MOSS SAFARI

THE MICROSCOPIC ADVENTURE

Dr. Andy Chandler-Grevatt

University of Brighton

www.mosssafari.com

Exploring the Hidden Life in Moss

Wednesday, 8 April 2026 12:30

Online

Introduction

Dr Andy Chandler-Grevatt

- Teacher (CSciTeach), Author, Researcher
- BSc (Hons) & MSc in Biological Sciences
- Doctorate in Science Education
- Teacher: Secondary School Science teacher (10 years), University Lecturer in Science Education and Teacher Training (2006-).
- Author: 96+ textbook / resource publications (Oxford University Press)
- Founder, Moss Safari
- Microscope and moss life enthusiast

Moss Safari: the activity

- Very simple
- No staining
- No specialised skills
- No specialised techniques
- Just - suck, squeeze, observe

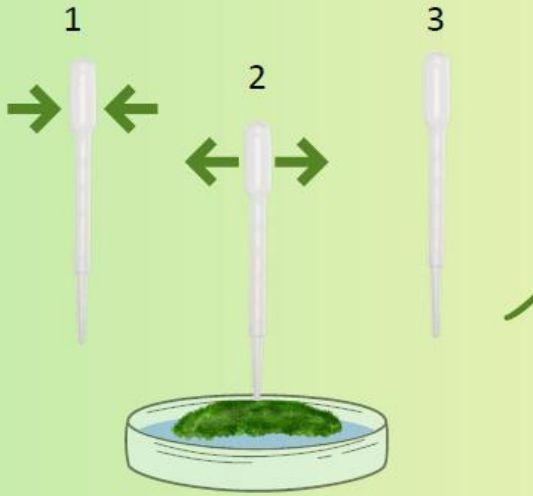
Techniques: Sampling
Moss squeeze: Pipette

Connect with nature
Promote microscopy
Inspire STEM

Stage 1: Collect

If the moss is not wet, soak it in mineral water for at least 24 hours.

1. Squeeze the pipette bulb.
2. Place pipette tip into the wet moss. Release the bulb, so it sucks up some water.
3. Raise the pipette and sample. Hold it vertical for 30 seconds.

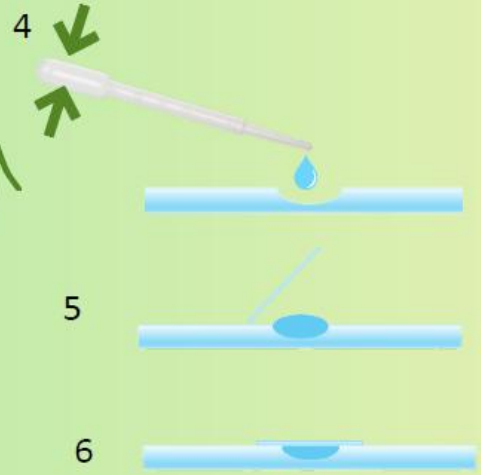


Wash your hands after handling moss

Stage 2: Prepare

Lay a glass 'dimple' microscope slide on a flat surface. Have a clean coverslip ready.

4. Squeeze 3-4 drops of sample into the dimple on the glass slide.
5. Take a cover slip and place an edge next to the sample.
6. Carefully lower the coverslip onto the sample.

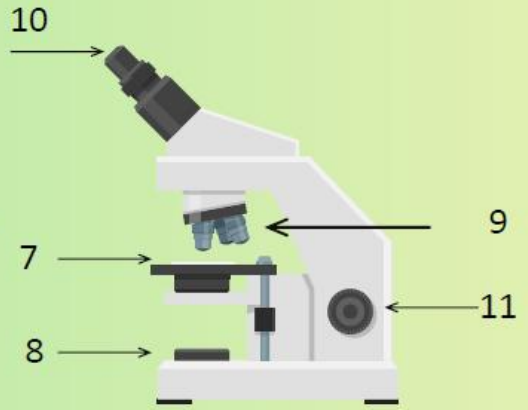


Clear up and dispose of broken glass carefully and responsibly

Stage 3: Observe

Observe at magnifications x40 to search and x100 for more detailed view.

7. Place the prepared slide on the stage, with the dimple over the hole.
8. Switch on the light source.
9. Set the objective to the lowest magnification.
10. Look through the eye piece.
11. Use the focus knob to lower the stage and get the sample into focus.



While looking through the eye piece, always lower the stage to focus.

