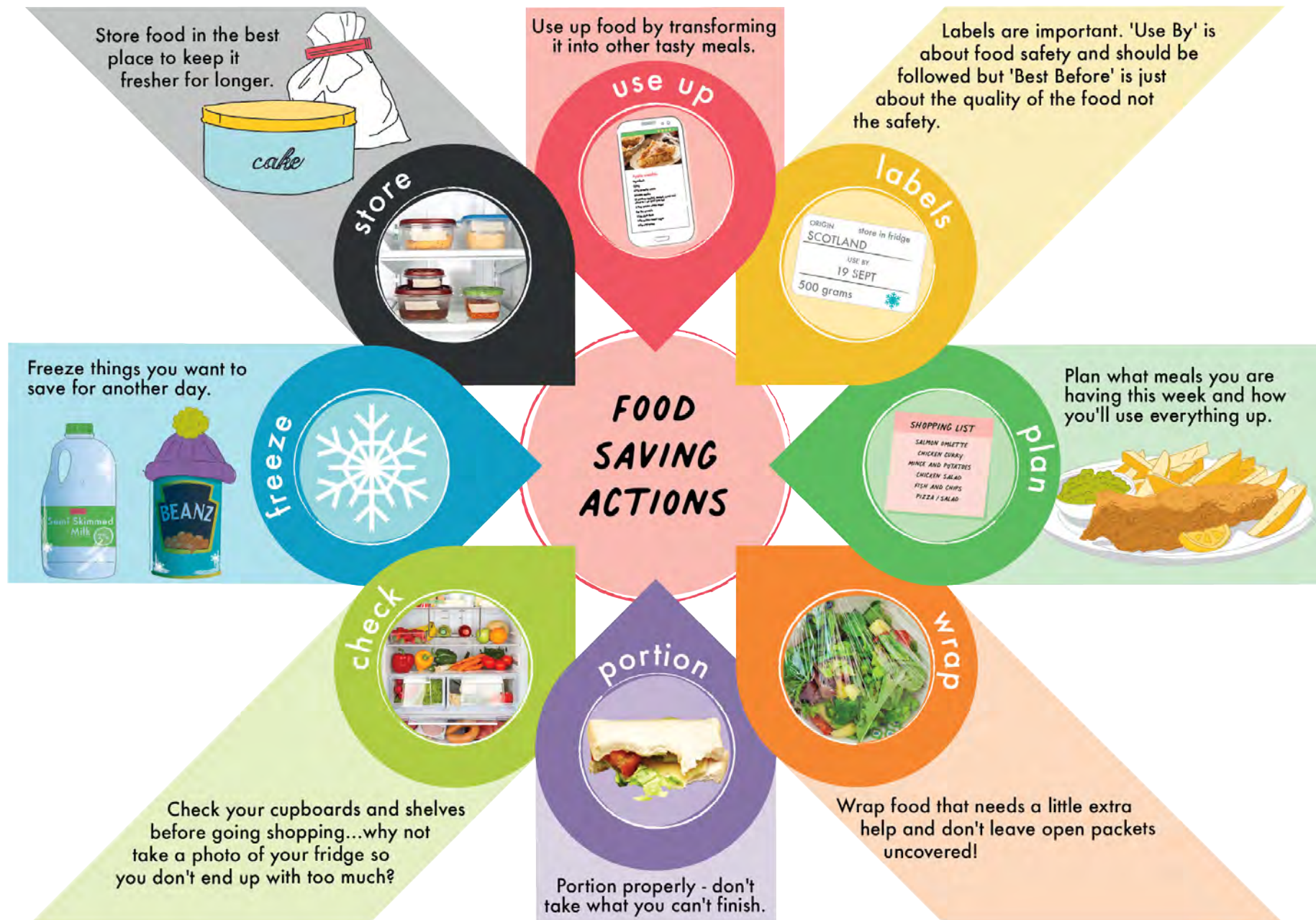
- Based on your results which method (or perhaps a combination of methods) do you think is the most effective at slowing down the chemical reaction that causes browning?
- How and why do you think each method affects the browning chemical reaction?

