

Get hands-on  
with real-life  
science



THE UNIVERSITY of EDINBURGH  
Easter Bush  
Science Outreach Centre



# Opening a Can of Worms

My question is....

Name .....

Class .....

# Observing Earthworms



Aim: Use your observation skills to draw an earthworm.

## Materials:

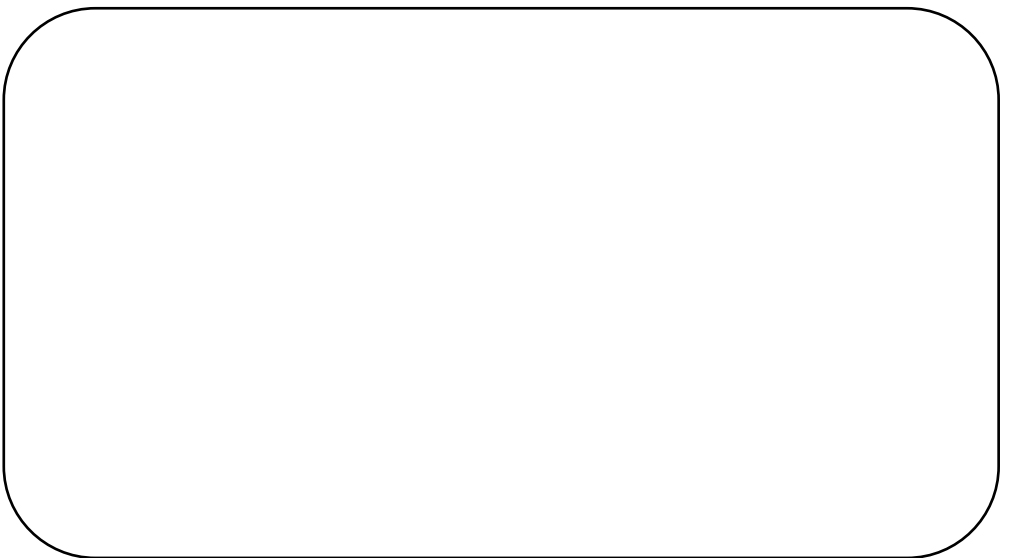
- ⇒ Earthworms
- ⇒ Water spray
- ⇒ Tray or plate
- ⇒ Soil
- ⇒ Magnifying glass

## Worm Welfare

Earthworms need to keep their skin damp so that they can breathe, they also prefer dark places and do not like to be handled. Worms should not be out of their home for more than 20 minutes.

## Method:

1. Carefully place your worm on a surface with some damp soil, the soil and worm should be kept moist using the spray.
2. Observe the shape and structure of the worm, look at how it moves.
3. Draw the worm in the space below, try to add as much detail as you can.
4. Label your diagram, where is its head, where is its tail? Can you see any other body parts?



# My Earthworm Experiment



**Aim** What do you want to find out?

**Hypothesis** What do you think your result will be?

**Materials** What do you need to do your experiment?



**Method** How are you going to do your experiment?

What ONE thing are you changing? What are you going to measure/observe?



# Worm Welfare: Have you checked the 3Rs?

**Replace      Reduce      Refine**

The 3Rs are how we make sure animals in experiments are properly taken care of and protected from unnecessary suffering.

Before scientists can get a licence to do animal research, they always have to show that they have applied the 3Rs.

Check the 3Rs for your experiment.

## Replace

This means using something else to do the experiment if you can and is the most important of the 3Rs. It is always better to avoid using animals if that is possible.

Can your experiment be done in another way without using an animal?

Yes

No

## Reduce

We should always use the fewest number of animals possible in any experiment. Fewer animals means there is less chance of causing harm.

Can you use fewer animals?

Yes

No



## Refine

This is the most complex of the 3Rs. It means trying to think about the experience of the animal and designing experiments and housing to make their experience better. We should always do everything possible to reduce pain, discomfort or distress.

Using an animal that has a simpler nervous system and brain (like a worm) can be a refinement, because we think those animals experience less stress.

Can you use a simpler organism to do your research?

Yes

No

Can you change your experiment in any way to make it less stressful for the animals? Perhaps by handling them for less time, or working in a more comfortable and familiar environment? If yes, how?

Yes

No

Do you understand what your animal needs to feel comfortable and can you improve their living conditions to make them more like what the animal would choose for itself? If yes, how?

Yes

No





**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?

**Reflection** If you could repeat this experiment is there anything you would change?

If you could do another experiment, what would your question be?



# Real-Life Research: Do Rats Like Being Tickled?

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

**Aim** 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.

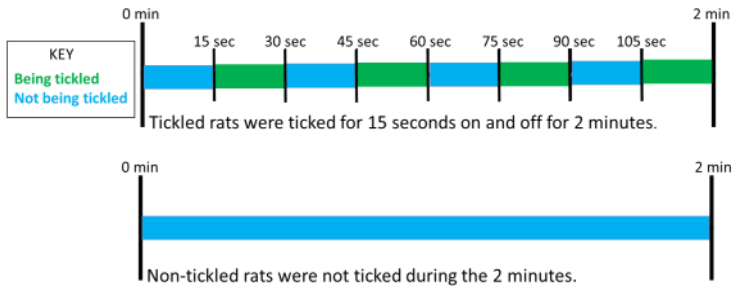
## Materials

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

**Method** Tayla took 24 male rats, and chose half of them at random to be tickled.

The other half were not tickled.

Each rat was then moved to the handling arena and tickled or not tickled for 2 minutes.



Any ultrasonic noises were recorded during the 2 minutes of the experiment.

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



Scan to watch Tayla tickling a rat

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



Tayla Hammond is the scientist that did this scientific investigation. She says "I love the variety in science, yesterday rat tickling, today observing behaviour!"

Tayla Hammond is a PhD student studying at SRUC & The Roslin Institute



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## Think & Discuss

- 1) What activities do you think rats do that make them happy?
  
  
  
  
  
  
  
  
- 2) Why do you think Tayla kept the rats in pairs in their cages?
  
  
  
  
  
  
  
  
- 3) What part of the scientific method is missing? Can you write it?
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
- 4) How many rats were tickled?
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
- 5) Why did Tayla only tickle half of the rats?
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
- 6) Why do you think it is important to understand positive emotions, like happiness, in animals?

**Extra space for notes:**





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