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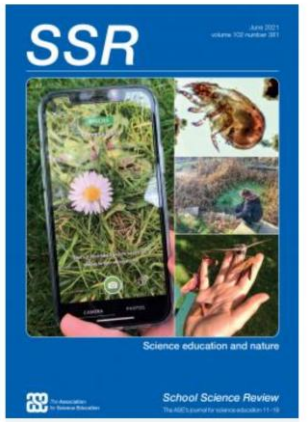
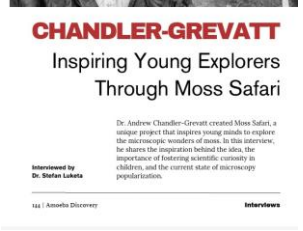
Moss Safari Aims

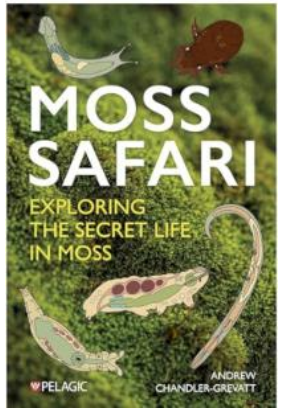
🌿 Connect with nature

🔬 Promote microscopy

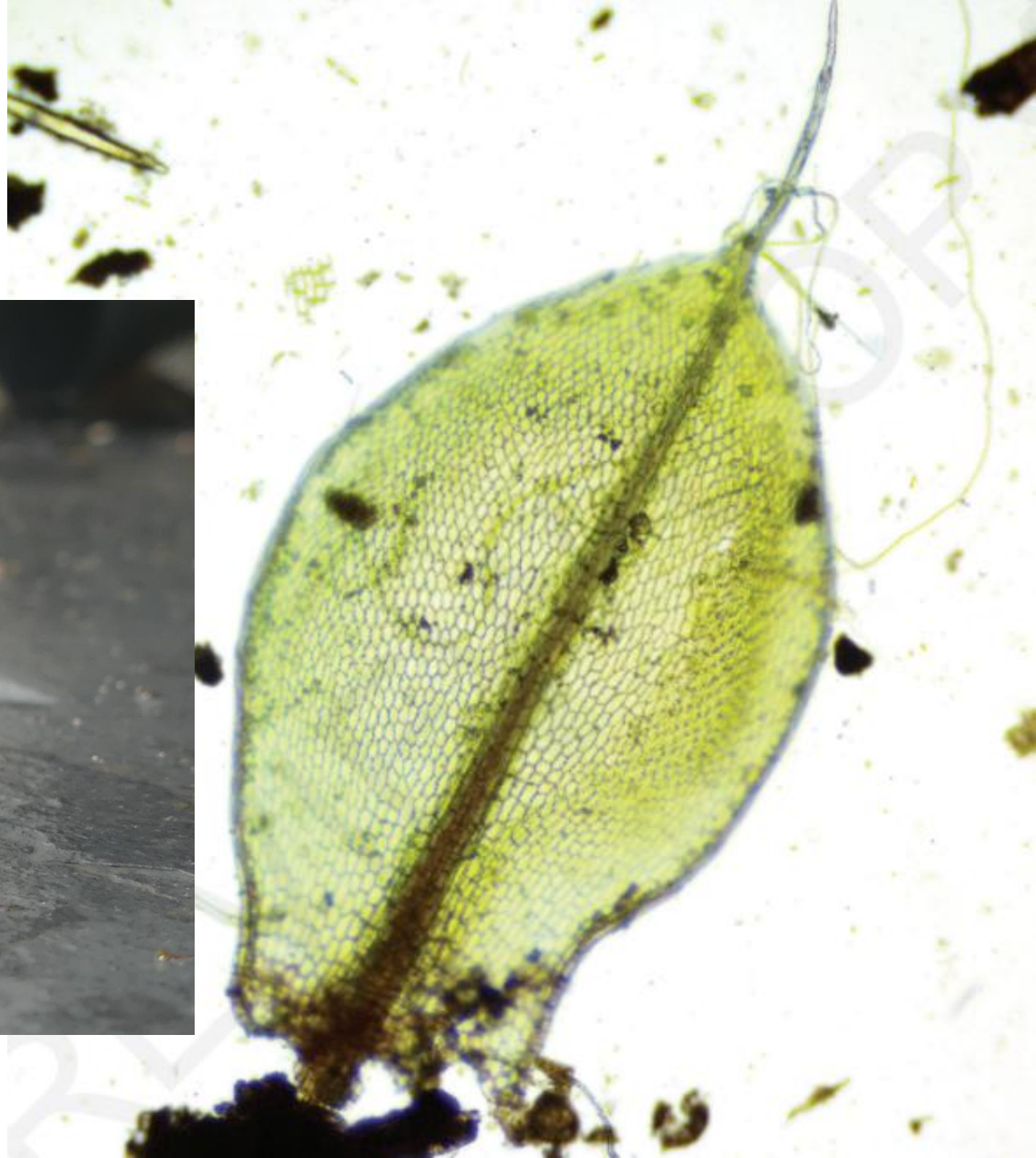
🚀 Inspire STEM





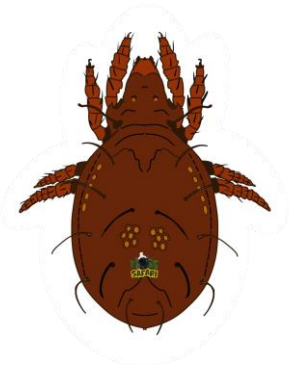


Moss: the terrain

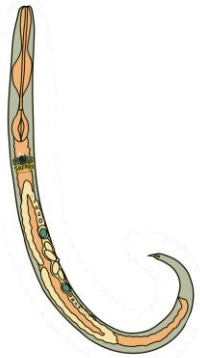


The microscopic Big Five

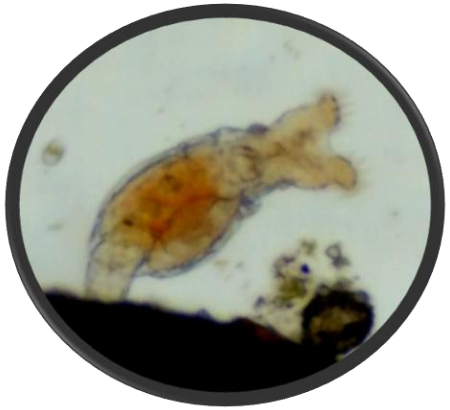
Oribatid mite