Once the experiment has been completed, answer the following questions:

- Which apple segment showed most browning?
- Which apple segment showed least browning?



2.10 'FOOD SAVING ACTIONS' POSTER



LESSON 3: S1 / 2 MATHS

3.1 IN A NUTSHELL

In this lesson, learners use their knowledge of decimals and percentages to explore the carbon impact of food and the implications of wasting food.

3.2 CORE LEARNING

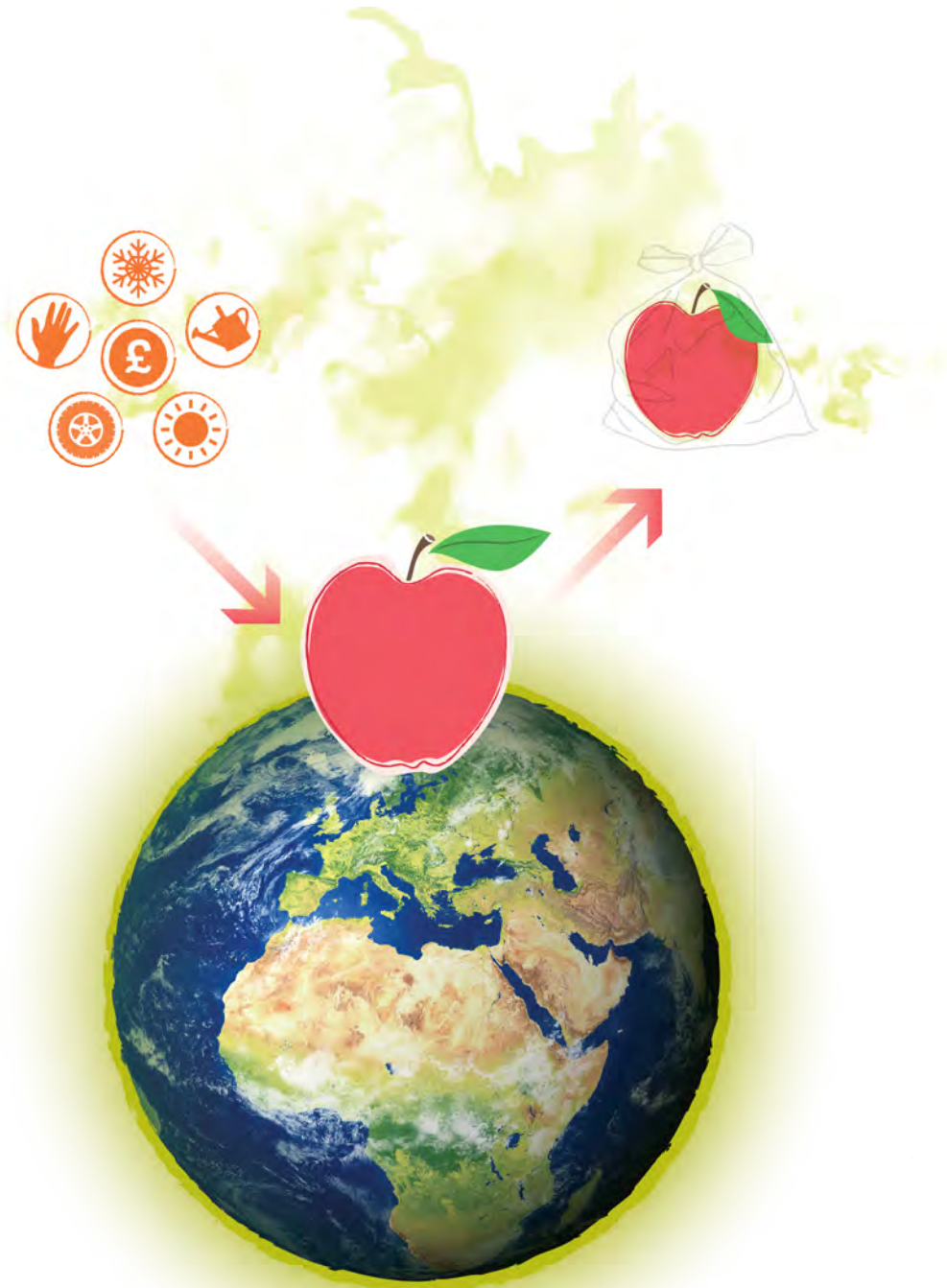
We are learning that greenhouse gases are generated at each stage of getting food from farm to fork and that different types of food have different impacts.

