

earthworm ●●●watch



Earthworms for a better Earth!

Thank you for joining Earthworm Watch

Earthworm Watch aims to better understand the health of soils in the UK. How much carbon do they store and how is this affected by human activity? By taking part you are contributing to world-class research from the Natural History Museum and Earthwatch Institute.

Why study earthworms?

Healthy soils are vitally important for supporting life on Earth as they recycle nutrients, filter water and grow most of our food. They also help limit the dangerous effects of climate change by storing large amounts of carbon in the form of tiny fragments of plants, micro-organisms and animals. Earthworms keep soil healthy: they improve its fertility and carbon storage ability by mixing in dead plant material, air and water.

Before you start

Choose a study site which has **two** of the following habitats: lawn, flower bed, vegetable bed, shrubs/hedges, meadow and woodland

or

two areas of the same habitat that are managed in different ways (eg fertilised/unfertilised).

You will dig one hole in each habitat or management type (see photo below).



Essential equipment

- suitable clothing for outdoor work
- this survey pack and a pen/pencil
- spade or trowel
- two 500ml bottles of mustard water (make this by adding 15g or a heaped tablespoon of powdered mustard to 500ml of tap water)
- clean water to wash the earthworms
- large plastic bag
- clock or watch
- two containers to store earthworms in eg yoghurt pots, food containers
- 15ml vinegar

Safety information

- adult supervision is required
- if you discover glass or other sharp objects **stop** and find another site
- ensure you have permission from the land owner
- be careful not to disturb local wildlife
- cover any open wounds on your hands and wash your hands before eating afterwards
- the mustard and vinegar included in the pack are not for human consumption

Please read these instructions before you start. The survey should take less than an hour. Don't do the survey during very dry weather or when the ground is flooded or frozen, as you will not find many worms. Make sure you have all the equipment you need and have read the safety information. Before heading outdoors, make two bottles of mustard water by adding 15g, or a heaped tablespoon, of powdered mustard to a 500ml bottle of water and shaking until very few lumps remain. This will be used later to extract earthworms from deep within the soil.

An instruction video is available at www.earthwormwatch.org

Section A

Please fill in the following information.

1. Your name _____

2. Who are you with?

- | | |
|--|---|
| <input type="checkbox"/> Family/friends (adults only) | <input type="checkbox"/> Family/friends (adults and children) |
| <input type="checkbox"/> Primary school | <input type="checkbox"/> Secondary school |
| <input type="checkbox"/> College/university | <input type="checkbox"/> Other youth group |
| <input type="checkbox"/> Adult volunteer group | |
| <input type="checkbox"/> Other (please describe) _____ | |

3. How many people (including yourself) are in your survey team? _____

4. Site name _____

5. Site address and postcode _____

6. Date of survey / /

7. What type of site is this?

- | | | |
|---|--|------------------------------------|
| <input type="checkbox"/> Garden | <input type="checkbox"/> Park | <input type="checkbox"/> Allotment |
| <input type="checkbox"/> Nature reserve | <input type="checkbox"/> Other (please describe) _____ | |



Section B: Your first soil pit

Start in one of the habitats or management types present at your chosen site. Follow these instructions to dig your first soil pit and gather information about the soil and earthworms in that area. Write your answers in this booklet.

Measure out a square 20cm by 20cm using the ruler on the Earthworm Chart enclosed in the survey pack.

The number of earthworms in soil can vary greatly. Don't worry if you only find a few, this is still a result!

8. How much of the square is covered with live plants?

- Bare soil, no plants at all More bare soil than plants
 About half bare soil, half plants More plants than bare soil
 Completely covered with plants

9. What covers most of the square?

- Lawn Flower bed Vegetable bed
 Shrubs, hedges Meadow Woodland

10. Is there anything else you'd like to tell us about the area around your first soil pit?

11. Do you use fertiliser on this area?

- Yes, organic fertiliser (eg manure, compost, chicken manure pellets)
 Yes, inorganic fertiliser (soluble or granules) No Don't know

Dig your first soil pit

Dig out the 20cm x 20cm square to 10cm deep using a trowel or spade. Remove the soil and place on your plastic bag.

Collect top soil earthworms

Search through the soil you removed from the pit and carefully collect all the earthworms you can find into a container. Don't forget to look through any plant roots as they often hide there!

Collect deep-living earthworms

Pour one bottle of mustard water into the hole and collect any earthworms that appear within five minutes. Put them into a separate tub.

Count and categorise earthworms

Keep your two tubs of earthworms separate. Wash the earthworms with a little clean water to make their features easier to see. Look at each earthworm in turn, and categorise it as adult or immature. Then identify whether it is deep-living, surface-feeding, or soil-feeding. The Earthworm Chart in this pack will show you how to do this. Record each earthworm in the table opposite.

12. How many earthworms did you find?

Earthworm type		In top soil	After mustard water
Adult	Deep-living		
	Surface-feeding		
	Soil-feeding		
Immature	Deep-living		
	Surface-feeding		
	Soil-feeding		

Measure soil properties using soil removed from the hole

Moisture. Squeeze a handful of soil in your hand.

13. Which category does it fit into?

- Dry (does not stick together when squeezed)
- Moist (sticks together when squeezed)
- Wet (water drips out when squeezed)

The substance that gives mustard its hot taste encourages earthworms to the surface, but it's non-toxic to them and their environment.

