



How does peat form? On your marks, get set, accumulate!

Time needed for activity 30 minutes

Location A flat and spacious outdoor area

Context

This activity is run in the form of 'tag' and explains to learners what peat needs in order to initiate and begin to accumulate. It also encourages discussion about the factors that can affect peat accumulation rates.

Natural Resources Wales' purpose is to pursue sustainable management of natural resources in all its work. This means looking after air, land, water, wildlife, plants and soil to improve Wales' well-being, and provide a better future for everyone.

Curriculum for Wales

Science and Technology

- **What matters** - Matter and the way it behaves defines our universe and shapes our lives.
- **What matters** - The world around us is full of living things which depend on each other for survival.

Objectives

Learners understand that peat forms and accumulates when organic matter is not fully decomposed because of acidic and/or anaerobic conditions (when the soil or substrate has little to no available oxygen) in waterlogged soils.

Human actions and environmental factors can have an influence on peat accumulation rates.

Equipment and resources

- 3 containers e.g. buckets
- 3 sets of Resource cards - On your marks, get set, accumulate!
- Safe space to run
- Stopwatch
- Hi vis-jackets or something to denote certain learners as 'workers'
- Resource Cards - Peatland photos

What to do

1. Show your learners our Resource Cards - Peatland photos so they are familiar with what a peatland area looks like. Working in small groups ask them to discuss and describe what they can see.
 - What does the picture tell us about peatlands?
 - What species of wildlife do they think live in this habitat?
 - What adjectives can they think of to describe the landscape?

Ask your learners to share their thoughts and then explain that if you walk onto the squelchy surface of an undamaged raised bog, the most abundant plants to be seen are the wonderful sphagnum mosses.



2. Explain to your learners that sphagnum moss plants are very small, but they grow closely together, forming spongy carpets on the surface of peatlands which absorb large amounts of water, keeping the bog surface wet. Sphagnum mosses are the habitat engineers of raised bogs and help support a variety of wildlife species whilst they are alive.

Any water or soil covered by sphagnum moss effectively becomes suffocated as the sphagnum stops it from receiving oxygen from the air. Sphagnum also absorbs minerals such as magnesium and calcium, causing the underlying soil and water to become mildly acidic.

Because there is a lack of oxygen and slight acidity in peat soil, bacteria and fungi which normally decompose dead organisms cannot function. This means that the rate at which organic materials decay is very slow. When sphagnum mosses die, their remains slowly decompose and turn into dark, brown peat soil. As they grow continually upwards new mosses grow over the remains of decomposing sphagnum. These remains eventually become compacted as more dead moss builds up on top. As the accumulation of the remains of partly decomposed plants and mosses accumulate over thousands of years, peat soil forms.



3. Explain to your learners that they are going to play a game to learn how peat forms. They need to imagine that their outdoor area is a peatland and they are all sphagnum mosses living on the peatland.
4. Fill each container with one set of **Resource cards – On your marks, get set, accumulate!** which detail the essential factors needed for peat accumulation and spread out the containers over your chosen area. This should ideally be a flat area with no trip hazards.

Split your learners into two teams and show them the containers and their contents. Explain that for them to successfully turn into peat soil each member of their team will need to fetch one of each of the essential peat forming factor resource cards as quickly as they can:

- **Low pH acidic soil** – the acidic conditions (below pH 7) in the soil stops organic materials from decaying.
- **Low oxygen supply, anaerobic soil** – the lack of oxygen in the soil stops the organic materials from decaying.
- **Cold, waterlogged land** – areas of blanket bog are waterlogged because they typically form in the uplands where drainage is poor and are found at the top of river catchments, where rainfall is frequent and heavy, and the water table is high. Areas of lowland raised bogs form on wet floodplains or in places which were historically areas of standing water such as a lake or a hollow which has infilled. Sphagnum mosses are perfectly adapted to grow and thrive on wet, flat ground.

