GREAT PHIZZI SHARE
How transparent is transparent?
9-14 year olds
Food miles

All of the food we eat has to make a journey from where it is grown to our plate. The distance it travels is described as its **food miles**.

We like to eat fruit and vegetables that are grown in warm climates all through the year such as strawberries and salad vegetables.

How can we create the right conditions to grow some of these foods in the UK?
Physics ideas help us choose materials with the right properties.

Plants get their light and heat from our nearest star, the Sun.

We need to choose transparent materials that allow light to pass through.

About 70% of sunlight that reaches Earth is absorbed by the earth’s surface and the atmosphere, making them heat up. Some of this light is absorbed by trees and plants giving them the energy they need for growth by photosynthesis.

We also need to choose materials that trap heat to create a warm environment. Heat moves from warmer to cool places, thermal insulators make it more difficult for the heat to travel.
If we use lots of layers of transparent material on our polytunnel the light will still get through to the plants but the air pockets will between the layers will trap the heat and help to keep the polytunnel warm.

What do you think about Sara’s idea?

Can we develop her idea into an enquiry question?

Do the number of layers of plastic affect how much light can travel through it?
Physicists carry out fair tests to find out about factors that affect the transparency of materials.

They work scientifically just like we do?
Planning to gather data.

Could you use following equipment to test the materials?
Is there anything else you could use?

- What are we changing from one test to another?
- What are we measuring to compare?
- What should we keep the same in each test?
- How many measurements shall we take? Why do we repeat them?

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A line graph to show how the number of layers of plastic affects its transparency.

- How much light passed through 1 layer of plastic?
- How much less light passed through 5 layers?
- How did increasing the number of layers affect how much light travelled through?
- Predict how much light would travel through 6 layers?

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Can we answer out scientific question?

Do the number of layers of plastic affect how much light can travel through it?
We are ready to draw our conclusion.
Evaluation

• Look carefully at your data. Do you have any odd measurements? What might have caused them?

• How accurate were your measurements? How precise were your measurements?

• If you were to repeat this experiment would you do anything differently? How would that help you collect better evidence?
Next steps

What scientific questions would you ask now to help solve the problem of growing fruit and vegetables that prefer warmer climates?

- Food miles
- Thermal insulation
- Building and testing greenhouses
- Growing plants
- ?