

# ACTIVITY WORKSHEETS

Discover the Dyson Farming approach to sustainable food production in harmony with the environment.

Dyson  
farming

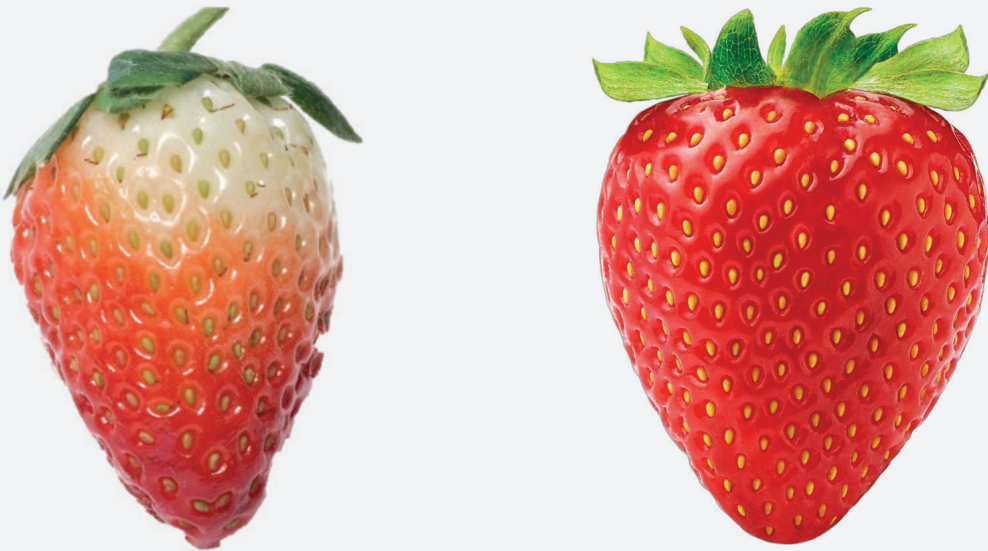
ENGAGEMENT  
CENTRE

## FOOD: DID YOU KNOW?

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The UK imports around 46% of the total food it consumes each year. Food security is an increasingly critical factor in food production. A reliance on imports can be bad for the environment, due to the food miles associated with them.

The importance of food security is a key reason why James Dyson invested in the future of British agriculture.



Circle the strawberry you think is imported.

# OIL FOOD MILES

Duration: 60 mins

Teacher pack: Page 16

## Learning objectives

1. Understand why supporting British food production is important for food security.
2. Able to identify the link between the crop and the product it makes.
3. Define what food miles are and understand their impact on the environment, cost and sustainability.

## Things you will need

Pencil

Paper

Clipboard

Discussion: 10 mins

Learning objective	Topic
1,3	<p><b>What are food miles?</b>            What are the negatives of importing food?            What can customers do to prevent this?</p>
1	<p><b>How do we measure food miles?</b>            Think about the journey from field to supermarket. How many steps are there in each process? Remember, energy is used to harvest, transport, produce, package and deliver. What two units are food miles measured in?</p>
1,2,3	<p><b>Oil press tour</b>            Find out about the process of pressing British oil from seed to cooking oil.</p>
1,3	<p><b>Calculate and compare</b>            Discover the difference between British produce and imported goods and their environmental impacts.</p>

# OIL FOOD MILES: CALCULATE AND COMPARE

## Olive oil journey

Food miles are measured as tonne-kilometres (tkm), the transport of 1 tonne of food over 1km

Process	Travel	Miles
Olives grown and harvested in Crete, Greece.	From field to store	30
Plant taken from farm to the press.	Crete, Greece to Massarosa, Italy	2,386
Pressed oil, packaged and shipped to consumer by vehicle and ship.	Massarosa, Italy to London, England	1,545
From warehouse to local store for customers.	London, England to Lincoln, England	233

## Rapeseed oil journey

Rapeseed oil Process	Travel	
Oilseed rape grown and harvested from fields on Nocton holding, England	–	–
Oilseed rape is taken to Nocton press.	Nocton fields to Nocton Wood Yard	Max 48
Pressed oil, packaged and shipped to consumer by lorry.	Nocton, England to London, England	214

# OIL FOOD MILES: KNOWLEDGE TEST

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Duration: 10mins

Q1. Define food miles.

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Q2. What are the total miles of the journey of olive oil from farm to plate?

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Q3. What are the total miles of the journey of rapeseed oil from farm to plate?

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Q4. How many more miles are there for olive oil used in the UK?

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Q5. How could food miles for olive oil be reduced?

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# OIL FOOD MILES: SUSTAINABLE THINKING

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Duration: 10 mins

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**Q6.** Can you think of any other benefits of having less food miles?

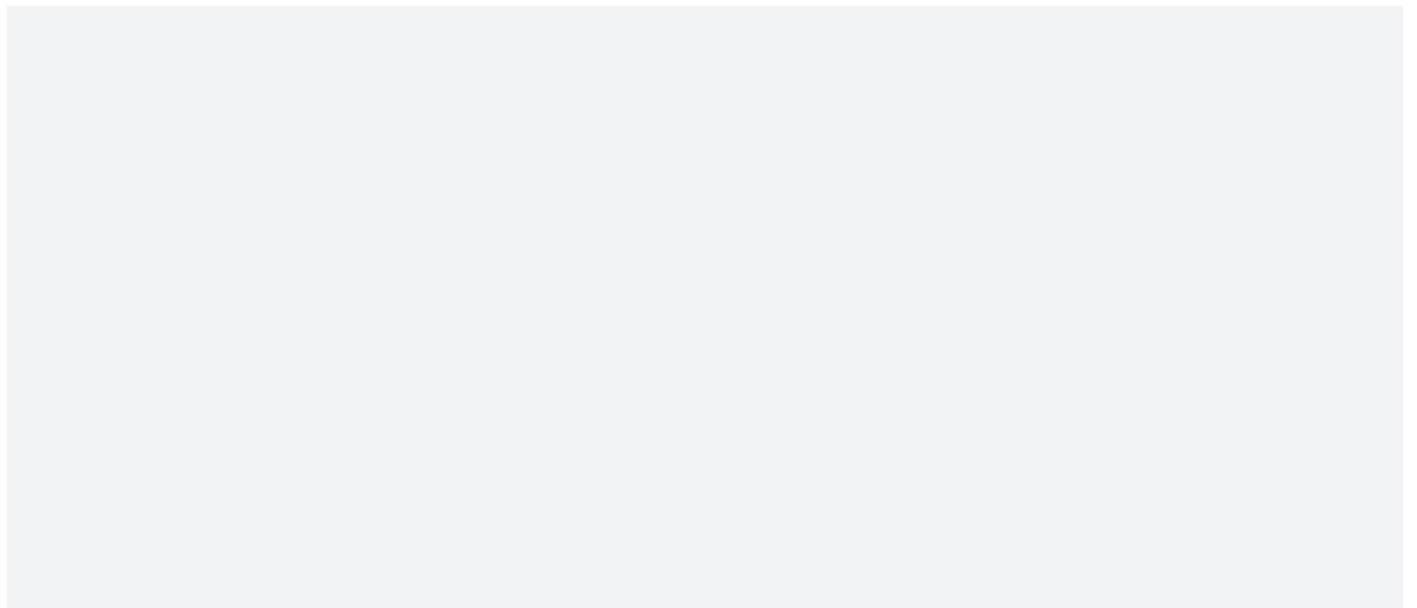
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**Q7A.** The team have asked you to suggest a more sustainable packaging for the oil to reduce landfill. A lot of oil in the supermarket is single use plastic, with a non-recyclable label and lid. Create or plan your idea below.



**Q7B.** When in the supermarket , what might give you a clue where the produce has come from?

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**Q8.** Can you think of any other foods with high food miles?

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## DID YOU KNOW?