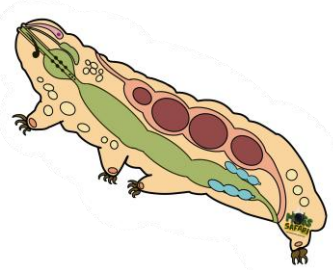
Nematode

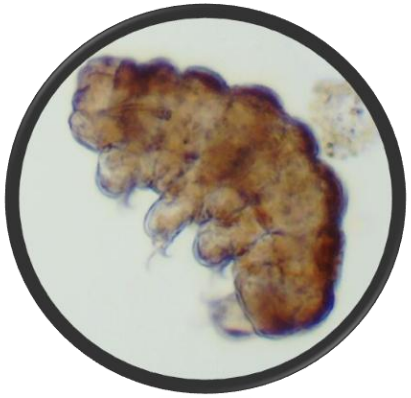


Rotifer

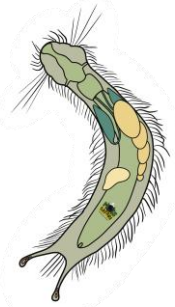


Tardigrade

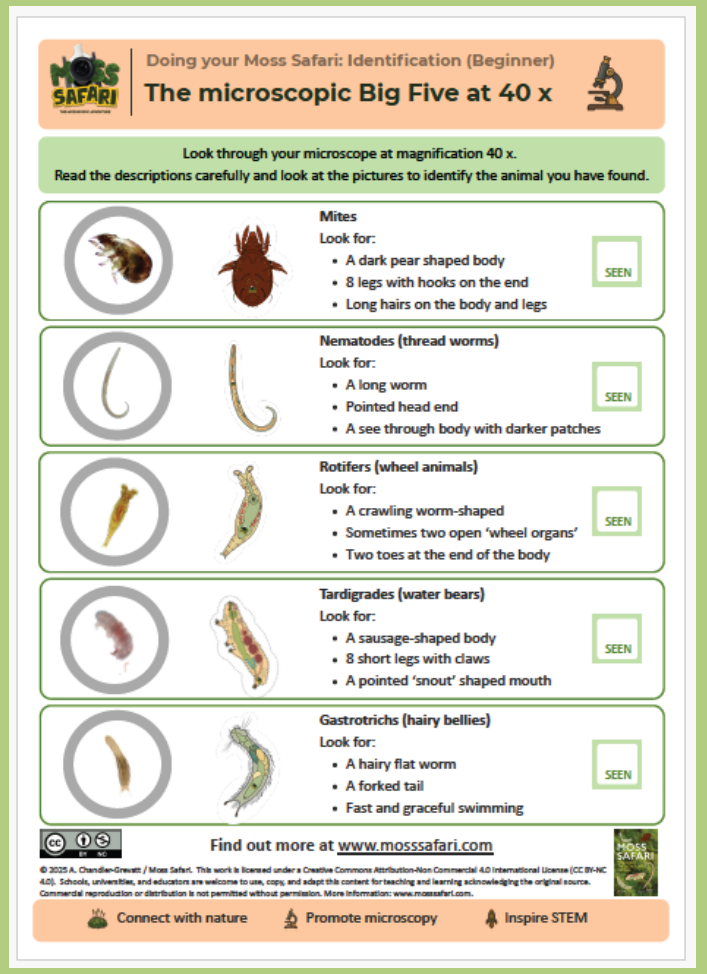




Gastrotrich



Microscopic Big Five Identification



Doing your Moss Safari: Identification (Beginner)

The microscopic Big Five at 40 x

Look through your microscope at magnification 40 x.
Read the descriptions carefully and look at the pictures to identify the animal you have found.

