# Acid Attacks

This lesson looks at the effect of pH in a pond on the organisms that live there.

The pH of ponds can differ depending on their location and the source of their water. pH levels are not static within ponds, however, and can fluctuate throughout the course of a day. The change in pH in a pond does not need to be large for the organisms living in it to be affected in quite significant ways.

## Resources

- Powerpoint presentation (see end of pdf)
- Teachers' notes to support the presentation (see end of pdf)

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# pH in Ponds – Acids attack

- A pond can vary in many ways, one of which is how acid or alkali the water is. This can be due to the type of soil or rock the pond is on, how much carbon dioxide is in the air, acid rain or even the type of plants present.

- A high pH (alkaline conditions) favours some species while low pH (acid conditions) favours other species.

- Most animals with a shell such as snails and crayfish can only survive in alkaline water, while some mosses prefer acidic water.

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**Starter: Where would you be more likely to find these organisms in an slightly acidic pond or a slightly alkaline one?**





**Go to the next slide once you have decided your answers**

**ACID**

**ALKALI**

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**Starter: Where would you be more likely to find these organisms in an slightly acidic pond or a slightly alkaline one?**



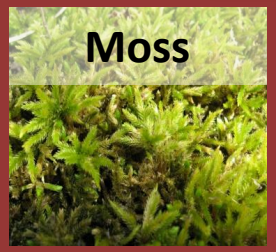


**Answers**

**Tends to be upland ponds on acid soils, some mosses can also increase acidity**

**Tends to be lowland ponds on chalky soil, snails need calcium from alkaline chalk to make their shells**

**ACID**





**ALKALI**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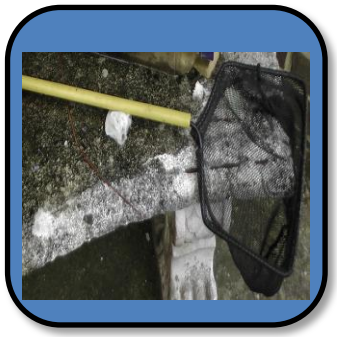
**Challenge:**

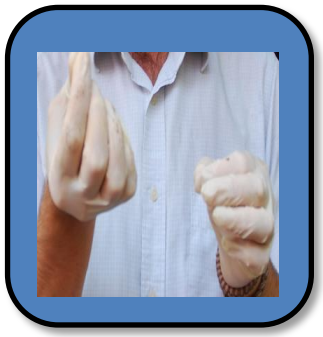
You are going to sample a pond to observe how pH affects the type of organisms (living things) in and around acidic or alkaline ponds.

**Equipment needed:**

white dish or tray at least 5cm deep



Pond net



Plastic gloves


pH test kit

Camera, notebook, Identification guide book/internet guide

**Need to know beforehand:**

**1) Don't get any of the pH indicator in the pond, it will damage the ecosystem**

**2) Make sure you remove samples carefully and replace all animals and plants back where you found them. Don't just throw the water from the tray back in, lower your tray to the water level to empty it. Throwing a pond skater back into the water from 1 metre high would be like dropping you off the London Eye!**

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**Challenge:**

You are going to sample the pH of your pond and sample the pond life to find out how pH can affect the type of organisms that live there.

**Method:**

1) Gloves on to protect you and the samples.
2) Fill your  test tube with water from the pond you are sampling, allow it to settle for 30 seconds.
3) Place 5 drops of Universal indicator into the test tube and record the pH.
4) Do **<u>not</u>** put the test tube water with Universal indicator back into the pond, dispose of it down a sink!
5) Repeat this 3 times with samples from different parts of the pond.
6) Now record all the livings things you can find with your net, if you don't know their name describe them, take photos or make sketches.

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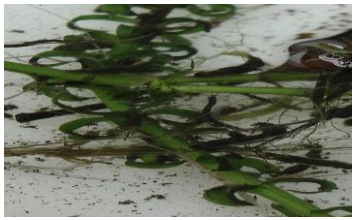
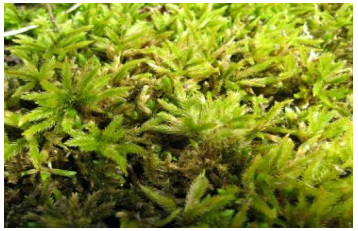
**Conclusions:**

1. What was the pH of your pond?
2. What kinds of organisms did you find in the pond?
3. Why might the pH change through the day and night?
4. What might increase the amount of CO2 in the water and how does this affect pH?
5. Were there any snails present?
6. Was there a significant amount of moss or algal growth?
7. What might change the pH of a pond?





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# pH in Ponds – Acids Attack

**Age group**: 12-16 years (the resource is adaptable for different levels as required by the facilitator)

**Curriculum links and keywords:** pH, Acids, Alkalis, aquatic life, adaptations

**Group size:** up to 30 students

**Locations:** anywhere with a pond or static water that is safe to access and a classroom

**Time needed**: 1 hour

**Learning outcomes:** For students to recognise that a pH can affect the species found in a pond community.

**Note: No specialist knowledge is required but students will need to have prior knowledge of acids and alkalis**

**Preparation** white dish or tray at least 5cm deep, pH test kit, plastic gloves, camera, notebook, Identification guide book/internet guide, notebooks, pencils.

**Activity**

1) Open the PowerPoint included in this download

Basic info:

- A pond can vary in many ways, one of which is how acid or alkali the water is. This can be due to the type of soil or rock the pond is on, how much carbon dioxide is in the air, acid rain or even the type of plants present.
- A high pH (alkaline conditions) favours some species while low pH (acid conditions) favours other species.
- Most animals with a shell such as snails and crayfish can only survive in alkaline water, while some mosses prefer acidic water.

Slide 1: The PowerPoint begins with an introductory video clip to ponds (click on the link in the PowerPoint to open the video which is already loaded onto YouTube). To preview the clip see: http://www.youtube.com/watch?v=STasskXuUiQ&feature=channel_video_title

Slides 2, 3: Starter activity on pH specific species with answers

Slide 4: Introduces the challenge activity where students sample a pond to observe how pH affects the type of organisms (living things) in and around acidic or alkaline ponds. It Includes a “need to know section” on avoiding sample damage.

Slide 5: Challenge instructions and method.

Slide 6: Conclusion questions.

Questions for students to consider:

1. What was the pH of your pond?
2. What kinds of organisms did you find in the pond?
3. Why might the pH change through the day and night?
4. What might increase the amount of CO2 in the water and how does this affect pH?
5. Were there any snails present?
6. Was there a significant amount of moss or algal growth?
7. What might change the pH of a pond?