We operate a 'circular farm system'. This means we look to use all of our resources efficiently to benefit the farm, producing wholesome food while also protecting and enhancing the environment. Anaerobic digestion (AD) is where renewable energy is created from biodegradable matter, such as energy crops



# ENERGY

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Duration: 5 – 20 mins

Teacher pack: Page 21

## Learning objectives

1. Ability to quantify energy production to examples.
2. Maths calculation in relation to curriculum.
3. Understand key word definitions such as kWh.

## Things you will need

Calculator

Pencil

Paper/worksheet

Match up exercises.

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Learning objective	Activity
1	<b>Energy explorers</b> Starter activity around energy and its forms.
2,3	<b>Energy explorers</b> Complete the calculations to explore the energy equivalents.

# ENERGY: ENERGY EXPLORERS

## Activity 1: Sources of energy

What do the images below all have in common?



Anaerobic digester



Maize



Solar panels



Sun

# ENERGY EXPLORERS: FACT SHEET

## Activity 2: Energy detective challenge

For this activity you can work on your own or in pairs. Use the information below to answer the questions.

### Nocton Farm energy fact sheet:

**Table 1: Solar panels**

Energy claim: Nocton Farm solar panels can produce 5,000kWh per day on a sunny day.

Activity	Energy used
Boiling a kettle once	0.1kWh
One hour of TV	0.1kWh
Charging a mobile phone	0.01kWh
Two hours of gaming on a console	0.55kWh
Powering a whole house for a day	10kWh

**Table 2: Anaerobic digester**

Plants	Energy generated per day
Nocton AD	46,700kWh
Carrington AD	71,400kWh

# ENERGY EXPLORERS: CALCULATION

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Solar panels.

**Q1a.** If the solar panels produce 5,000kWh in a day, how many kettles could be boiled?

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**Q1b.** How many phones can be charged?

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**Q1c.** On a sunny day, the solar panels produce 5,000kWh but on a cloudy day they produce only 35% of this. How much energy is produced on a cloudy day? How many homes could that power if one home uses 12kWh per day?

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**Q1d.** A solar array receives 20,000kWh of sunlight energy in a day and produces 5,000 kWh of electricity. Calculate the efficiency of the system as a percentage (EXTENSION KS3 + 4)

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# ENERGY:

## ENERGY EXPLORERS

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### Anaerobic digester

Dyson Farming's anaerobic digester's turn crops and organic material into biogas, which is used to make electricity. One of our anaerobic digesters can produce 71,400kWh per day.

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Q1. How many kWh is that per hour?

Q2. How many homes could one AD power for a day?

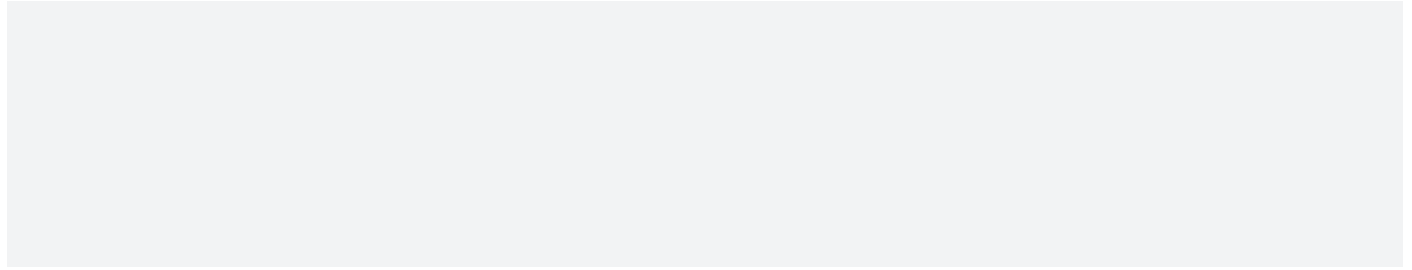
Q3. If an AD runs for 7 days, how much energy would it produce?

Q4. If a school uses 200kWh per day, how many days could the AD power it for?

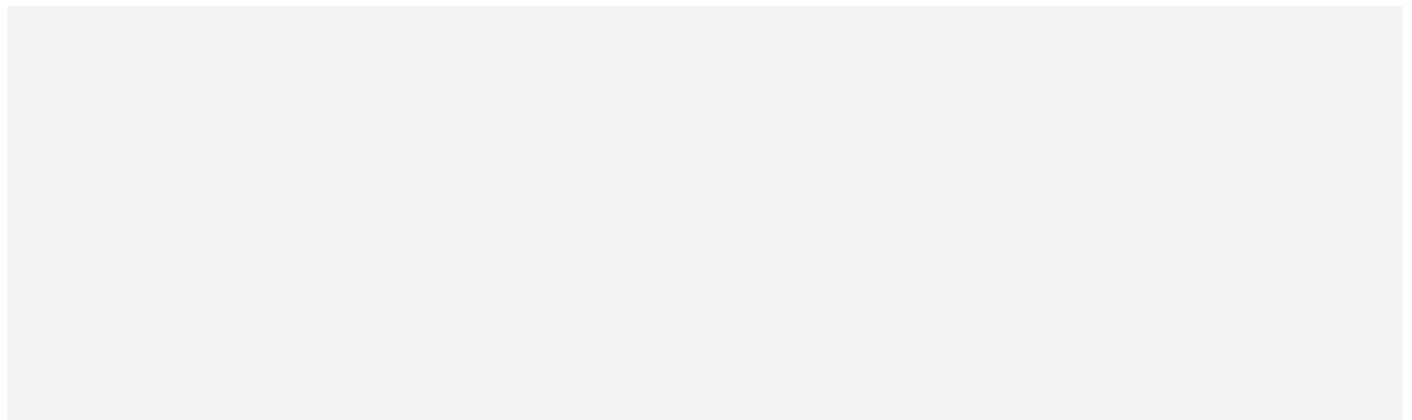
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**Anaerobic digester: Advanced questions (KS3 + KS4)**

**Q1.** If one tonnes of maize silage produces 350kWh of usable energy, how many tonnes are needed to supply an AD that outputs 20,000kWh per day?