Explain that ‘Sphagnum mosses’ should venture out one at a time and if they succeed in collecting one of each of the three peat forming factor cards, they have the right conditions to turn into peat. Learners that have successfully turned into peat should stand in a line at the side of the peatland (designated area). To highlight the fact that the land is waterlogged, the accumulated peat can make squelching noises and they should make themselves appear as large as possible.



5. Set your learners off to complete the challenge. After a minute or so of accumulation, ask your learners to stop.
- How many learners in each team are standing in a line having accumulated to peat?
 - Explain that it can take a year or so for peat to build up by just 1 millimetre.
Ask your learners if it takes a year for a millimetre of peat to accumulate, how long will it take for a cm of peat to accumulate? 50cm? A metre? Ten metres?
 - Explain that each learner in their team that has successfully accumulated represents 500 years and 50cm of peat.
To what depth of peat has their team accumulated?
How many years has it taken for their peat to accumulate?
Working back from the present day, in what year did their team's peat begin to accumulate?
 - Explain that in some areas such as Cors Caron near Tregaron and Cors Fochno near Aberystwyth, there are areas of peat as deep as 10 metres which have taken thousands of years to accumulate. It can however take a lot less time to disturb and damage these unique habitats.
6. Explain to your learners whilst the peat has been accumulating over time, other factors have been at work and it looks as if the peatland area is about to be disturbed.
Scenario options:
- Some humans want to dig up and drain the land in order to plant trees
 - The farmer wants to drain the peatland to increase the amount of available pasture for animals.
 - A garden centre wants to drain and dig up the peatland to create their own brand of peat compost to sell to gardeners.
- Assign the role of 'workers' to the learners that haven't yet turned into peat or take on the role yourself. Explain to your learners that it will take the 'worker' five days to dig up the top 50 cm of peat soil at the site. Starting from the present day, ask these 'workers' to pretend to operate a mechanical digger and dig up the latest layer (top layer) of peat (one learner). Emphasise to your learners that in five days, five hundred years of peat accumulation and 50 cm of peat soil has been lost. Ask the 'worker' to dig up 2 metres depth of peat. How many days did it take the 'worker' to complete his task? How many years of peat accumulation has been lost?
7. Explain to your learners that as the peatland is dug up and drained the land will become dry causing the compressed organic matter within the peat to dry out and decay. The drier conditions will give non-peat forming plant species, such as heather, the opportunity to colonise. Heather forms a dense layer of vegetation, consumes large volumes of water and outcompetes the peat forming sphagnum causing peat accumulation to stop. To highlight this, learners acting as accumulated peat should make sucking noises as the water drains away and they should shrink their body size to represent the peat contracting and drying out. The peat accumulation process which has taken thousands of years has stopped and reversed following the detrimental consequences of a few weeks' worth of work.

Suggested key questions

- Ask your learners why they think that low acidity in the soil and lack of oxygen, affect the decaying process?
- Can they think of a habitat which has a high level of decomposers in the food chain e.g. woodlands?
- What would happen if there were no decomposers in the food chain?



Adapting for different needs/abilities

Less support

- Give your learners the facts and figures, don't pose as many questions or give them laminated year cards to help them visualise the peat accumulation over time.

More support

- Allow peat to accumulate for longer and to a greater depth. Allow the 'worker' to dig up more layers of peat. Can your learners calculate the depth and years back in time?

Follow up activity/extension

- Expressive arts challenge - can your learners come up with a sequence of movements to tell the story of the creation of peat growth?
- Compare sizes of peatlands on a local, national and international level.
- Ask your learners to write a newspaper style article for a local newspaper on how peat is created, how it accumulates and how we can help restore/conserves it.

Other resources

- Activity plan - Why are bogs important?
- Activity plan - To bog or not to bog?
- For further information about how peat forms, where peatlands can be found in Wales and further information on the problems facing our peatlands, check out our **Information Note - Peatlands**.
- LIFE Raised Bogs project webpages.

Looking for more learning resources, information and data?

Please contact: education@naturalresourceswales.gov.uk or go to <https://naturalresources.wales/learning>

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