Success criteria:

- Understand the journey of food from farm to fork and appreciate how greenhouse gas emissions arise at each stage of the supply chain.
- Participate in problem solving calculations and explore the carbon impact of different types of food.
- Identify and discuss the implications that wasted food has on greenhouse gas emissions.

3.3 PREPARATION

Print the '[Crunching numbers](#)' worksheet or display the '[Secondary maths](#)' PowerPoint on your whiteboard and have learners work through each question.



3.4 STARTER: FROM FARM TO FORK

To set the scene for the lesson ahead, explain to learners that they will be looking at the carbon footprint of their dinner by working out the volume of greenhouse gas emissions to get it from farm to fork.

Key terms to explain to learners:

- **Supply chain** - The supply chain of our food is a term used to describe the processes and different stages to get the food product all the way from farm to fork. Stages include: producing, processing, packaging, distributing and storing.
- **Greenhouse gases** - A greenhouse traps the heat from the sun to keep it warmer than outside. The earth has a natural layer of gases that keep our planet at a temperature we can survive at but certain human activities (e.g. driving a car) release gases (like carbon dioxide) which add to the greenhouse effect and have a negative impact on our planet. We call these gases greenhouse gases for this reason. If a greenhouse gets too hot then all the plants in it can't survive.
- **Carbon impact** - The total carbon impact of food is an estimate of all the greenhouse gases that have been generated in producing food, packaging it, transporting it, preparing it and disposing of it. This is sometimes referred to as a carbon footprint. You may wish to ask learners to explore the concept of a footprint and how it leaves a mark and compare this with the way carbon impacts on our planet.[2]
- **CO₂e** - This is an internationally recognised measurement of greenhouse gas emissions called carbon dioxide equivalent.

Now that learners understand the principles of greenhouse gas emissions and where they arise, ask them where they think emissions happen in the following video 'The Extraordinary Life and Times of a

[2] Note: not all greenhouse gases are carbon based but for the purposes of this lesson the two are being equated.

Strawberry'.

<https://www.youtube.com/watch?v=uTaFYF1nA4c>

Where in this video do emissions happen?

- Producing - producing fertiliser, using tractors and other farm equipment
- Processing - transport, machinery
- Packaging - manufacturing, shipping
- Distributing - lorry and boats
- Storing - refrigeration, lighting, controlling humidity



3.5 MAIN: CRUNCHING NUMBERS

Share the '[Crunching numbers](#)' worksheet with learners and ask them to complete the following questions based on the following information:

Below: farm to fork carbon impact by food type (kgCO₂e/kg food)

	Beef	Carrots	Tomatoes	Pasta
Growing	83.33	0.37	3.25	3.13
Processing	0.70	0.40	0.17	0.64
Transporting	0.35	0.36	0.36	0.36
Packaging	0.17	0.17	0.17	0.17
Storing	0.93	0.62	0.31	0.62
Total Carbon impact per kg	85.5	1.9	4.3	4.9

- Using the numbers above, calculate the total carbon impact to one decimal place of getting 1 kg of each food type from farm to fork. (Answer: Meat 85.5, Carrots 1.9, Tomatoes 4.3, Pasta 4.9)
- Using the results from question 1, calculate the total carbon impact of all four food types. (Answer: 96.6 kgCO₂e)