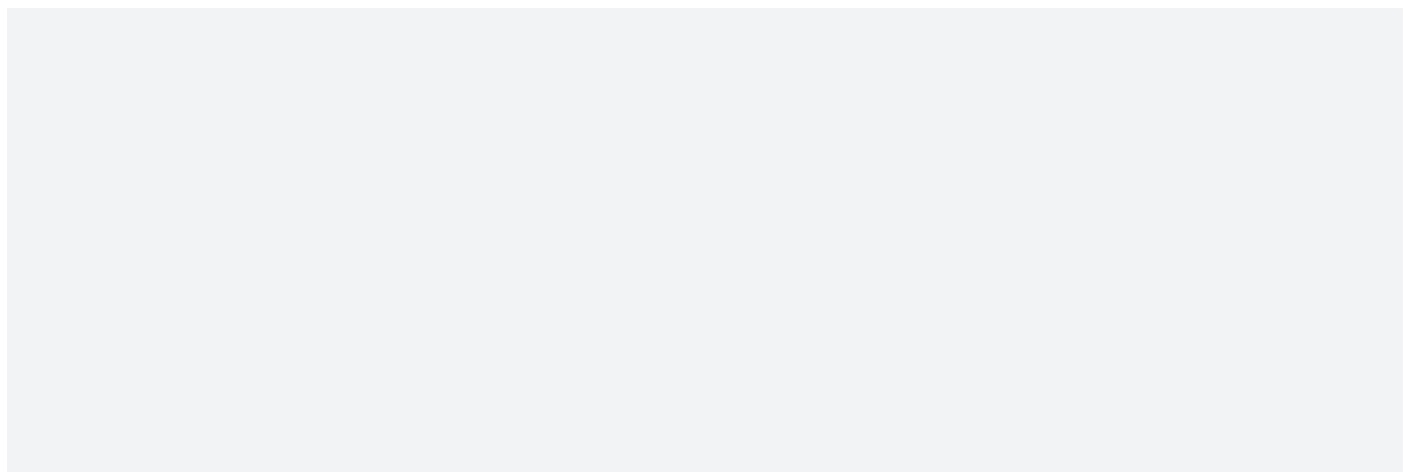


**Q2.** If the AD produces 71,400kWh per day, calculate the total output for one week, one month and one year?

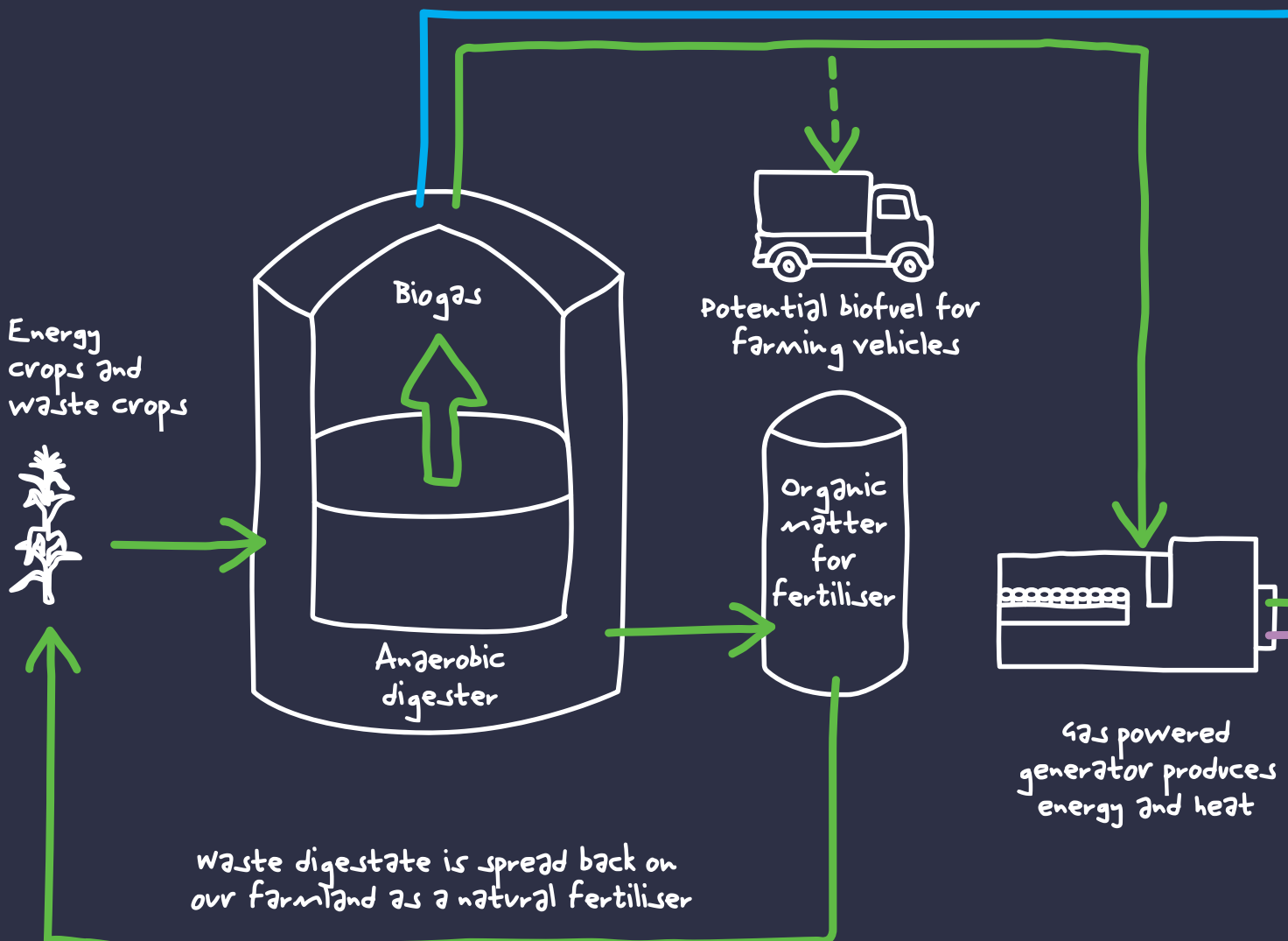


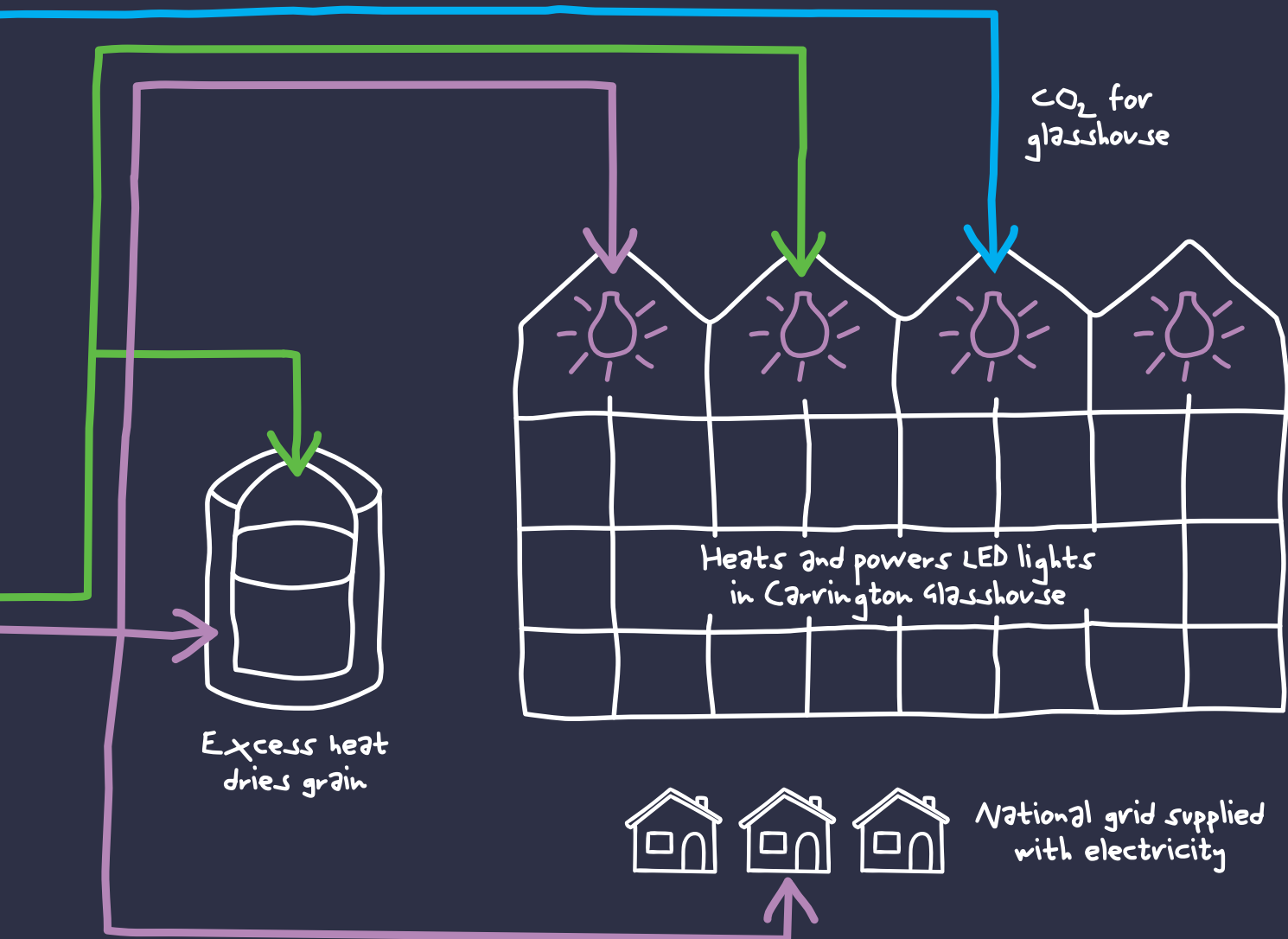
**Q3.** If we generate 71,400kWh from Carrington AD , 46,700kWh from Nocton AD 5,000kWh from solar panels.

