



Wonder with Worms

Do worms prefer dry or wet soil?

The study of animal behaviour is important for many reasons - **How many can you think of?** Animals give us companionship, help us do work, provide us with food and clothes; they help us to study diseases and to make new medicines. Scientists at the Roslin Institute study the behaviour of farmed animals to help us understand what farmed animals need to live comfortable lives and stay healthy.

In this activity, you will carry out a simple science investigation the same way our scientists do it, by using the **scientific method**. We will give you an example to try out, and some ideas for our you to **create your very own science investigation**.

Let's get started!

1 When we do an experiment we make a prediction about **what we think the answer will be**. This is called making a **hypothesis**.

Do you think worms prefer wet or dry soil? Write your hypothesis here:

.....

.....

.....

.....

Thinking caps on!



1. How will you know if the worm prefers wet or dry soil?
2. Can you measure this? *Hint: look at your equipment list*.....
3. Is it important to test more than one worm?

Science @ home

SIMPLE HANDS-ON ACTIVITIES EXPLORING REAL-LIFE SCIENCE

What do you need?

- ☐ Earthworms (keep them in the dark in soil)
- ☐ Soil (dry and wet)
- ☐ Deep tray or roasting tin
- ☐ Water
- ☐ Timer or clock with a second hand

2

Worms are **living creatures** and they have the same needs as other animals. They need food, water, air, space and natural surroundings. They also need to be protected from pain and injury.

How can you keep your worms comfortable? Mark true T or false F.

- 1) Keep them in the light for less than 20 minutes. ☐
- 2) Keep them in the dark with soil when not working with them. ☐
- 3) Keep their skin damp so they can breathe. ☐
- 4) Return them to where you found them, when you are finished. ☐



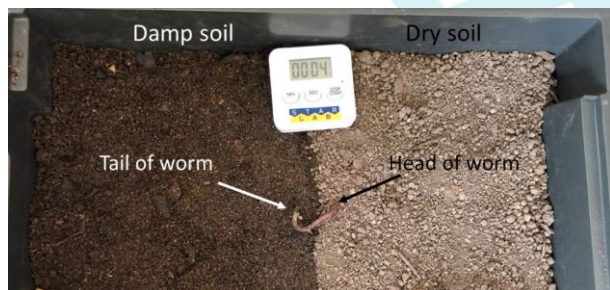
Grown-ups: Please read through the advice for supervising adults before continuing.



Do your experiment

3

1. Cover half the tray with dry soil and the other with wet soil.
2. Place the worm on the boundary so that it can feel both soils, with its head on the dry soil.
3. Start your timer.



4. When the worm moves its whole body to one side, stop your timer.
5. Repeat with other two earthworms.

Where is an earthworm's head?

- ✓ Earthworms move forward, head first, so look at its movement.
- ✓ If it is an adult earthworm it will have a **saddle** nearer its head end.

1	tail
2	saddle
3	head



Image credit: Difidave GettyImages

What did you discover?

4

1. Write down the **results** of your experiment in this table:

Worm number	Did it move to the wet or dry soil?	How long did it take to move its <u>whole body</u> to one side?
1		
2		
3		

2. When we do an experiment, we make a summary of **what we found out**. This is called making a **conclusion**.

Do your worms prefer wet or dry soil? Write your conclusion here.

.....

3. Look back at your **hypothesis** (prediction), was it correct?

.....

What next?

5

1. **Repeat** the experiment but this time place the head on the wet side.

Don't forget to:

- ☐ Make your hypothesis
- ☐ Do everything else in your experiment in exactly the same way as the first time
- ☐ Write down your results
- ☐ Make a conclusion

More ideas!

6

Do worms prefer light or dark?

Using a torch and a piece of card, cover half of the tray with the card and shine the torch on the other half. *How will you know if the worms prefer light or dark?*

Can worms feel touch?

Using a clean cotton bud, touch the worm gently along its body at two or three points e.g. head, middle and tail. *Does it react? Can you measure this?*

Which types of food to worms like?

Place the foods at different edges of the tray, place the worms in the middle and cover the tray so it is dark. Wait for 5 minutes. *How will you know what food worms prefer? Is it important to put the same amount of food?*

Do rats like being tickled?

Real-Life Research



This is Tayla Hammond and she is a scientist here in Edinburgh, studying at The Roslin Institute and Scotland's Rural College. She spends her time as a scientist studying the behaviour of animals, just as you have done.

"I love the variety in science, yesterday I was tickling rats and today I am watching their natural behaviour!"

