

Colour in the correct arrows to follow the path to your locust.

Cut out the picture at the top and stick it with paper glue in one of the squares at the bottom of the key to complete your path. You can draw pictures in the other squares to finish your key.



Making a life-cycle wheel

Now that we know about complete and incomplete metamorphosis we can make a life-cycle wheel.

You will need:

Two pieces of A4 card or thick paper Scissors Something round to draw around or a compass Paper fasteners

1. Fold a piece of card in half. Make a mark in the middle and make a small hole through the two pieces of card.

2. Next cut out a space above the hole (on the unfolded edge).

3. On one side of the card write **Incomplete metamorphosis** and on the other side write **Complete metamorphosis**.

4. On a new piece of card, cut out a circle about 14cm in diameter. Make a mark in the centre of your circle and make a small hole.

Use the pictures on the next sheet to help you draw some life-cycles. You could stick them onto your card if you want to.

5. On one side of your circle draw the life cycle of the locust around the edge. This will have, **an egg**, **five nymphs (**hoppers) and **an adult.**

6. On the other side draw the life cycle of a butterfly. This will have **an egg**, **a caterpillar**, **a pupa and an adult butterfly**.

7. Put your life-cycle circle into your folded card.

The life-cycle of the **locust** will be on the side which says **locomplete metamorphosis**. The life-cycle of the **butterfly** will be on the side which says **Complete Metamorphosis**

8. Put a paper fastener through the holes in your folded card and card circle, and your wheel is ready to turn (move it anti-clockwise).











Unlike most grasshoppers, locusts can form large groups or swarms. Desert

locusts normally live in an area in a band across Africa south of the Sahara and into India. When a locust plague occurs, the swarms move into Africa, Asia, Europe and beyond. Swarms can migrate over huge distances.

When locusts are on their own (i.e. not in swarms) they are called **solitarious** and they normally try to avoid each other, flying at night. The solitarious adults are coloured **green**. When there are lots of locusts crowding together, **often to find food**, swarms can develop.

When locusts are about to swarm they not only change their behaviour, but if they are still nymphs, they will even grow up to look different as adults. These adults are **multi-coloured**, e.g. with black, pink and yellow areas. They are called **gregarious** forms. A gregarious mother can also decide whether her offspring will be solitarious or gregarious. Scientists have found that there is something in the protective foam around the eggs that may cause them to hatch into gregarious nymphs.



A green solitarious nymph



A multi-coloured gregarious nymph

What the scientists say.....

Scientists have found that if solitarious locusts are crowded together they change to have gregarious behaviour after only a few hours.

Experiments at the University of Oxford have tried to find out whether it is the sight, smell or contact with others, or a combination of these, that causes the change in behaviour.

Scientists have found that touch is the major stimulus, the locusts don't even have to touch another locust. Touching the locusts with small balls of papier mâché is enough to trigger a change in behaviour. Locusts have touch receptors all over their bodies, but the receptors on their legs are especially important.

Although sight and smell alone are not enough to trigger a change in behaviour, sight and smell together may be important. Smell helps to keep the locusts together, scientists think that it is the smell of the faecal pellets that is important in maintaining swarms.



When the researchers do their experiments they always have

to make sure that it is a *fair test*. For example if they are testing sight, they can put the locusts in transparent perspex chambers so that they can't smell or touch the other locusts. They also have to make sure that the temperature and the length of time are the same. The locusts that are used in the experiments are bred and reared under carefully controlled conditions to keep them healthy.

Where do locusts live?



The following countries may have swarms of locusts:

Australia, Mauritania, Morocco, Mali, Sudan, Saudi Arabia, Yemen, Egypt, India, Pakistan, Algeria, Niger, Kazakhstan, Uzbekistan, Russia, Kenya, Ethiopia, China, Libya, Philippines, South Africa, Eritrea.



Look up these places in an atlas of the world. Colour in the map below to show where locusts are found.