- We now know what the individual carbon impacts are for each of our ingredients. Now let's use this and the information below to calculate the carbon impacts for one portion of Spaghetti Bolognese when one portion includes:
 - 70 grams of pasta (Answer: $4.9 \times 0.07 = 0.34$)
 - 100 grams of mince (Answer: $85.5 \times 0.1 = 8.55$)
 - 180 grams of tomatoes (Answer: $4.3 \times 0.18 = 0.77$)
 - 50 grams of carrots (Answer: $1.9 \times 0.05 = 0.09$)
- What is the total carbon impact of all learners in the class eating one portion of Spaghetti Bolognese? (Answer: Number of pupils in the class \times 9.75)
- You now know the total carbon impact of one portion of Spaghetti Bolognese, but what percentage of the total is each food group to one decimal place? (Answer: Meat 87.7%, Carrots 0.9%, Tomatoes 7.9%, Pasta 3.5%)
- The total carbon impact of a pasta dish made with mushrooms rather than meat is 1.79 kgCO₂e. Which meal has a lower carbon footprint the Spaghetti Bolognese or the mushroom pasta? (Answer: Mushroom pasta)
- Imagine that 3 learners only eat half (50% or 0.5) of their Spaghetti Bolognese meal and the other half is waste.
 - How many total portions have been wasted? (Answer: $3 \times 0.5 = 1.5$)
 - Now we know what the total carbon impact of one portions is, how many emissions did we generate to create the wasted portions? (Answer: $9.75 \times 1.5 = 14.62$ kgCO₂e)

Tell learners there are different way of disposing of food waste.

When you put food waste in a rubbish bin that is sent to landfill, it breaks down and rots in the bin bags creating more greenhouse gases which harm our planet. So when you throw food away not only are you wasting all the emissions that went in to producing the food; you're also creating new greenhouse gas emissions!

When you put food waste in a separate food waste bin it doesn't go to landfill. Instead, it is treated in a process called anaerobic digestion, which ensures all the gas created is captured so it cannot enter the atmosphere!

8. Wasting 1 kg of Spaghetti Bolognese in landfill will generate 0.99 kgCO₂e.
Wasting 1 kg of Spaghetti Bolognese in the food recycling bin will generate 0.01 kgCO₂e.

How many times more harmful is it to put wasted food in the landfill bin rather than the recycling bin? (*Answer: 99 times more harmful*)

3.6 DESSERT: THE IMPACT OF OUR FOOD CHOICES

Have a broader discussion with learners about the impact of producing and wasting food. Was there anything about the lesson that took them by surprise? Think of the different stages of the supply chain and how each one impacts on our environment. Highlight the ['Food saving actions'](#) poster as a way of emphasising the impacts of producing and wasting food. Food waste is something that we should make a real effort to save from the bin.

3.7 CURRICULUM FOR EXCELLENCE EXPERIENCES AND OUTCOMES

Numeracy and Mathematics

- MNU 3-01a: I can round a number using an appropriate degree of accuracy, having taken into account the context of the problem.
- MNU 3-03a: I can use a variety of methods to solve number problems in familiar contexts, clearly communicating my processes and solutions.
- MNU 3-07a: I can solve problems by carrying out a wide range of fractions, decimal fractions and percentages, using my answers to make comparisons and informed choices for real-life situations.
- MNU 3-08a: I can show how quantities that are related can be increased or decreased proportionally and apply this to solve problems in everyday contexts.
- MTH 2-21a / 3.21a: I can display data in a clear way using a suitable scale, by choosing appropriately from an extended range of tables, charts, diagrams and graphs, making effective use of technology.
- MNU 4-07a: I can choose the most appropriate form of fractions, decimal fractions and percentages to use when making calculations mentally, in written form or using technology, then use my solutions to make comparisons, decisions and choices.
- MNU 4-08a: Using proportion, I can calculate the change in one quantity caused by a change in a related quantity and solve real-life problems.
- MNU 4-20a: I can evaluate and interpret raw and graphical data using a variety of methods, comment on relationships I observe within the data and communicate my findings to others.