Mites
Look for:
- A dark pear shaped body
- 8 legs with hooks on the end
- Long hairs on the body and legs

SEEN

Nematodes (thread worms)
Look for:
- A long worm
- Pointed head end
- A see through body with darker patches

SEEN

Rotifers (wheel animals)
Look for:
- A crawling worm-shaped
- Sometimes two open 'wheel organs'
- Two toes at the end of the body

SEEN

Tardigrades (water bears)
Look for:
- A sausage-shaped body
- 8 short legs with claws
- A pointed 'snout' shaped mouth

SEEN

Gastrotrichs (hairy bellies)
Look for:
- A hairy flat worm
- A forked tail
- Fast and graceful swimming

SEEN

Find out more at www.mosssafari.com

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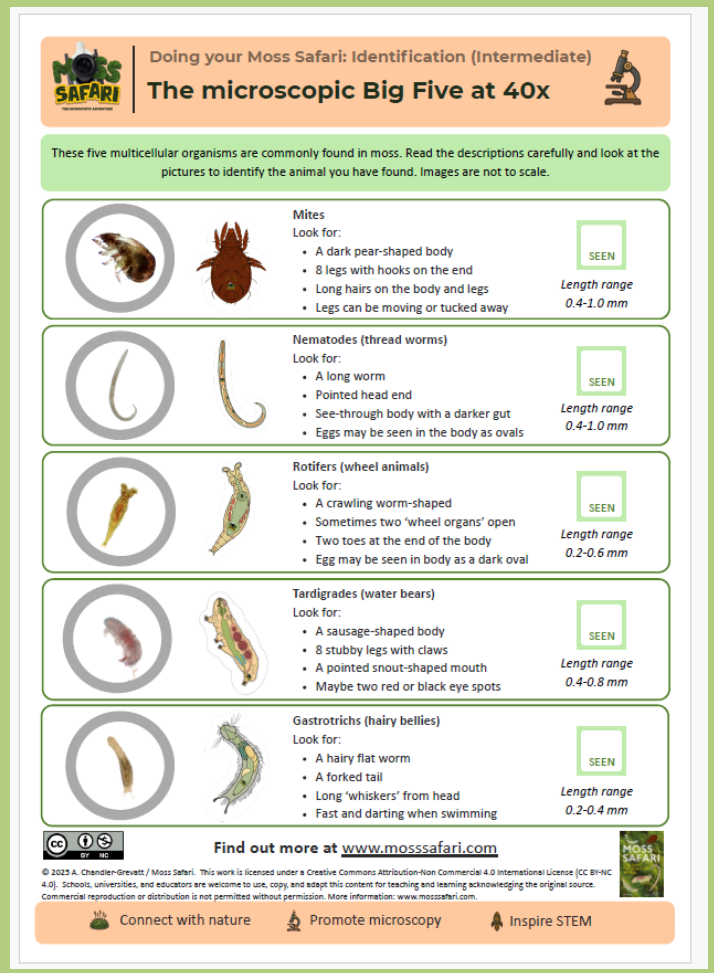

Doing your Moss Safari: Identification (Intermediate)

The microscopic Big Five at 40x

These five multicellular organisms are commonly found in moss. Read the descriptions carefully and look at the pictures to identify the animal you have found. Images are not to scale.

Mites
Look for:
- A dark pear-shaped body
- 8 legs with hooks on the end
- Long hairs on the body and legs
- Legs can be moving or tucked away

SEEN
Length range 0.4-1.0 mm

Nematodes (thread worms)
Look for:
- A long worm
- Pointed head end
- See-through body with a darker gut
- Eggs may be seen in the body as ovals

SEEN
Length range 0.4-1.0 mm

Rotifers (wheel animals)
Look for:
- A crawling worm-shaped
- Sometimes two 'wheel organs' open
- Two toes at the end of the body
- Egg may be seen in body as a dark oval

SEEN
Length range 0.2-0.6 mm

Tardigrades (water bears)
Look for:
- A sausage-shaped body
- 8 stubby legs with claws
- A pointed snout-shaped mouth
- Maybe two red or black eye spots

SEEN
Length range 0.4-0.8 mm

Gastrotrichs (hairy bellies)
Look for:
- A hairy flat worm
- A forked tail
- Long 'whiskers' from head
- Fast and darting when swimming

