Live Moss Safari

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Dr Andy Chandler-Grevatt, CSciTeach

Senior Lecturer in Science Education,
University of Brighton

Expedition plan

Expedition briefing

20 min guided moss safari expedition

20 min your own moss safari

Reflection and feedback

Photo credit: Andy Chandler-Grevatt

Expedition expectations

We will be exploring an **extreme habitat**.

We will be the first and (likely) only people to see these plants and animals on this expedition.

We will see some of the most **resilient organisms** that exist on planet Earth (and beyond).

Photo credit: Andy Chandler-Grevatt

Illustration and photo credits: Andy Chandler-Grevatt

Habitat: conditions and adaptations of moss

No tubes to transport water, so they are very small.

Can ‘catch’ water from the air on tiny leaf spikes.

Leaves and rhizoids are spongy, so they can hold a lot of water.

Can dry out almost completely but rehydrate.

Contain antifreeze chemicals to protect from freezing.

Rhizoids have very small ‘hairs’ to grip to bare rock strongly.

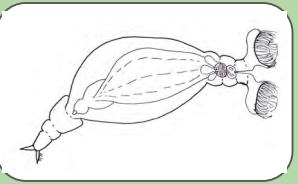
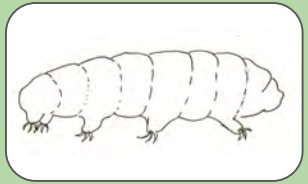
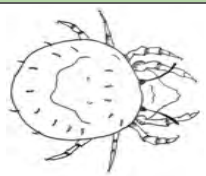
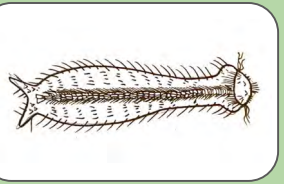
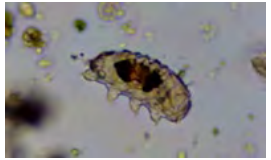
Temperature

Water availability

Light

Illustration and photo credits: Andy Chandler-Grevatt

The ‘Big’ Five (multicellular animals at low magnifications)

Nematode	Rotifer	Tardigrade	Mite	Gastrotrich
				
	 Image: Damián H. Zanette/Wikipedia			 Image: David McCamey
Worm-like animal	Wheel animal. Has ‘rotating’ hairs on its head.	Water bear with eight clawed legs and a small snout.	Looks large and dark under the microscope. Eight legs; big body.	Looks like a hairy flatworm. Known as hairy belly.
Thrashing or wiggling. Sometimes still.	Walks like an inchworm. Uses its feet to anchor.	If moving, looks like it is moonwalking.	When moving, it moves its legs like an insect.	Swims fast, darting around.

Equipment

Microscope

Magnifies objects too small to see with the naked eye.

Magnification 40× and 100×

Everything we see will be less than 1 mm

40× field of view on screen <1 mm

1000 microns in 1 mm

Use a checklist

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Moss Safari: what lives in moss?

Big Five identification sheet

Big Five at low magnification (40×)

Nematodes (known as roundworms) These are smooth worms with pointed ends. They are often observed thrashing or stationary. They are often transparent, but you may observe coloured food in their gut. At higher magnifications, you can see their mouth parts and internal organs, including their digestive system and reproductive system. Length: 200–400 microns	 Image: A. Chandler-Grevatt
Rotifers (known as wheel animals) There are several kinds, but the basic body plan is a top end with fast-moving cilia that create big currents, a mouth midway, and a kind of foot at the end. However, they can contract into a ball shape. They are transparent, and you will see their digestive systems and sometimes eggs inside them. Length: approx. 350 microns	 Image: Darwin H. Zanette/Wikipedia
Tardigrades (known as water bears or moss piglets) They can be found stationary or moving. They have distinctive movement, as they walk on chubby clawed legs. They have a pointy 'snout' through which they feed. If you look carefully at their heads, you may see two red eyes, each of which consists of a single cell. Sometimes you will see shed skin with eggs inside it. Length: 450 microns	 Image: A. Chandler-Grevatt
Oribatid mites (known as moss mites) A variety of mites are found in moss. They have a relatively large, dark body and eight legs that move in a similar way to a spider or beetle. Mites are arthropods (spider family) with eight legs. Adjusting the lighting often allows the body to become translucent. Length: 600 microns	 Image: A. Chandler-Grevatt
Gastrotrichs (known as hairybellies or hairybacks) A flatworm-like organism covered in hairs, cilia, with a forked tail. Using its cilia against a surface, it glides gracefully and quickly. Length:100–300 microns	 Image courtesy of David McGillivray

Expedition and route

Expedition information

We will stop at interesting animals or plants.