3.8 'CRUCHING NUMBERS' WORKSHEET

Below: farm to fork carbon impact by food type (kgCO₂e/kg food)

	Beef	Carrots	Tomatoes	Pasta
Growing	83.33	0.37	3.25	3.13
Processing	0.70	0.40	0.17	0.64
Transporting	0.35	0.36	0.36	0.36
Packaging	0.17	0.17	0.17	0.17
Storing	0.93	0.62	0.31	0.62
Total Carbon impact per kg	85.5	1.9	4.3	4.9

- Using the numbers above, calculate the total carbon impact to one decimal place of getting 1 kg of each food type from farm to fork.
- Using the results from question 1, calculate the total carbon impact of all four food types.
- We now know what the individual carbon impacts are for each of our ingredients. Now let's use this and the information below to calculate the carbon impacts for one portion of Spaghetti Bolognese when one portion includes:
 - 70 grams of pasta
 - 100 grams of mince
 - 180 grams of tomatoes
 - 50 grams of carrots
- What is the total carbon impact of all learners in the class eating one portion of Spaghetti Bolognese?
- You now know the total carbon impact of one portion of Spaghetti Bolognese, but what percentage of the total is each food group to one decimal place?
- The total carbon impact of a pasta dish made with mushrooms rather than meat is 1.79 kgCO₂e. Which meal has a lower carbon footprint the Spaghetti Bolognese or the mushroom pasta?
- Imagine that 3 learners only eat half (50% or 0.5) of their Spaghetti Bolognese meal and the other half is waste.
 - How many total portions have been wasted?
 - Now we know what the total carbon impact of one portions is, how may emissions did we generate to create the wasted portions?
- Wasting 1 kg of Spaghetti Bolognese in landfill will generate 0.99 kgCO₂e. Wasting 1 kg of Spaghetti Bolognese in the food recycling bin will generate 0.01 kgCO₂e. How many times more harmful is it to put wasted food in the landfill bin rather than the recycling bin?

LESSON 4: S1 / 2 RME

4.1 IN A NUTSHELL

This lesson presents food as something of value that shouldn't be wasted and that can bring people together. Learners consider how food is celebrated in different world religions. They then go on to explore how charitable organisations respond to the moral issue of food waste, touching on food poverty. Lastly, learners design their own event to celebrate food with a moral or religious message in mind.

4.2 CORE LEARNING

We are learning that food is something of value that is celebrated in various religions and a way of bringing people together. We understand the moral issues around wasting food and how different organisations respond to this.

Success criteria

- Research and discuss how world religions value and celebrate food.
- Investigate different approaches that redistribute food waste and challenge the moral issue of food waste in a positive way.
- Design a flyer that celebrates food and ensures it feeds people and not bins.

4.3 PREPARATION

- Give each learner 2 triangular pieces of paper with holes in two corners.
- Learners will require access to the internet.

4.4 STARTER: EXPLORING THE SPIRITUAL SIGNIFICANCE OF FOOD

Ask learners to work in small groups to research the different ways that food features in world religions covering the following topics:

- Festivals, feasts and fasts - how is food used in celebrations?
- Religious rituals - how is food valued in religious ceremonies and customs?
- Sharing stories - how often does sharing food with others feature in stories?

You may wish to tailor this to a religion your learners are currently focusing on or make it broader and cover a variety of world religions to compare and contrast.

Give each learner a triangular piece of paper with holes in two of the corners. Focusing on what they've researched, learners should draw an item of food on one side of the paper. On the other side of the paper learners should explain which religious celebration, ritual or story the food is used in. Using a piece of string, string the triangles together to make bunting and display around the classroom.

Ask learners to present their findings and bunting contributions back to rest of the class.

Ask learners:

- Why do they think food is valued by different religions?
- Do they think food is central to and valued in modern society?
- Food can be a way of bringing people together; do they have examples from their own lives of how food is celebrated socially?

4.5 MAIN: FEEDING THE WORLD, NOT THE BIN

Explain to learners that although food is celebrated all over the world and valued by different religions, food being wasted is a major issue in a world where land and resources are becoming scarcer and people go hungry.