Scientists, like Tayla, ask questions and answer them using the **scientific method** just as you have. Read about Tayla's investigation then look at the questions.



Scan to watch Tayla tickling a rat

1 What did Tayla need?

- ☐ 24 rats (12 pairs)
- ☐ Cotton glove
- ☐ Night vision camera
- ☐ Ultrasonic sound recorder

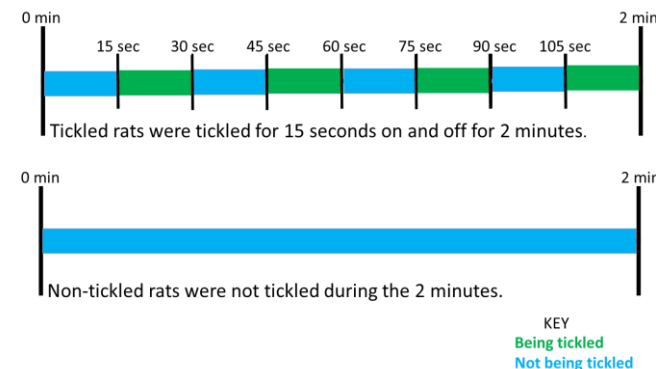
2 What did Tayla want to find out?

Rats make **ultrasonic** (very high pitched) noises when they are happy! **Observing** when rats make these noises tells scientists what rats like and don't like. Tayla wants to know if rats like to be tickled.



3 How did Tayla do her investigation?

1. Tayla took 24 boy rats and chose half of them at random to be tickled. The other half were not tickled.
2. Each rat was then moved to the **handling arena** and tickled or not tickled for 2 minutes.
3. Any ultrasonic noises were **recorded** during the 2 minutes of the experiment.



4 What did Tayla discover?

During the tickle test the tickled rats made **3x more ultrasonic noises** than the non-tickled rats.

What is Tayla's conclusion?

Rats like to be tickled. She also **observed** that the rats looked forward to tickling!

Think and discuss

1. What activities do you think rats do that make them happy?
2. Why do you think Tayla kept the rats in pairs their cages?
3. How many rats were tickled?
4. Why do you think it is important to understand positive emotions, like happiness, in animals?



A guide for grown-ups

1. About this resource

This series of simple hands-on activities aims to support families to do Science @Home and is brought to you by the [Easter Bush Science Outreach Centre](#) at the University of Edinburgh. All of our activities are based on the scientific method, which is used in school and in scientific research to answer scientific questions. This resource can be used to encourage your young science explorer(s) to ask and answer their own scientific questions. It also gives a little peek into how scientists at the Roslin Institute answer their own questions about science. Share your investigations by tagging [@EBSOClab](#) & [@roslininstitute](#)

2. Advice about supervising the activity

- This activity has been designed for 8-13 year olds. Younger children will need more support with reading through the instructions and carrying out the investigation.
- Read and follow the instructions with your young science explorer, this activity is to be carried out by children working with a grown-up. The adult is fully responsible for carrying out this investigation safely.
- Do not eat or drink during the experiment- just like in a science laboratory!
- Collect worms from your garden, stamping on the ground can help bring the worms to the surface, especially if the weather has been dry.
- When handling soil wear suitable gloves.

Worm welfare checklist:

- ✓ Complete section 2 of the activity, the answer to all statements is “true”.
- ✓ Worms should **not handled or kept in the light for more than 20 minutes** at a time.
- ✓ Worms need to keep their **skin wet so they can breathe**, we recommend you sprinkle or lightly spray water on them as you work with them.
- ✓ Return the worms to where you found them when your experiment is finished.
- **Wash your hands** with soap and hot water after handling soil and worms.

3. The Scientific Method

All good investigations begin with a question, the scientific method is how scientists answer those questions:

HYPOTHESIS Predict - what do you think the result will be?



METHOD How are you going to do your investigation?



RESULTS What did you see? Can you measure it? Can you make a table or a graph of your results?



CONCLUSION What did you find out? Was your hypothesis correct? If not, why do you think this is?

4. Worm Fact file

Do worms have noses? No, they don't, but they have special receptors that can react to chemicals.

Do worms have eyes or ears? No, they don't, but they have receptors on their bodies that are sensitive to light and vibrations.

Do worms have mouths? Yes, they have a mouth at one with no teeth.

Can worms feel touch? Yes, they can feel touch. Their head has more nerve endings than its tail so it is more sensitive at its head end.

5. Find out more about this research

You can read more about the science behind our Real-Life Research activity by reading this [news article](#) on the Roslin Institute website.



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