- A) What percentage of renewable energy comes from solar?
- B) What percentage of renewable energy come from the AD?



Farming sustainably using a circular farming system. We make our own energy through our anaerobic digesters. It's like a mechanical cow that turns animal waste and crops into gas for energy and natural fertiliser. It helps farms make their own power and keeps things clean and green.





# ENERGY:

## CIRCULAR FARMING

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Duration: 30 mins  
Teacher pack: Page 25

### Activity outcomes

1. Explain the benefits of a circular approach to farming.
2. Able to identify the value in capturing all outputs from system and reusing them.
3. Understand the importance of the environment in the system along with the inputs and outputs it provides.

### Things you will need

Velcro balls  
Velcro vests  
Role badges  
Script

Learning objective	Activity
1,2,3	<b>Discussion around growing</b> Talk about what elements you think are needed to sustainably grow Dyson Farming's British strawberries.
1,2,3	<b>Role play</b> Allocate the roles of the circular farming model to each person of the group. Following the script you will discover the Dyson Farming circular farming story.

# ROLE PLAY SCRIPT

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## Your roles

For this activity each person in the group will be assigned a role.

You will need people to be the sun, soil, nutrients, tractors, energy, maize, heat and strawberry.

Once you have your role listen out to where you fit in the script.

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**Sun: I shine down and give energy to everything, it all starts with me!**

(Pass energy to soil and crops)

**Soil: I hold nutrients and soak up the sun's warmth, ready for the crops to grow!"**

(Pass nutrients to the crops)

**Crops: I am not used for food. We grow strong in the soil, powered by the sun.**

(Pass energy to the tractor)

**Tractors: We harvest the crops and take the leftovers to AD, no waste here.**

(Pass energy to the AD)

**Anaerobic digester: I turn leftover crops into biogas and fertiliser for green energy.**

(Pass energy to the glasshouse)

**Glasshouse: I use the green energy and excess heat to grow strawberries all year round!"**

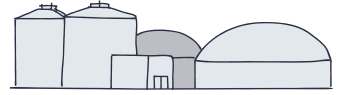
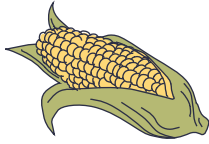
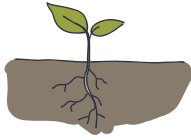
(Pass energy to the strawberry)

**Strawberry: I'm sweet, juicy, and grown with care and it all began with the sun!"**

(Pass energy back to the sun and soil)

# CIRCULAR FARMING: ROLE PLAY

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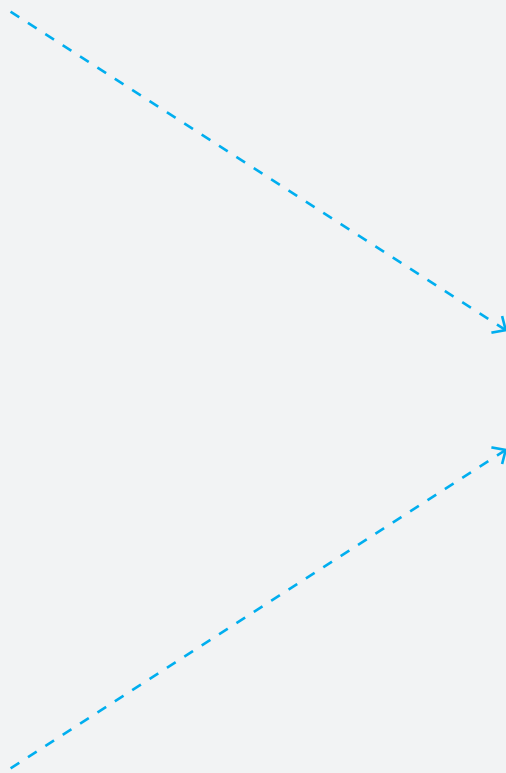
**SUN**

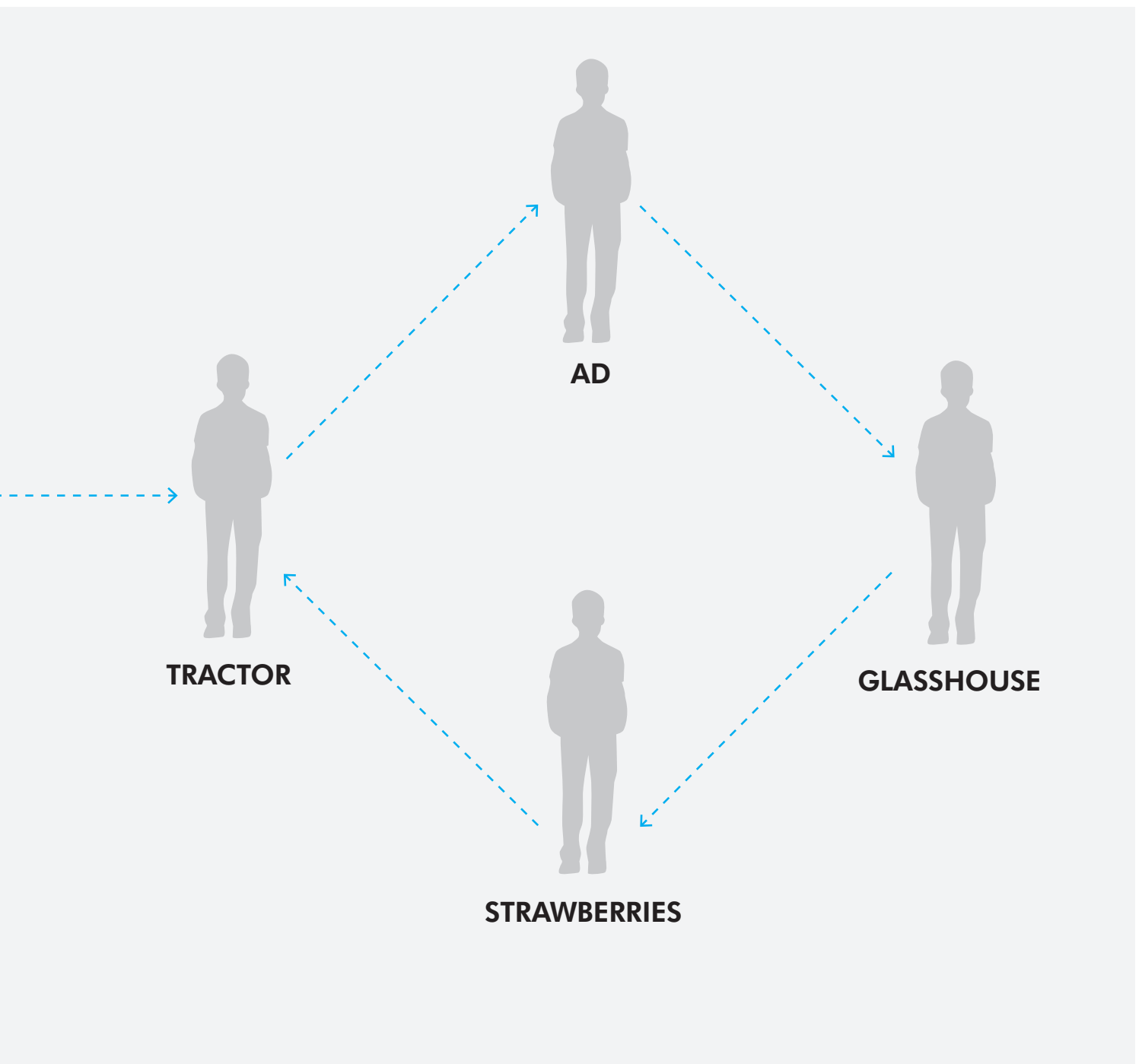
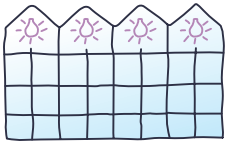


**SOIL**



**CROPS**





# ENERGY

Duration: 15 mins

Teacher pack: Page 27

## Learning objectives

1. Understand the energy requirements for food production.
2. Identify ways in which farms can use renewable energy to produce food.