Locusts and grasshoppers have sturdy jaws that bite or saw-off pieces of vegetation.

Locusts jaws move from side to side. Do your jaws move from side to side or up and down?

Other insects have different types of mouthparts. **Butterflies** have mouthparts like a **drinking straw**. **Mosquitos** have needle-like mouthparts like a **syringe**. The **housefly** has mouthparts like a **vacuum cleaner** or a sponge. Ancient insects had three sets of jaws and now the mouthparts have **evolved** to have different uses.

Can you draw lines to match the object with the insect mouthpart?



How much can a locust eat?

A locust can eat its own weight in fresh food every day.

Think about how much food you would need to eat if you ate your own weight each day. First weigh yourself on some household scales, then weigh common food items on some kitchen scales, you can also look on the packets to find out how much they weigh.

I weigh _____ kg.

A packet of crisps weighs _____kg or _____g.

If I ate my weight each day it would be like eating _____ packets of crisps.

Food chains



A food chain shows "what eats what", it also shows how energy flows from one living thing to another. Lots of food chains may link to one another to form a food web.

Food chain facts

A food chain will always start with a plant (a primary **producer**).

Green plants get their energy from the sun.

Plants make their own food in a process called **photosynthesis**.

Animals that eat the plants are called **consumers**.

Animals that eat other animals are also called **consumers**.

A fox eats a rabbit. The fox is called a **predator** and the rabbit is called the **prey**.

Locusts eat plants. Locusts can be eaten by spiders, birds, lizards and foxes.

Can you fill in the spaces using the key words below?

primary birds sun consumer



The plant material gets its energy from the _____. Plants are

called	producers. The locust eats plant material so	
it is a	Locusts can be eaten by	

Rearrange the pictures below to make a food chain. Write the key words under each picture.

producer	consumer	prey	predator	consumer
L] [
				A start



lizard

What type of skeleton?

We are full of bones, if we didn't have any bones we would fall down. Bones fit together and make a skeleton. Lots of animals have skeletons inside them (an internal skeleton).

As we grow, the bones of our skeleton grow too. This means that an adult has a bigger skeleton than a child.

Not all animals have skeletons inside their bodies. Some animals have skeletons outside of their bodies like a hard shell (an external skeleton). Some don't have a skeleton at all.



What type of skeleton do these animals have? Draw lines to the correct skeleton.

	nternal skeleton	External skeleton	No skeleton		
Contraction of the second seco					



The locust's skeleton is on the outside, how does the locust grow?



Locust bar-charts

Measure the locusts with a ruler and write down their exact sizes in cm (measure right to the end to their feet).

Use the number line below to help you. We've already measured one locust for you.



Now if they are not a whole cm, round them up to the nearest cm. You can write this underneath. Use the number line to help you.

Draw a bar chart on squared paper.

Which size is the most popular? Which size is the least popular?

Tip: Write the length in centimetres at the bottom of bar chart (from 1cm to 6cm), and write the number of locusts at the side of the bar chart (from 1 to 5).



Locust fractions

During plagues, locusts can spread into parts of 60 counties. This is more than 20% of the total land surface of the world.

1) Circle the fractions that are the same as 20%, then write their decimal fractions underneath them.

	1/10	2/10	5/10	20/100	5/100	1/5	2/5
2)	Circle the decimal fractions that are the same as 20%, then write their fractions underneath them.						
	0.1	0.2	0.5	0.20	0.50	0.8	0.9

Don't forget that 0.2 is the same as 0.20, it just has a different number of decimal spaces after the decimal point.

Hot crickets!

The number of times that a cricket chirps shows what the temperature is.

For Hoppy the cricket, the temperature is the number of chirps in six seconds plus twelve. If Hoppy chirps three times in one second, what is the temperature?



The temperature is $(3 \times 6) + 12 = ? °C$



Can you do this?