Fizz test. Take a scoop of soil about the size of a 50p piece and add a few drops of vinegar to it. Watch it for about a minute.

14. Does it fizz? If so it contains calcium carbonate (chalk or limestone).

- Yes No

Texture. This is a measure of the size of mineral grains in your soil. Follow the flow diagram on the Soil Chart, to find out which soil type you have.

15. Which soil type do you have?

- Sand Loam Clay

Colour. Take a scoop of soil about the size of a 50p piece and compare it to each colour on the Soil Chart eg C3.

16. Which best matches your soil?

- Letter Number

Fill in the first soil pit

Place the earthworms back in the hole, avoiding areas with mustard water still standing. Put the soil back into the hole, then move to your second habitat or management type where you will repeat these steps.



Section C: Your second soil pit

This soil pit will be in the second habitat, or management type, present at your chosen site. Follow these instructions to dig your second soil pit and gather information about the soil and earthworms in that area. Write your answers in this booklet.

Measure out a square 20cm by 20cm using the ruler on the Earthworm Chart enclosed in the survey pack.

17. How far is your first soil pit from your second one?

_____ metres

18. How much of the square is covered with live plants?

- | | |
|--|---|
| <input type="checkbox"/> Bare soil, no plants at all | <input type="checkbox"/> More bare soil than plants |
| <input type="checkbox"/> About half bare soil, half plants | <input type="checkbox"/> More plants than bare soil |
| <input type="checkbox"/> Completely covered with plants | |

19. What covers most of the square?

- | | | |
|---|-------------------------------------|--|
| <input type="checkbox"/> Lawn | <input type="checkbox"/> Flower bed | <input type="checkbox"/> Vegetable bed |
| <input type="checkbox"/> Shrubs, hedges | <input type="checkbox"/> Meadow | <input type="checkbox"/> Woodland |

20. Is there anything else you'd like to tell us about the area around your second soil pit?

21. Do you use fertiliser on this area?

- | | | | |
|---|-----------------------------|-------------------------------------|--|
| <input type="checkbox"/> Yes, organic fertiliser (eg manure, compost, chicken manure pellets) | | | |
| <input type="checkbox"/> Yes, inorganic fertiliser (soluble or granules) | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | |

Dig your second soil pit

Dig out the 20cm x 20cm square to 10cm deep using a trowel or spade. Remove the soil and place on your plastic bag.

Collect top soil earthworms

Search through the soil you removed from the pit and carefully collect all the earthworms you can find into a container. Don't forget to look through any plant roots as they often hide there!

Collect deep-living earthworms

Pour one bottle of mustard water into the hole and collect any earthworms that appear within five minutes. Put them into a separate tub.

Count and categorise earthworms

Keep your two tubs of earthworms separate. Wash the earthworms with a little clean water to make their features easier to see. Look at each earthworm in turn, and categorise it as adult or immature. Then identify whether it is deep-living, surface-feeding, or soil-feeding. The Earthworm Chart in this pack will show you how to do this. Record each earthworm in the table opposite.

22. How many earthworms did you find?

	Earthworm type	In top soil	After mustard water
Adult	Deep-living		
	Surface-feeding		
	Soil-feeding		
Immature	Deep-living		
	Surface-feeding		
	Soil-feeding		

Measure soil properties using soil removed from the hole

Moisture. Squeeze a handful of soil in your hand.

23. Which category does it fit into?

Dry (does not stick together when squeezed)

Moist (sticks together when squeezed)

Wet (water drips out when squeezed)

Fizz test. Take a scoop of soil about the size of a 50p piece and add a few drops of vinegar to it. Watch it for about a minute.

24. Does it fizz? If so it contains calcium carbonate (chalk or limestone).

Yes No

Texture. This is a measure of the size of mineral grains in your soil. Follow the flow diagram on the Soil Chart to find out which soil type you have.

25. Which soil type do you have?

Sand Loam Clay

Colour. Take a scoop of soil about the size of a 50p piece and compare it to each colour on the Soil Chart eg C3.

26. Which best matches your soil?

Letter Number

Fill in the second soil pit

Place the earthworms back in the hole, avoiding areas with mustard water still standing. Put the soil back into the hole. **Now move on to Section D – sending us your results.**

Now, the important bit!

Turn over to Section D to find out how to send us your results.



Section D: Send in your results

Enter your results at www.earthwormwatch.org

If you don't have internet access, post this booklet with your name and address (and email address if you have one) to:

Earthworm Watch
Angela Marmont Centre for UK Biodiversity,
The Natural History Museum, Cromwell Road, London, SW7 5BD.

Your observations will then be included in our research.

What next?



Meet the scientists! Get to know the team behind the survey.
www.earthwormwatch.org/about-us



Put your vegetable peelings to good use. Carry out the Earthworm Watch experiment by adding peelings to one plot and comparing it to a control plot. Email info@earthwormwatch.org to take part.



Get composting! Improve the quality of your soil by composting your vegetable peelings, tea bags and garden waste, then adding them to your garden or allotment.



Make a log pile. Log piles make excellent habitat for earthworms and other soil-dwelling creatures. Pile logs up in a damp or shady corner of your garden or allotment and leave them to slowly rot.

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Many thanks from the Earthworm Watch team

We'd love to hear what you got up to, so share your stories and photos with us on



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www.facebook.com/EarthwormWatch



Earthworm Watch is a collaboration between the Natural History Museum and Earthwatch Institute in association with the Earthworm Society of Britain