## Things you will need

Jars

Signs for each stage of the supply chain

Dried peas

Learning objective	Activity
1,2	<b>Establishing the supply chain</b> Discover what processes go into taking peas from pod to plate. Put the correct cards on the jars and put them in order on the worksheet.
1,2	<b>Visualising energy use</b> Share the peas to the right jar based on what part of the process uses the most energy. The peas represent the energy.

# SUPPLY CHAIN

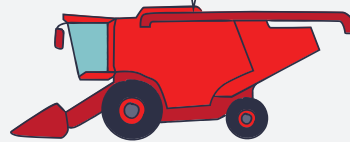
**Activity:**

Use this worksheet and the jars in the area to work out the supply chain for peas. Fill in the names of each step of the supply chain with help of the cards and the jar and the descriptions. Next you will have to distribute the peas which represent the energy into the correct jars based of the relevant energy consumption.

**1** \_\_\_\_\_  
 This part of the journey begins in the dirt, with sun, water, and a little green squirt. Watch closely it's starting to sprout!



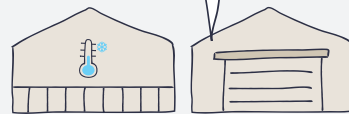
**2** \_\_\_\_\_  
 The fields are full, and the timing is just right. Every pod is collected quickly so the peas stay fresh.



**3** \_\_\_\_\_  
 The peas are ready to go. They're loaded up and taken away from the farm. This helps them reach where they need to be next.



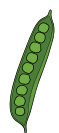
**4** \_\_\_\_\_  
 To keep peas tasty, they need to be cooled. This helps lock in their flavour. Stored until it's time to move again.



**5** \_\_\_\_\_  
 The peas are ready for customers, waiting for someone to take them. You might see them whilst shopping.



**6** \_\_\_\_\_  
 The peas have been bought and taken home. Now they're being heated up in a pot or pan. They might be part of a meal with other foods.



# ENVIRONMENT

## DID YOU KNOW?

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We've repaired and restored over 10km of dry stone walls in Gloucestershire, an area which is famous for them.

We manage nearly 400km of existing hedgerows plus 20km of new planted hedges. 17.5km of laid hedges – a way of encouraging thicker growth to contain livestock without the need for fencing.



# HULA HOOP TRANSECT

Duration: 30 mins

Teacher pack: Page 30

## Learning objectives

1. Identify common farmland species and their role in the ecosystem.
2. Able to use sampling and data collection techniques to complete simple diversity index calculations.
3. Counting the number of a particular plant species.
4. Determining the percentage cover of a number of invertebrates.
5. How frequently a plant species appears in a set area.

## Things you will need

Hula hoop

Clipboard

Pencil

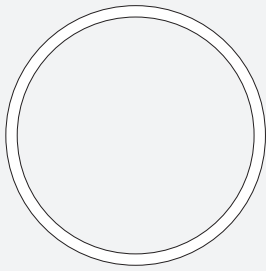
Paper

Learning objective	Topics
1	<b>Predictions</b> Discuss what species you would expect to find in this habitat. Are there some that you are expecting to be more common than others?
1,2	<b>Sampling</b> Take your first sample, collect the invertebrates and record your findings.
1,3,4,5	<b>Comparing data</b> Evaluate your findings and use different methods to find out the number of potential number of species in the wider area.

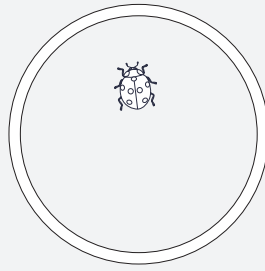
# HULA HOOP TRANSECT: ACTIVITY SET UP

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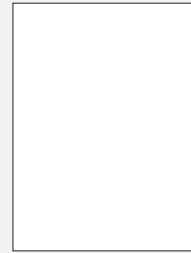
## Activity flow:



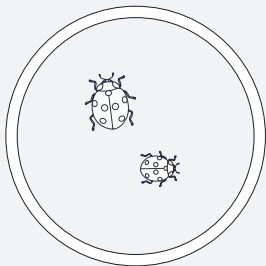
Drop the hula hoop



Identify insects and plants  
in the sample



Record results



Repeat steps in different spot



Discuss your findings

# HULA HOOP TRANSECT: RECORDING DATA

Record your findings:

Hula hoop number	Number of different plants	Number of invertebrates
1		
2		
3		

Activity findings	Number of individual plants
Total number of plants	
Mean number of plants	

What species have you spotted?

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Plant name	Hula hoop number (tick if plant present)			% Frequency
	1	2	3	

# SWEEP NETTING

Duration: 30 mins

Teacher pack: Page 33

## Learning objectives

1. Identify common bugs you find.
2. Compare your findings with other members of the class.
3. Identify, classify and group living things in the environment.

## Things you will need

Net

Tray

Learning objective	Activity
3,4	<b>Sweeping</b> Decide on an area to sample, this could be in the long grass or hedgerows. Empty the nets and see what insects you have caught and can identify.
1,2	<b>Discussion</b> Talk about how many species you find and how this might suggest species richness or diversity.

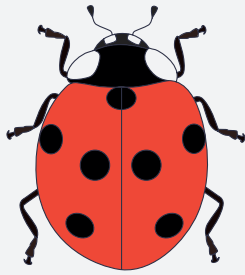
# **SWEEP NETTING:** **WHAT DID YOU SEE?**

On your sweeps make sure you record your findings.

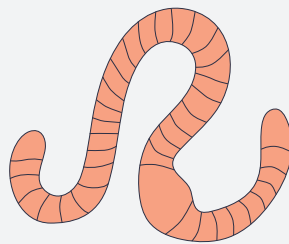
How many different species of insects did you see and where did you find them?

Think about the following points:

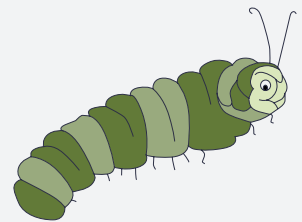
1. How do insects help the environment
2. What insects did you expect to find, did you see them all?



Ladybird  
Habitat:



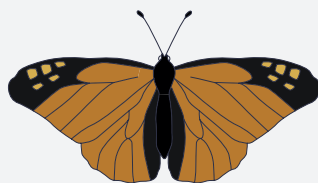
Worms  
Habitat:



Caterpillar  
Habitat:



Bees  
Habitat:



Butterfly  
Habitat:



Ant  
Habitat:

# BIRD WATCHING

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Duration: Unrestricted  
Teacher pack: Page 38

**Learning objectives**  
Teacher pack: Page 38

1. Identify common bird species.
2. Understand the concept of habitats and their importance.
3. Using your senses to identify different bird sounds.

**Things you will need**  
Binoculars (optional)

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Learning objective	Activity
1,2,3	<b>Observation</b> Sit quietly in the bird hide and see what species of birds you find. Which birds did you see or hear? Are there any birds you thought you might see but didn't? Can you think of any reason why?

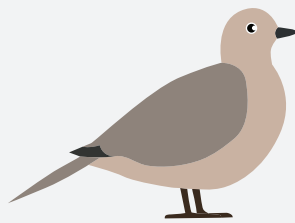
## BIRD WATCHING: WHAT DID YOU SEE?

Since 2018, we have recorded the numbers of 20 rare bird species across the Dyson Farming land. Through our work to improve the habitats and nesting opportunities for rare birds, we have seen numbers of Red Listed Species including Yellow Wagtail and Corn Bunting increase.