We do not chase the wildlife!

Magnification 40× (sometimes 100×).

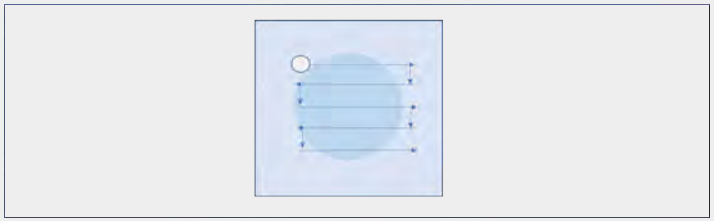
Focussing takes time.

No guarantee we will see any of the Big Five, but we will see interesting things.

I’m still learning…

(Wash your hands afterwards if you do this yourself.)

2 drops of water from moss

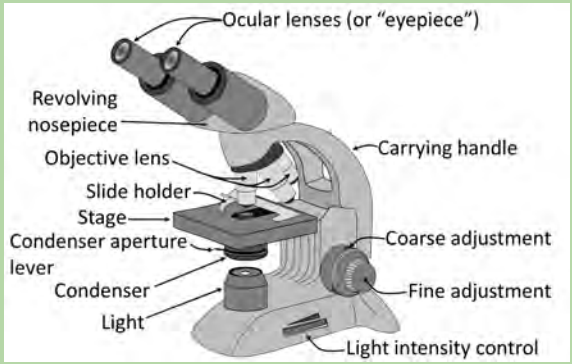


Zigzag spotlight across a 15 mm well

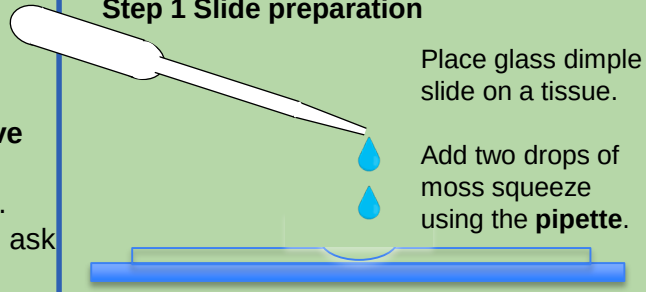
Doing your own moss safari

Safe use of microscopes

- Lift by the **arm** only.
- Do not touch **eyepiece lens** or **objective lenses**.
- Avoid getting any microscope parts wet.
- If you break the glass slide or coverslip, ask for help.



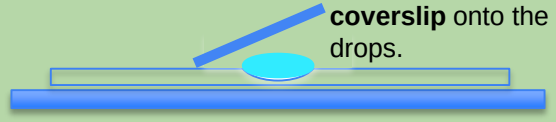
Step 1 Slide preparation



Place glass dimple slide on a tissue.

Add two drops of moss squeeze using the **pipette**.

Step 2



Lower glass **coverslip** onto the drops.

Step 3

Soak up any excess moss squeeze with a tissue.

Step 4 Viewing your moss squeeze

A. Place prepared slide onto the stage.

B. Line up the centre of the dimple with the hole in the stage.

C. Switch on the light source.

D. Use the objective with the **lowest** magnification first.

E. Viewing from the side, use the course adjustment knob to lower the objective to just above the slide (not touching).

F. Looking down the eyepiece, use the course adjustment, then fine adjustment, to raise the objective up and focus on the specimen.

G. Make a record of your observations using the Big Five identification guide. Draw pictures or take photos.

Wash you hands afterwards.

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