SEEN
Length range 0.2-0.4 mm

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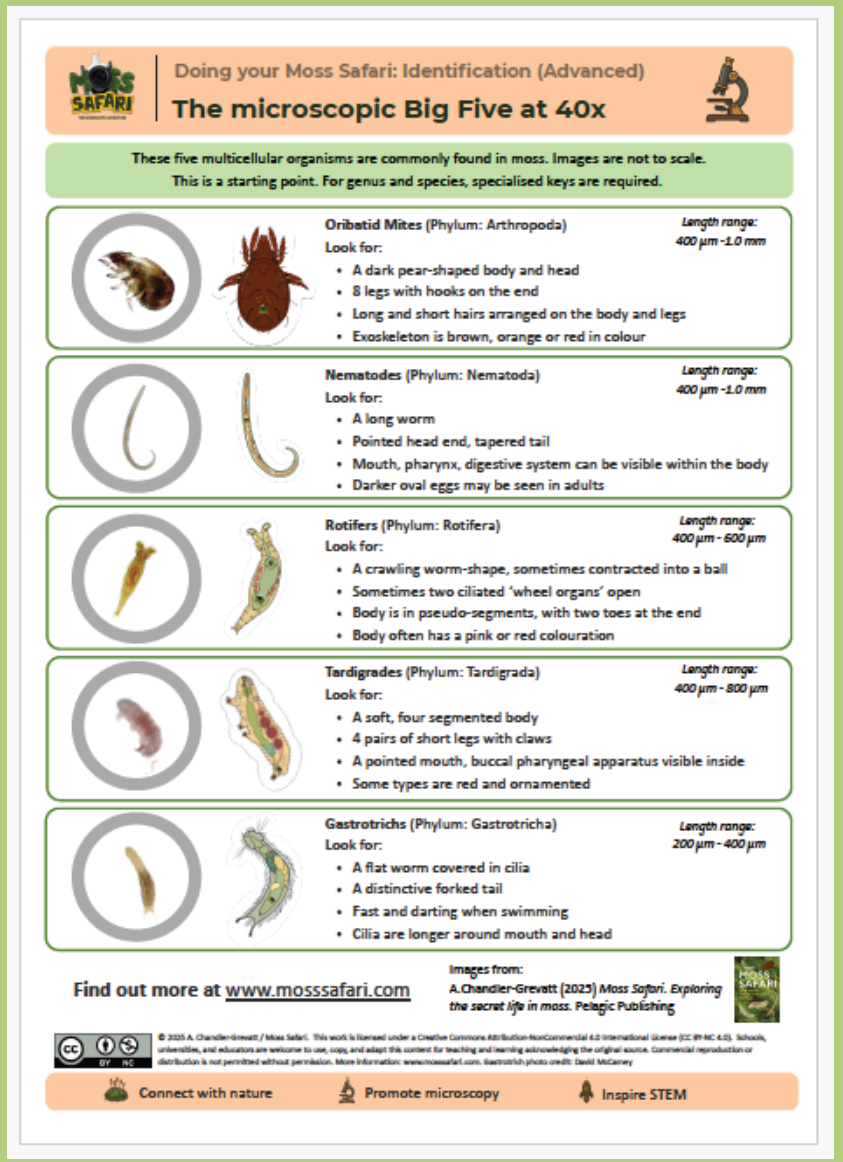

Doing your Moss Safari: Identification (Advanced)

The microscopic Big Five at 40x

These five multicellular organisms are commonly found in moss. Images are not to scale.
This is a starting point. For genus and species, specialised keys are required.

Oribatid Mites (Phylum: Arthropoda) — *Length range: 400 µm -1.0 mm*
Look for:
- A dark pear-shaped body and head
- 8 legs with hooks on the end
- Long and short hairs arranged on the body and legs
- Exoskeleton is brown, orange or red in colour

Nematodes (Phylum: Nematoda) — *Length range: 400 µm -1.0 mm*
Look for:
- A long worm
- Pointed head end, tapered tail
- Mouth, pharynx, digestive system can be visible within the body
- Darker oval eggs may be seen in adults

Rotifers (Phylum: Rotifera) — *Length range: 400 µm - 600 µm*
Look for:
- A crawling worm-shape, sometimes contracted into a ball
- Sometimes two ciliated 'wheel organs' open
- Body is in pseudo-segments, with two toes at the end
- Body often has a pink or red colouration

Tardigrades (Phylum: Tardigrada) — *Length range: 400 µm - 800 µm*
Look for:
- A soft, four segmented body
- 4 pairs of short legs with claws
- A pointed mouth, buccal pharyngeal apparatus visible inside
- Some types are red and ornamented

Gastrotrichs (Phylum: Gastrotricha) — *Length range: 200 µm - 400 µm*
Look for:
- A flat worm covered in cilia
- A distinctive forked tail
- Fast and darting when swimming
- Cilia are longer around mouth and head

Find out more at www.mosssafari.com

Images from:
A.Chandler-Grevatt (2025) *Moss Safari. Exploring the secret life in moss.* Pelagic Publishing

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Equipment for Moss Safari

Microscope

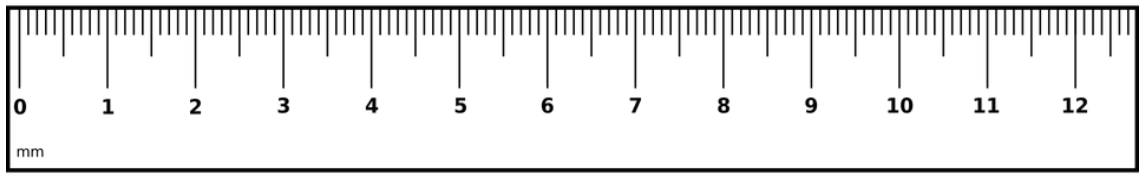
Magnifies objects too small to see with the naked eye.