Globally one third of all food grown is lost or wasted; ask the class to stand up and tell every third learner to sit down. Explain that a third of food being wasted would be the equivalent of all those sitting down throwing all their food for the day in the bin. Enough food is produced globally to feed everyone but at the moment so much of this food is lost or wasted and at the same time almost 800 million people in the world suffer from food poverty.

Show learners the '[Food we waste in Scotland](#)' poster and discuss the key facts about food that is unnecessarily wasted in Scotland. Why not show learners this short film about the impact of food waste?

https://www.youtube.com/watch?v=N7v8_DJct_l&t=135s

Explain to learners that there are a number of groups who respond to the moral issue of food waste in a positive way by ensuring that food is used to feed people and not bins by bringing people together socially and raising awareness of the issue.

Listed below are some examples but you may wish to encourage learners to explore what is going on in your local area and/or speak to community groups tackling food waste.

The Scottish Pantry Network

<https://scottishpantrynetwork.org.uk/>

The Scottish Pantry Network is a network of sustainable pantries

across Scotland who provide low cost food to those in need. The network redistribute food, which would otherwise have gone to waste, to communities, tackling food poverty and waste in a dignified approach.

Feeding the 5000

<https://feedbackglobal.org/campaigns/feeding-the-5000/>

At each Feeding the 5000 event a feast for 5000 people is prepared made entirely out of food that would otherwise have been wasted. Feedback, the charity behind the events, aim to inspire new local initiatives around reducing food waste and make people more aware of why it is bad to waste food. The first event took place in Trafalgar Square in London in 2009 and one took place in Edinburgh in 2013.

Disco Soup

<https://www.youtube.com/watch?v=oCg2WJn0h38>

Disco Soup events aim to bring people together to raise awareness about food waste. Soups, salads and smoothies are made communally in a public space and given away for free while music is played and people come together socially. The movement started in Germany but there are now Disco Soup events in Scotland and across the UK.

Using the internet, ask the learners to research:

- What motivated each group to start what they are doing?
- Are there any comparisons with the festivals, ceremonies or stories discussed at the start of the lesson?
- How do they work, how is food valued and not wasted?

Ask learners to create another triangle for the bunting. On one side put a key fact about food waste and on the other why they feel food should be valued, celebrated and not wasted. Add to the string and display around the classroom.

4.6 DESSERT: FEAST WITH PURPOSE

Learners have now explored why food is valued and shared communally from both a religious perspective and a moral one. Food waste is a big issue in Scotland but one that everyone has the power to influence.

Ask learners to imagine they are planning a celebration with a focus on food. This could be a religious event or like one of the activities explored earlier.

As the organiser, get them to consider these key questions and create a leaflet for their event:

- Who will you be inviting?
- Where will it take place?
- What food is needed?
- How will the food be celebrated?
- How will waste be avoided?
- What key moral message will those attending learn?

Disco Soup events aim to bring people together to raise awareness about food waste



Why not put this event into practice? If you're planning a Disco Soup or similar with your learners get in touch with us at:

lfhw@zerowastescotland.org.uk



4.7 CURRICULUM FOR EXCELLENCE EXPERIENCE AND OUTCOMES

Expressive arts

- EXA 3-03a: I can use and combine the visual elements and concepts to convey ideas, thoughts and feelings in expressive and design work.
- EXA 3-04a: Through observing and recording, I can create material that shows accuracy of representation.

Literacy and English

- LIT 3-05a / LIT 4-05a: As I listen or watch, I can make notes and organise these to develop thinking, help retain and recall information, explore issues and create new texts, using my own words as appropriate.
- LIT 3-06a / LIT 4-06a: I can independently select ideas and relevant information for different purposes, organise essential information or ideas and any supporting detail in a logical order, and use suitable vocabulary to communicate effectively with my audience.

Religious and moral education

- RME 3-07a / RME 4-07a: I am developing respect for others and my understanding of their beliefs and values.
- RMS 3-08a / RME 4-08a: I am developing an increasing awareness and understanding of my own beliefs and I put them into action in positive ways.
- RME 2-06b: Through investigating and reflecting upon the ways in which followers of world religions mark major life events and times of year, I can explain key features of such festivals and celebrations. RME 3-06a: I have researched and reflected upon the major ceremonies and customs of world religions and

can explain the significance of these to the followers of these religions.