Tick the birds you see:



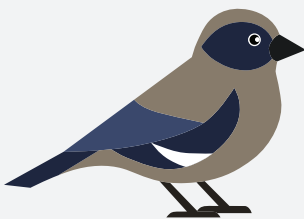
Blackbird



Turtle Dove



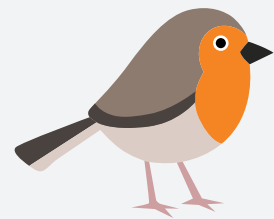
Bluetit



House Martin



Starling

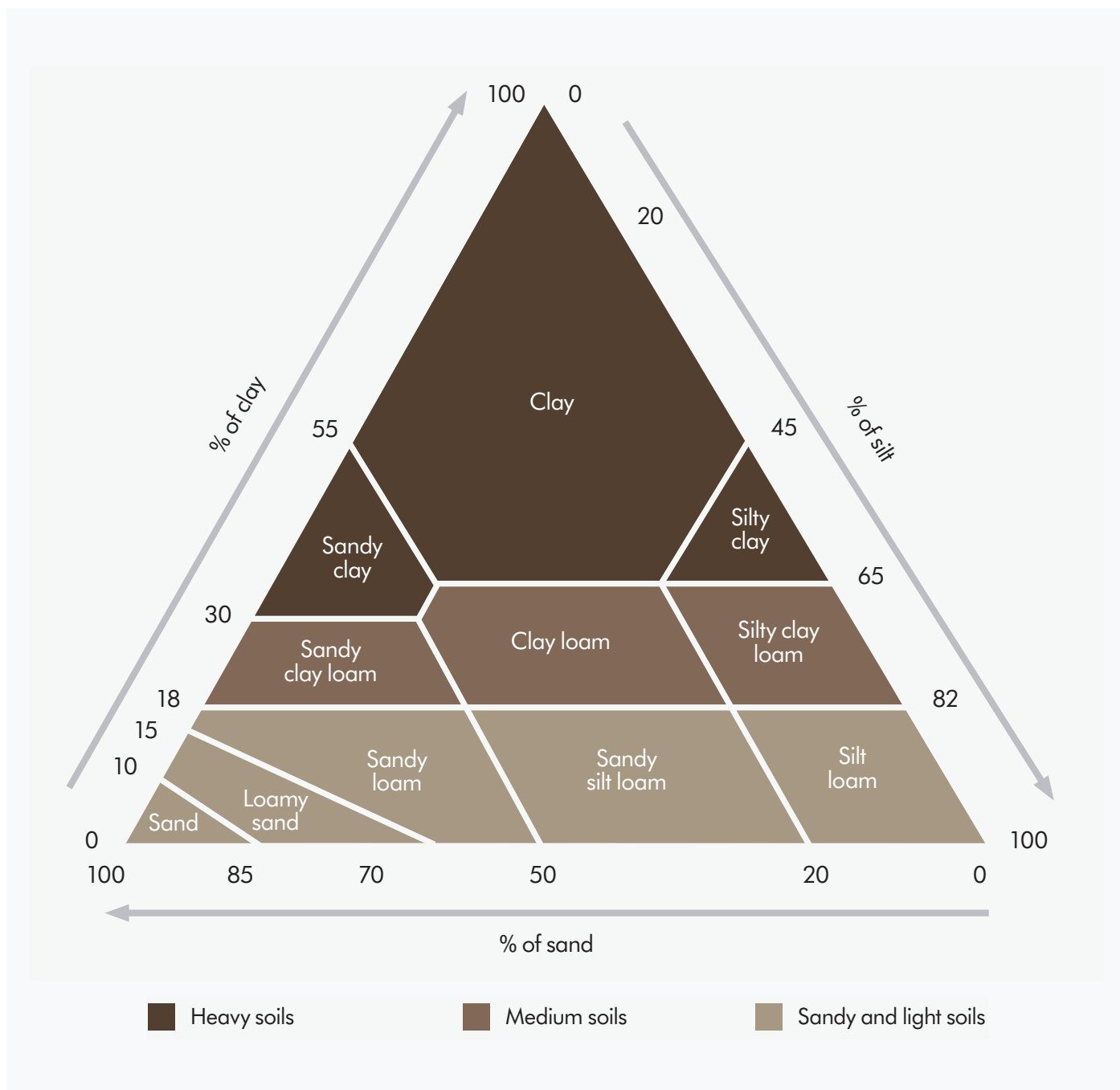


Robin

# SOIL:

## DID YOU KNOW?

Everything starts with soil health. Years of over-farming meant much of what we acquired was lacking in nutrients. Inefficient land drainage leads to lower yields or ruined crops. We have cleared ditches and excavated deep to install new pipes to provide drainage channels across our fields. Working with the land to restore the balance has meant stronger crops, grown from nutritionally enriched soil, with higher yields and healthy livestock.



# SOIL MATCHING:

Duration: 20 mins

Teacher pack: Page 46

## Learning objectives

1. Consider what crops are best suited to different soil types.
2. Discuss the methods farmers use to improve and protect the soil.

## Things you will need

Soils from the patches  
Crop cards  
Soil texture chart  
Activity worksheet

Learning objective	Activity
1	<b>Identify the soils</b> Spot the characteristics of the soil using your knowledge from previous activities.
1	<b>Match the soil to the crop</b> Spend time finding what soil type would be most suited to growing each crop.
2	<b>Discussion</b> Think about why good quality soil is important and how farmers can improve and protect it.

# SOIL MATCHING: CHARACTERISTICS

Duration: 10 mins

## Soil 1

Using the soil texture chart to help you, what type of soil do you think this is?

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Describe the soil:

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## Soil 2

Using the soil texture chart to help you, what type of soil do you think this is?

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Describe the soil:

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## Soil 3

Using the soil texture chart to help you, what type of soil do you think this is?

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Describe the soil:

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## Soil 4

Using the soil texture chart to help you, what type of soil do you think this is?

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Describe the soil:

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# SOIL MATCHING: CROPS

Duration: 10 mins

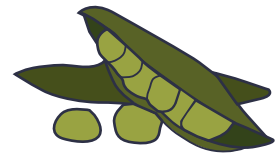
Farmers try to grow crops that are suited to the soils on their farm to grow healthier crops with less input. Use the crop cards to match them with their ideal soil.



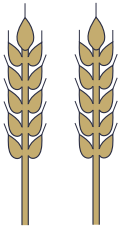
Winter barley:



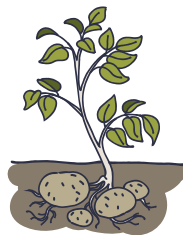
Whole crop forage:



Vining peas:



Spring barley:



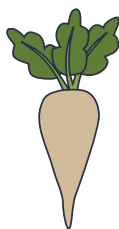
Potatoes:



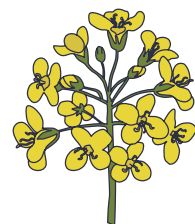
Maize:



Winter wheat:



Sugar beet:



Oilseed rape:

## WELLBEING: DID YOU KNOW?

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We believe connecting people with their local environment is important. That's why we make our farmland accessible to explore with walking routes across the UK.



# MUSIC WITH NATURE

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Duration: 20 mins

Teacher pack: Page 53

## Learning objectives

1. Use the resources around you to create your own music.
2. Create music by experimenting with rhythms, pitches and sounds with various objects.

## Things you will need

Natural materials

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Learning objective	Activity
1,2	<b>Creating music</b> Use the natural materials in the area to make different sounds.

## CREATIVITY: DID YOU KNOW?

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By using innovative technology including renewable energy and robots, we're able to provide our plants with the optimal conditions to thrive outside of the usual British growing period to produce our strawberries that are fresh, juicy, sweet and intense.



# BRANDED PUNNET

Duration: 45 mins

Teacher pack: Page 62

## Learning objectives

1. Understand the importance of brand identity.
2. Consider sustainable and suitable packaging choices.
3. Develop the skill of planning, expression and communicating.