Magnification x 40 and x 100

Everything we see will be less than 1 mm

x 40 field of view on screen < 1 mm

1000 micrometres in 1 millimetre



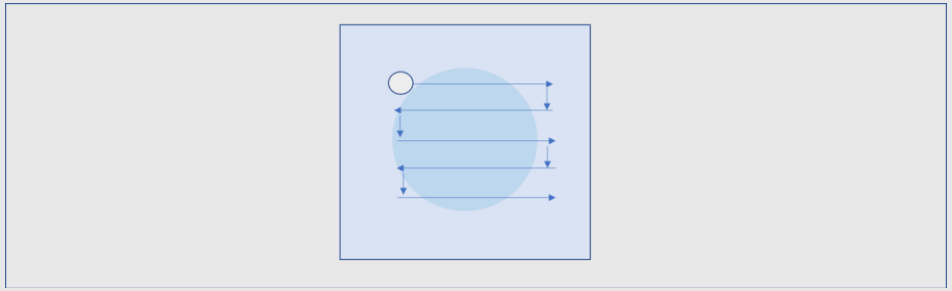
Moss Safari: The expedition and route

Expedition information:

- We will stop at interesting animals or plants.
- We do not chase the wildlife!
- Magnification x 40 (sometimes x 100).
- Focussing takes time.
- No guarantee we will see any of the Big Five, but we will see interesting things.
- I'm always learning...

(Wash your hands afterwards if you do this yourself)

2-3 drops of water from moss

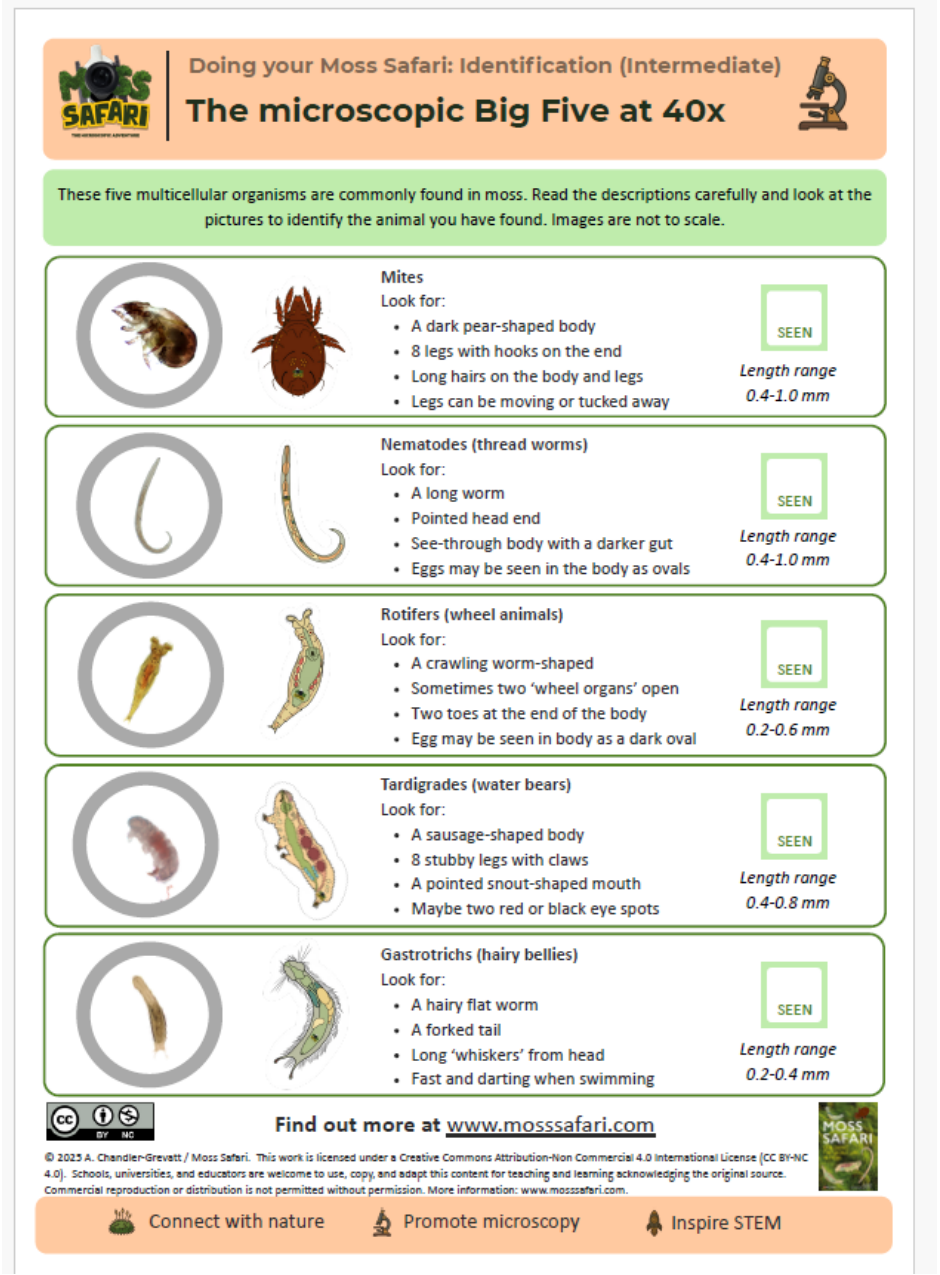


Zig zag spotlight across a 15 mm well

Let’s go on a Moss Safari

Reflections and Questions

- Which of the Big Five did we see?
- What did we learn about their lives, our lives and life itself?
- What did you learn about moss?
- Has your view of the natural world changed? How?