- RME 3-02b / 3-05b: I can demonstrate my developing understanding of moral values through participating in events and projects which make a positive difference to others.
- RME 4-02b / 4-05b: I can apply my developing understanding of morality to consider a range of moral dilemmas in order to find ways which could promote a more just and compassionate society.



4.8 'FOOD WE WASTE IN SCOTLAND' POSTER

By saving food from the bin we could save this much money every year from our homes in Scotland.

£460



We throw away this many tonnes of food from our homes every year.



600,000

By saving food from the bin it could have the same effect for the planet as taking this many cars off the road.

1 in 4



**LOVE
FOOD
hate waste**

By 2025 Scotland is aiming to cut the food we throw in the bin by



33%

LESSON 5: S1 / 2 HOME ECONOMICS

5.1 IN A NUTSHELL

In this lesson learners explore the scale of food waste in Scotland and how much it costs us. They then consider key ways that food can be saved from the bin. Finally, they reimagine or use up leftovers to create a tasty dish.

5.2 CORE LEARNING

We are learning ways to use up food to save it from the bin because we understand the impact of food waste in Scotland.

Success criteria:

- Explain how much food is wasted unnecessarily in Scotland each year.
- Demonstrate an understanding that not only does avoidable food waste cost money, it is also bad for the environment.
- Discuss the different ways of saving food from the bin and reducing avoidable food waste.
- Prepare two different recipes that use up leftovers.

5.3 PREPARATION

- Display [‘Home Economics’ PowerPoint](#).
- Display [‘Food we waste in Scotland’](#) and [‘Food saving actions’](#) posters.

5.4 STARTER: TURN LEFTOVERS INTO SAVINGS

Explain to learners that this lesson will focus on how to save food from the bin by creating simple dishes that reimagine or use up

leftover food. Show learners the ‘Food we waste in Scotland’ poster and highlight the scale of food waste in Scotland. Ask them what they would rather spend £460 on? Explain that by saving food from the bin we are not only saving money but also limiting the harm that we do to the planet.

Now show learners the [‘Home Economics’](#) PowerPoint. Highlight that there are 8 key ways to save food from the bin:

- Plan - knowing what meals we are having this week and how we’ll use everything up.
- Check - looking in our cupboards and shelves before going shopping.
- Labels - the ‘use by’ date is important as it is about food safety, but the ‘best before’ date is just an indication of when food is at it’s absolute best in terms of quality. • Portion - not taking what we can’t finish.
- Store - putting food in the right places to keep it fresher for longer
- Wrap - protecting food that needs a little extra help.
- Use up - turning food into other tasty meals.
- Freeze - freezing things we want to save for another day.

You may want to ask learners to create a leaflet or poster to demonstrate what they’ve learned.

5.5 MAIN: USING UP FOOD EFFECTIVELY

Tell learners that we will now use up food effectively to save it from the bin. Included in this lesson plan are two recipes - one sweet and one savoury - if neither suits why not pick a recipe that suits the age, stage and needs of your learners?

Sweet & sticky use up noodles

Ingredients

- dried noodles
- ½ red pepper, carrots (and/or other vegetables at the bottom of the fridge!)
- Chicken
- ½ onion chopped
- 50g peas
- 1x15ml spoon soy sauce
- 2 x 15ml runny honey
- ½ 5ml spoon sesame seeds (optional)
- Salt and pepper

Method

1. Prepare the noodles by boiling in water for 5 minutes.
2. Chop the chicken into bite sized pieces.
3. Chop and slice the peppers and onion.
4. Peel and finely slice the carrot (and/or other vegetables).
5. Drain the noodles.
6. Heat the oil in the wok. Cook the chicken add the carrot, pepper and other vegetables.
7. Add the noodles and seasoning.
8. Serve garnished with sesame seeds.