## Things you will need

Punnet template  
 Scissors  
 Glue  
 Pencil  
 Colouring pencils  
 Clipboards

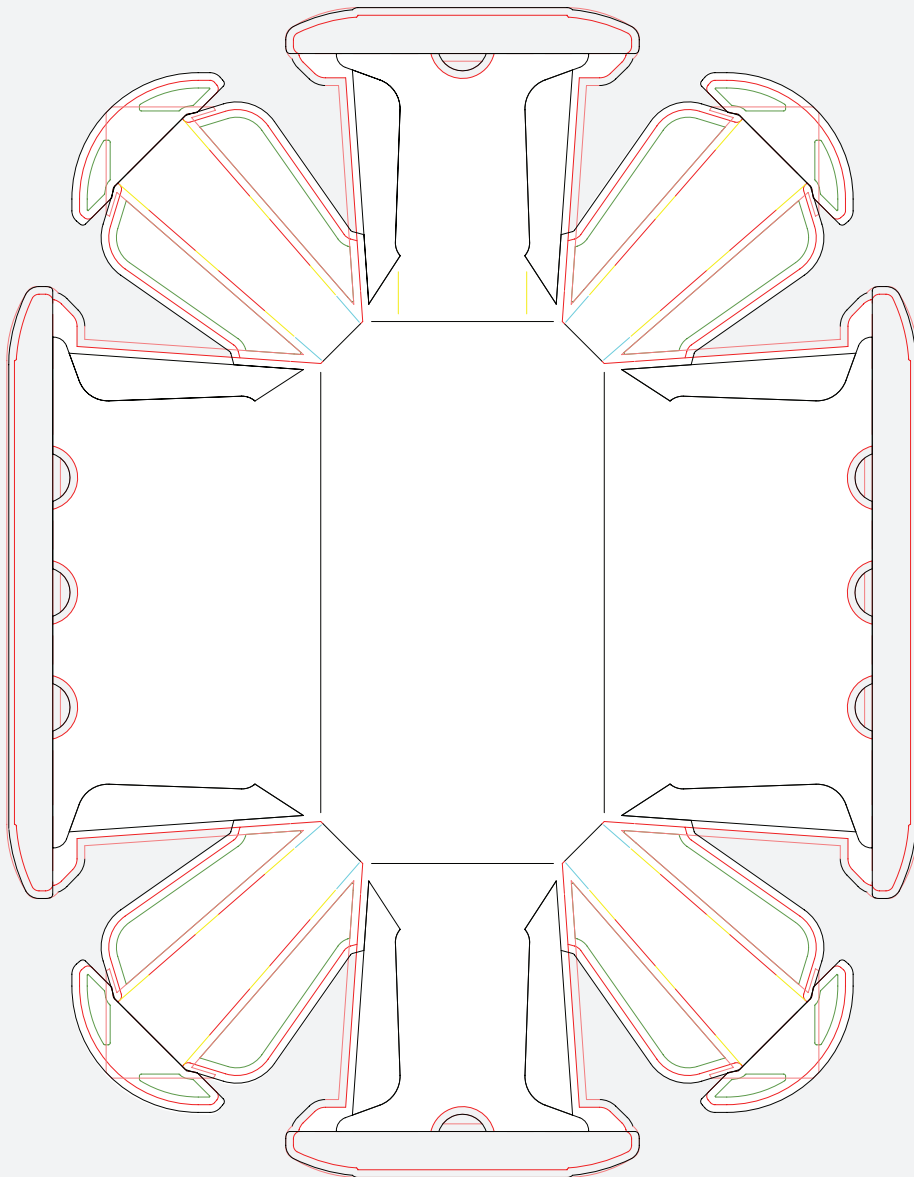
Learning objective	Activity
1,2,3	<b>Plan your design</b> Consider what makes packaging effective including the messaging, colours and vocabulary. What makes the brand recognisable visually?
1,2	<b>3D punnet</b> Complete your design on the packaging net.
2,3	<b>Discussion</b> What are the main factors that make packaging sustainable? Why are Dyson Farming using cardboard punnets instead of plastic?

# BRANDED PUNNET: PLAN AND SKETCH

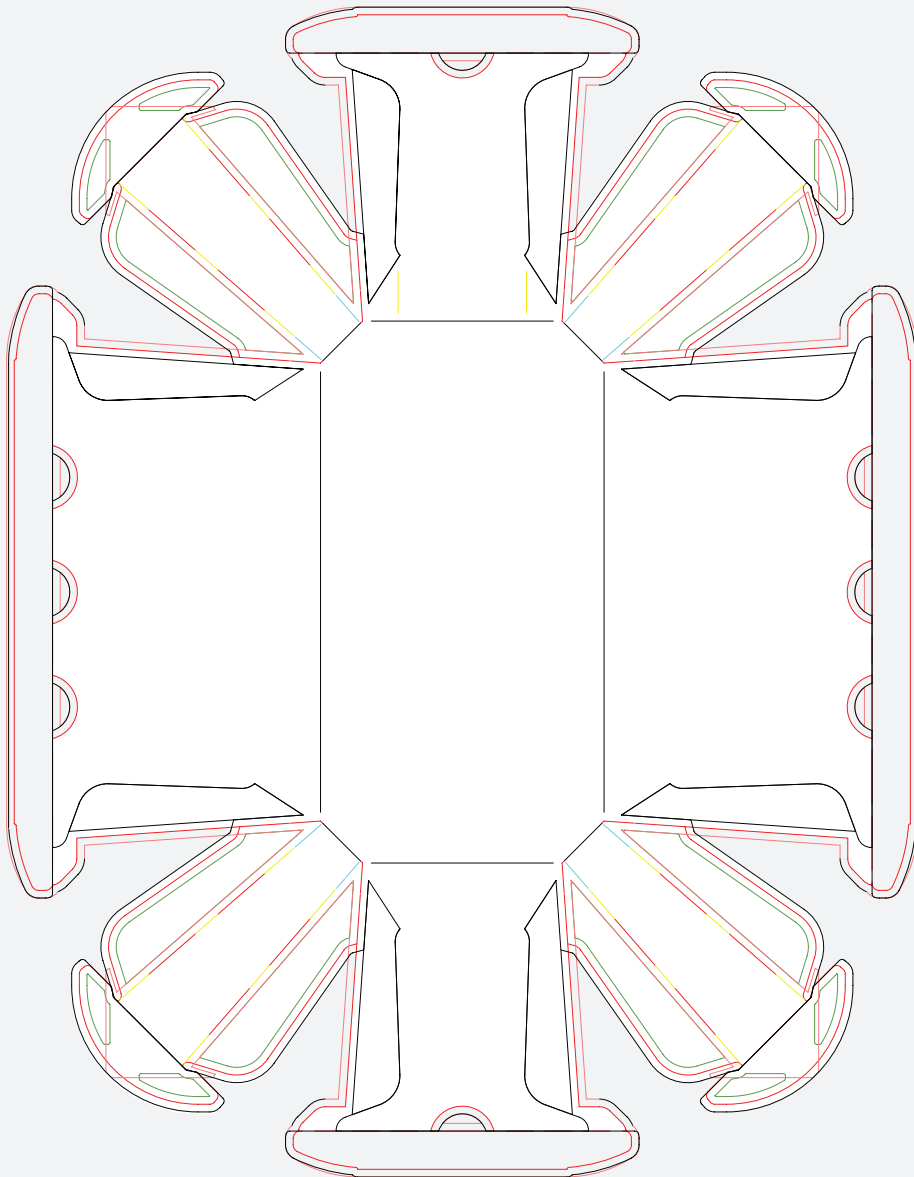
Duration: 10mins

Before you get into making your own punnet, use the space below to plan out your design. You can decide whether you want to make your own brand or redesign our punnet. Make sure you consider the pointers on the worksheet to help you.

Idea one:



Idea two:



# INNOVATING WITH BRITISH CROPS: DYSON SCENARIO SHEET

Duration: 45 mins

## Learning objectives

Teacher pack: Page 63

1. Apply the new product development process to create additional opportunities for revenue generation.
2. Identify market gaps and trends.
3. Use SWOT (STRENGTHS, WEAKNESSES, OPPORTUNITIES and THREATS) analysis to evaluate business ideas.
4. Communicate business ideas effectively through short pitches.