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Length range 0.2-0.4 mm

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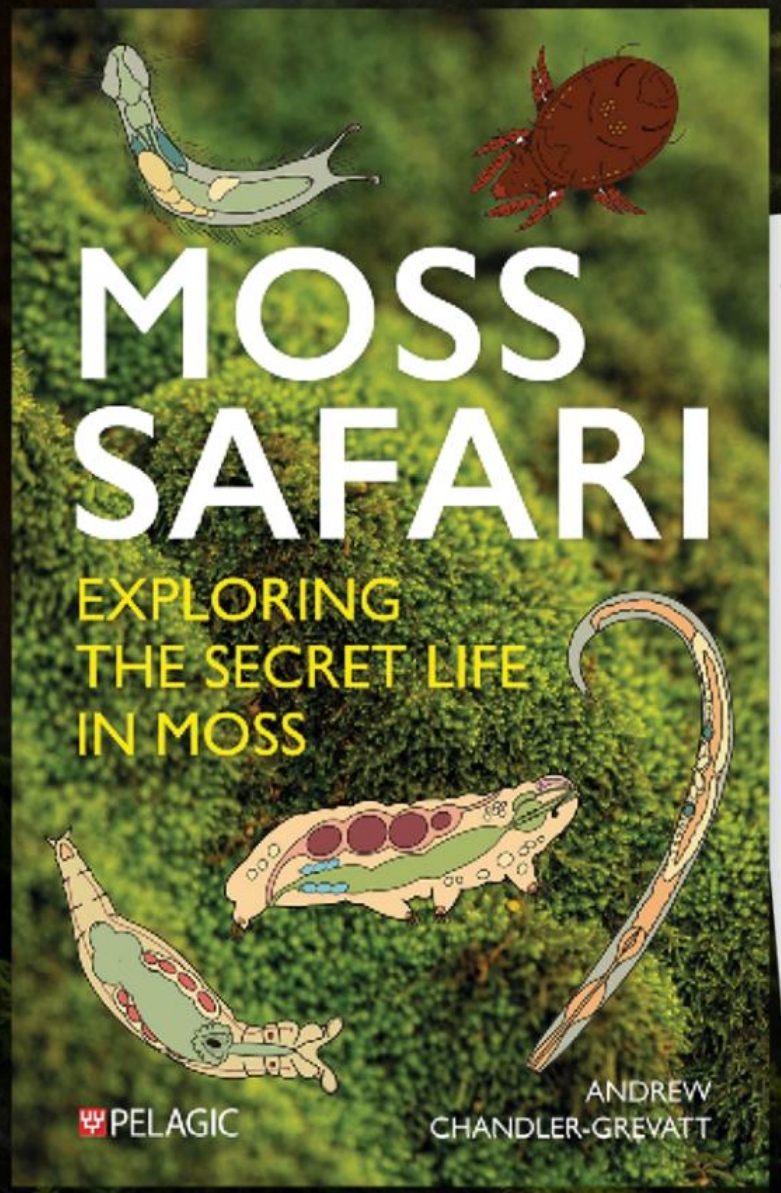

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Thank you

Dr. Andy Chandler-Grevatt

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Moss Safari: What Next?

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Word of mouth

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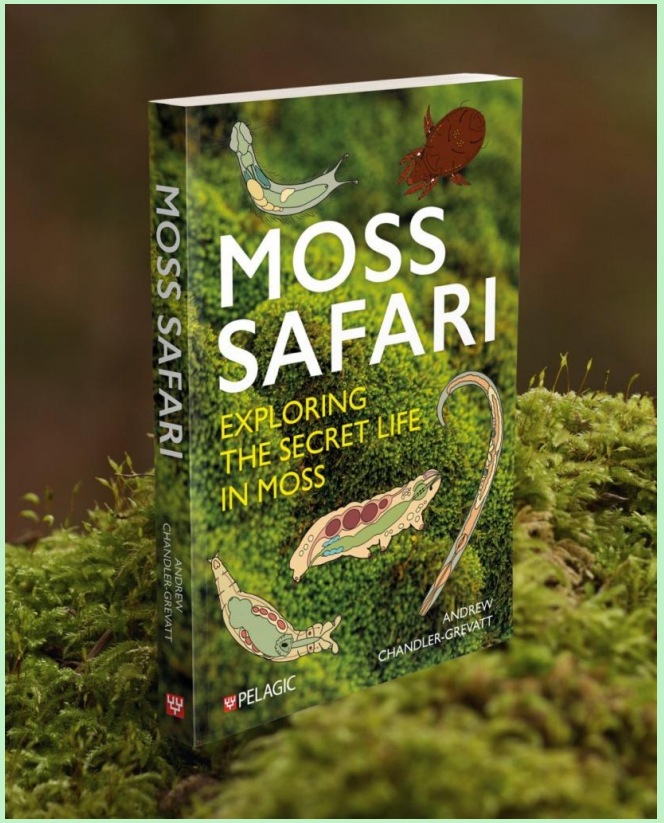
Shares, comments, likes, pictures

Recommend to schools, clubs, team building

Get the book!