Equipment

- Chopping board & mat
- Sharp knife
- Cutlery box
- Sieve
- Measuring jug
- Plate
- Small bowl

These noodles are a great way to turn any vegetables that are lurking at the bottom of the fridge into a tasty and nutritious meal that is simple and easy to make.

Empty fruit bowl cake

Ingredients

- 50g self-raising flour
- 50g Soft brown sugar
- 50g margarine
- 1 egg
- Eating apple or other fruit in need of saving
- 15ml sugar
- 2.5ml mixed spice

Method

1. Set oven to 200 C, No. 5.
2. Sieve flour into large bowl, add soft brown sugar, margarine and egg.
3. Beat till soft and creamy.
4. Spoon into foil dish and spread flat.
5. Wash core and slice apple thinly.
6. Arrange on top of the cake in a wheel pattern.
7. Mix sugar and spice together. Sprinkle over apple and bake 20 minutes.

Equipment

- Cutlery box
- Bowl scraper
- Large bowl
- Cup
- Sharp knife
- Chopping board
- Round foil dish
- Baking tray
- Scales

Did you know apples stay fresh longer in the fridge? If you have extra apples, this recipe is a great way to use them up. It works with any fruit, fresh or canned. You could have learners try different fruits to show the recipe's versatility.



5.6 DESSERT: SNAP & SAVE

Ask learners to take photos of their finished dishes and write down at least two key food saving actions they will do at home from now on to save food from the bin.



5.7 CURRICULUM FOR EXCELLENCE EXPERIENCES AND OUTCOMES

Expressive arts

- EXA 3-03a: I can use and combine the visual elements and concepts to convey ideas, thoughts and feelings in expressive and design work.
- EXA 3-04a: Through observing and recording, I can create material that shows accuracy of representation.

Health and wellbeing

- HWB 3-30a: By taking part in practical food activities and taking account of current healthy eating advice, I can prepare healthy foods to meet identified needs.
- HWB 3-33a: I can apply food safety principles when buying, storing, preparing, cooking and consuming food.
- HWB 3-36a: Using my knowledge of nutrition and current healthy eating advice, I can evaluate the information on food packaging, enabling me to make informed choices when preparing and cooking healthy dishes.



A'PEELING LINKS & RESOURCES

We hope that you have enjoyed working through this food waste fighting education pack from Love Food Hate Waste. If you're still hungry for more, why not explore some of the links below?

The Global Goals for sustainable development from the United Nations

- This pack contributes directly to goal 12. Responsible Consumption & Production but touches on others including goals 11 and 13.
- <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Zero Waste Scotland

- <https://www.zerowastescotland.org.uk/citizens>

Food for Life

- <https://www.soilassociation.org/our-work-in-scotland/food-for-life-scotland/>

Quality Meat Scotland

- <https://qmscotland.co.uk/marketing-development/health-education>

Royal Highland Education Trust

- <https://www.rhet.org.uk/>

Food and Drink Federation Scotland

- <https://www.fdfscotland.org.uk/>

Eco Schools Scotland

- <https://www.keepsotlandbeautiful.org/climate-action-schools/>

[eco-schools/](#)

Chefs in Schools

- <https://chefsinschools.org.uk/>

Royal Environmental Health Institute of Scotland

- <https://rehis.com/community-training/>

Food Standards Scotland

- <https://www.foodstandards.gov.scot/education-resources>

Scottish Business in the Community

- Food for Thought
- <https://www.bitc.org.uk/business-in-the-community-scotland/>

Seafood in Schools

- <https://www.seafoodnutrition.org/resources/seafood-in-schools/>

Better Eating Better Learning

- <https://education.gov.scot/resources/better-eating-better-learning/>

Making Things Last

- A Circular Economy Strategy for Scotland, including the food waste target.
- <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/>

The Crunch

- Food, Health & our Environment
- <https://www.stem.org.uk/resources/collection/133666/crunch-primary-resources>

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scotland.lovefoodhatewaste.com

facebook.com/lovefoodhatewastescotland

lfhw@zerowastescotland.org.uk

01786 433960