For Jumpy the cricket, the temperature is the number of chirps in six seconds divided by 2 plus 11. If Jumpy chirps 5 times in one second, what is the temperature?



The Ant and the Grasshopper

In the summer the grasshopper was content to play music and sit in the sun. The ant kept scurrying past carrying grains of wheat, he looked tired and hot. "Why are you bustling about in this weather?" the grasshopper asked the ant. "I'm preparing for winter when there is less food, and so should you!" he replied. The grasshopper ignored the advice of the ant, she was enjoying the sunshine far too much to start collecting food for the winter. So she lay on the warm grass and listened to her music again.

In the winter the grass was cold and frosty, and the

wind howled across the fields. The ant was happy in his home because his larder was full of corn and wheat. He knew that he had enough food to last for the entire winter. The grasshopper was starting to get hungry, it was too cold for the grass outside to grow and she had no food. She knew that the ant would have some food, so she went out into the cold wind and walked to the ant's house. "Please may I have some of your food?" she begged. The ant was angry because he had worked so hard to collect enough food for the long winter months ahead. "If you hadn't been so lazy and had prepared for the winter like I suggested, you wouldn't be hungry now. I don't have any extra food for you." The ant went back to his warm fire and stocked cupboards, leaving the lazy grasshopper out in the cold.

This is an interpretation of a story from a collection of tales called **Aesop's Fables**.

This is a **Fable** – fables are stories with a hidden meaning which is called a **moral**.

Most fables are about animals like 'The ant and the grasshopper' and 'The hare and the tortoise', but some include people like 'The boy who cried wolf'.

Class questions and activities.

1 Read the first part of the story. Can you predict how it will end?

2 What have the ant and the grasshopper learnt, does this link with the message of the story? What do you think the message is?

3 Write a similar story based on the message of the ant and the grasshopper. Maybe you could use people instead of animals, like in 'The boy who cried wolf'. Maybe you could make it into a modern day story.

- 4. Plan out a cartoon storyboard to illustrate the story.
- 5. Look for descriptive words in the story, can you think of other descriptive words that you could use to describe the ant or the grasshopper?
- 6. Look at the words used to replace 'said'. Talk about why these are better.
- 7. Look at the apostrophes in the story. They are used differently, can you see how they are used?
- 8. Find other versions of Aesop's Fables and work out the message behind the stories?

Charles Dickens

There are lots of other examples of things written about crickets and grasshoppers.

Charles Dickens wrote a series of Christmas books. One of them was called "The Cricket on the Hearth". A quote from the book is "*To have a Cricket on the Hearth, is the luckiest thing in all the world!*".

The cricket that Charles Dickens was writing about was probably a species called *Gryllus campestris*, the black field-cricket.



The Bible

There are many references to locusts in the Bible.

In St Matthew Chapter 3 Verse 4, John ate locusts and wild honey. In some parts of the world people still eat locusts cooked with honey today!



In Amos Chapter 7 Verse 13, Moses warns the people before entering the Promised Land that if they will not obey the laws of the Lord, they will "carry much seed out to the field but gather little in, for the locust shall consume it."

This means that the farmer will sow some seeds that will grow into a food crop, however locusts will eat the plants before the farmer is able to harvest the crop.

Locust Poems

This is a poem about a locust called "Locust" by Kristy Overton.

The shell of dry and crumbling skin Holds nothing but the air within. The body's gone, the soul's departed – We're left with less than when we started – The faded form alone remains To wash away with coming rains.

Class questions and activities.

What do you think this is referring to? (Try to think about the life-cycle of the locust).

What can you say about the style of the poem, for example, does it rhyme?

Can you write a poem about an insect? Think about what style to use and how many verses it should have. Remember poems do not always have to rhyme.

How are locusts adapted? What do you think?





The back legs of a locust are bigger than the back legs of many other kinds of insects. Why do you think that the locust's back legs are so big?