Contact me

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£5 each

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(£16 for all four plus P&P)

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Learn about mosses around you
Seven Free Infographics

Discovering Mosses
Is that a moss?

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What is a moss?
Do you know what mosses look like? Use this guide to help...

Mosses are **plants** ... **Bryophytes**, along ... hornworts.

Key visual charact...
- Grow in clumps...
- No flowers, seed... they make spor...
- Shoots with spir...
- Leaves have no ... central "nerve" ...
- No roots, instea... brownish thread...
- Texture: soft, ve...

Where t...
Shady, damp place... Mosses grow in tov... in the countryside... sunny o...

Things that look like moss (but aren't!)

Bryophyte cousins

Discovering Mosses
How does moss grow?

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You know what a moss is, but which type of moss is it? This ste... identify their ...

Have you ... describe mo... same words ... furnishings? ... and mo...

It is almost ... nature's u...

In fact, these ... are the first st... us to identif... moss we ar... Mosses hav... growth ... **cushions**

Is the moss growing in a **cushion** shape?

Is the moss growing in a **mat** shape?

Get moss spotting

Discovering Mosses
Where does moss grow?

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Use this guide ... moss spotting i... local area.

Mosses are smi... can grow in the ... cracks, so look ca...

Use a magnifyin... hand lens, ... smartphone to e...

Take part and ...
Share your moss ... on social me...

Use hashtag #ise...
www.mosssafar...
Tag @mosss...

Discovering Mosses
Some urban mos...

Connect with nature

Spotting and identifying urban mosses

Look around your local area to find mosses growing on walls, tree trunks, pavement cracks and around drain covers.

Look for growth forms, leaf shape, hairiness, colour and the shapes of any capsules.

As these two pictures show, often more than one types of moss grows in the same space.

Pleurocarpous (mats)

Take part and share

Share your moss photos on social media

Use hashtag #iseemoss
www.mosssafari.com
Tag @mosssafari

Silky Wall Feather-moss
Homalothecium sericeum

Shiny golden-green mats on walls or tree bark. Flattened, feather-like shoots. Leaves pressed close, giving a silky sheen.

Rough-stalk Feather-mo...
Brachythec... rutabulum

Glossy green to yel... on soil, walls, or tre... irregular feathery ... branching. Curved ... overlapping leaves ... rough look.

Discovering Mosses
What is a moss plant like?

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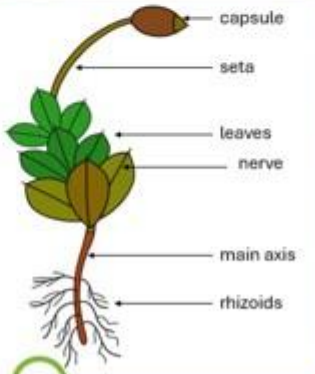
Get down and close to moss plants
Mosses are small, simple plants that don't have true roots, stems, or leaves, but they do have structures that look and act like them.

General appearance
- Grows in clumps in dense tufts, cushions, or carpets (not usually as single plants).
- Small, green, leafy shoots
- Soft, velvety, or sponge-like texture to the touch
- Colours: mostly green, but also yellow-green, dark green, brown, or reddish.

No flowers, fruits, or seeds. Instead a sporophyte made up of thin stalk (seta) with a capsule (spore case).
No leaves. Instead, leaf-like structures with a 'nerve' support.
No roots. Instead rhizoids which are fine, brownish, thread-like filaments.

Simple diagram of a moss stem



Try this
- Use a hand lens or phone macro lens to see the growth form clearly.
- Tease out one small moss shoot and identify each part.

Parts of a moss plant: names and purpose

Sporophyte (the spore producing part) Made up of a stalk (**seta**) and spore case (capsule). When the capsule dries out, it releases spores into the air. The spores grow into new moss plants.

Gametophyte (the main plant you see) Made up of the stalk (**main axis**), leaves and roots (**rhizoids**). The **rhizoids** anchor the moss to t... surface. The main axis suppor... the plant. The leaves make food by photosynthesis and are supp... **nerve**. Leaves are often just one c... thick.

Take part and share
Share your moss photos on so... media. Use hashtag #iseemoss

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Discovering Mosses
Moss specimen record sheet

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Step 1
What you see with the naked eye

Date:
Environment
...me:
...coordinates:
...face:

Step 2
Close-up with phone camera or hand lens

Zoom in on stems, leaves, and capsules:
Gametophyte
Leaf shape:
Leaf size: (<1 mm), (1–3 mm), (>3 mm).
Nerve (midrib):
Leaf edge:

Step 3
Hand lens detail or microscope

Look for fine details that separate similar species:

...nt:
...ion (microscope):

NEW FREE RESOURCES

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