## Things you will need

Dyson Omega™ Project case study  
SWOT template  
Pens and paper

## Opportunities

Do competitors have any weaknesses your product could benefit from? Is there a gap in the proposed market you are entering?

Learning objective	Activity
3	<b>Analyse your innovation</b> Complete a SWOT analysis of the existing product. Share with other teams and compare thoughts.
1,2	<b>Concept discovery</b> Brainstorm what new products could be made in commercialisation from any of the crops that Dyson Farming grow.
3,4	<b>Pitch your idea</b> Pick two products, complete a SWOT analysis for both and then pitch an idea to the group.

dyson  
o|me|ga



### Dyson Omega™

Dyson Omega Nourishing Range is a haircare line designed to nourish and protect hair before styling.

The range currently includes:

Omega Hydrating Hair Oil

Omega Leave-In Conditioning Spray

These products contain a blend of seven omega-rich oils, including sunflower oil produced using sunflowers grown on Dyson's farms.

### The role of Dyson Farming

Dyson grows over 800,000 sunflowers in Lincolnshire, selecting varieties specifically for oil quality and nutrient content.

By growing its own crop, Dyson can:

Control ingredient quality

Ensure traceability from farm to product

Experiment with crop varieties that improve oil performance

Promote sustainability and transparency

### Market trends

#### 1. Premium Beauty Market

Increase in haircare products with health benefits.

#### 2. Natural Ingredients

Consumers are shifting toward naturally derived ingredients. Sunflower oil is being used in cosmetics as a natural alternative to synthetic ingredients.

#### 3. Traceability and Sustainability

Consumers increasingly expect transparency about where product ingredients come from. Dyson meets this expectation by producing ingredients that are farm-grown, traceable and sustainably produced.

### Example return of investment (ROI)

Scenario 1: Selling sunflower seeds as a crop

Revenue (seed sale) ≈£1,100 per hectare

Costs (growing, harvesting) ≈£600

Profit ≈£500 per hectare

Scenario 2: Using the crop in a product e.g

Sunflower oil becomes an ingredient. Example

product price (RTP): Hydrating hair oil ≈£45.99,

Leave in spray ≈£59.99.

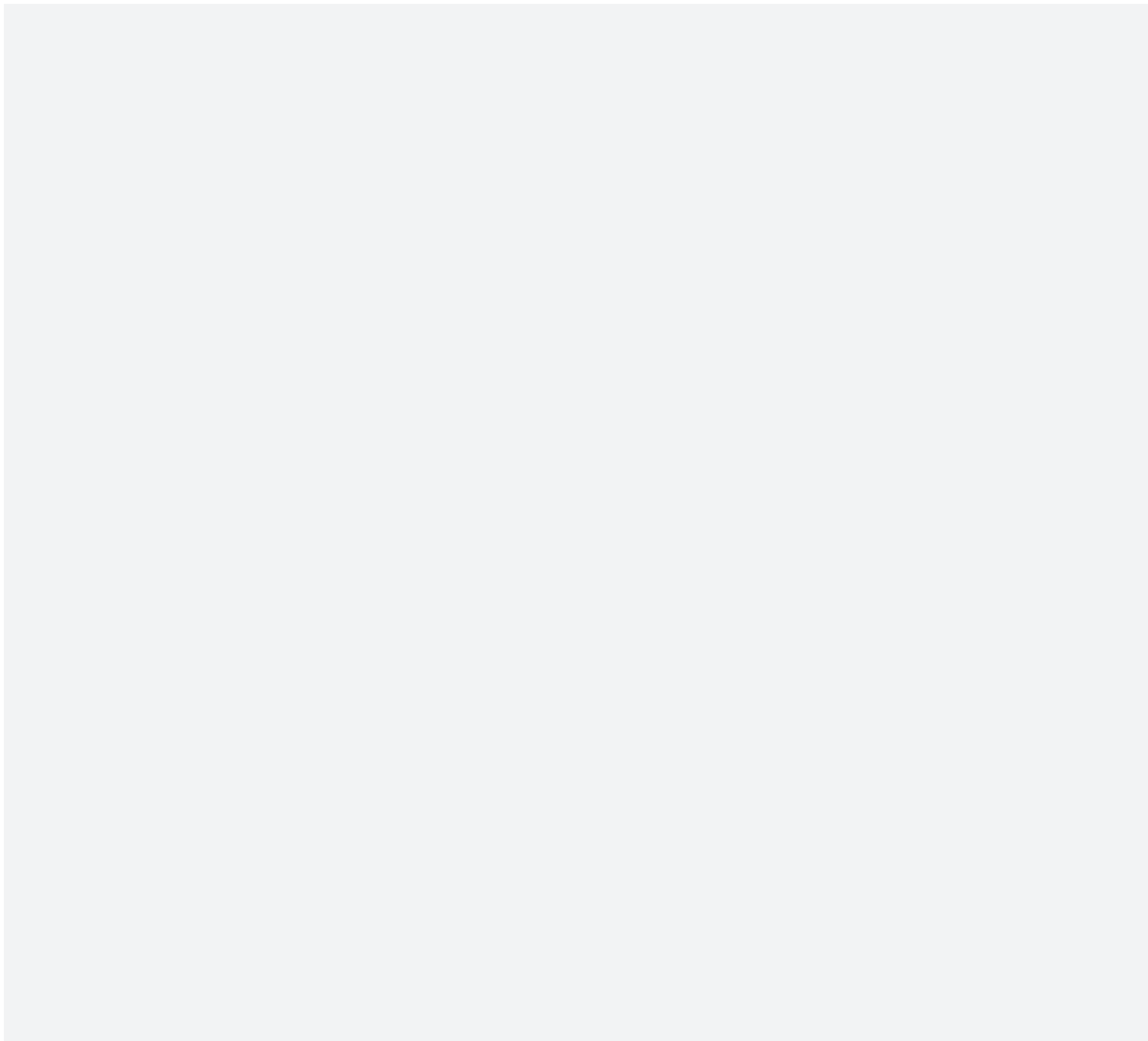
Although manufacturing, distribution and marketing increase costs, the value per kilogram is significantly higher than selling the raw material. This demonstrates how value-added products improve overall return on investment.

# INNOVATING WITH BRITISH CROPS: YOUR IDEA

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Duration: 30 mins

Use the space below, start to brainstorm your ideas and SWOT for the products you come up with. Consider: current market trends, USP, ROI and target markets.

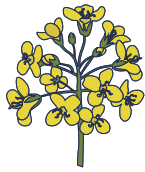


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## Crops to consider for product commercialisation



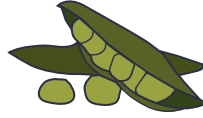
Winter barley



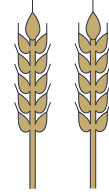
Oilseed rape



Wheat



Vining peas



Spring barley



Potatoes

# INNOVATING WITH BRITISH CROPS: SWOT ANALYSIS

Duration: 5 mins

Use the template to analyse your innovation using the SWOT method. This activity will allow you to see how your product may perform if it was to be launched in the real world. Consider outside influences and think of things that may improve your product and adapt. If you have more than one idea complete both SWOT templates to see which one performs best.

## Strengths

What are the product's advantages?

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## Weaknesses

What can we improve? Think about how it meets the customer's needs, is it sustainable?

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## Opportunities

Do competitors have any weaknesses your product could benefit from? Is there a gap in the proposed market you are entering?

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## Weaknesses

Is there any new technology that could work against your product, or a shift in consumer behaviour?

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### Strengths

What is the products advantages?

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### Weaknesses

What can we improve? Think about how it meets the customers needs, is it sustainable?

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### Opportunities

Do competitors have any weaknesses your product could benefit from? Is there a gap in the proposed market you are entering?

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### Weaknesses

Is there any new technology that could work against your product, or a shift in consumer behaviour?

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Dyson  
farming

**ENGAGEMENT  
CENTRE**