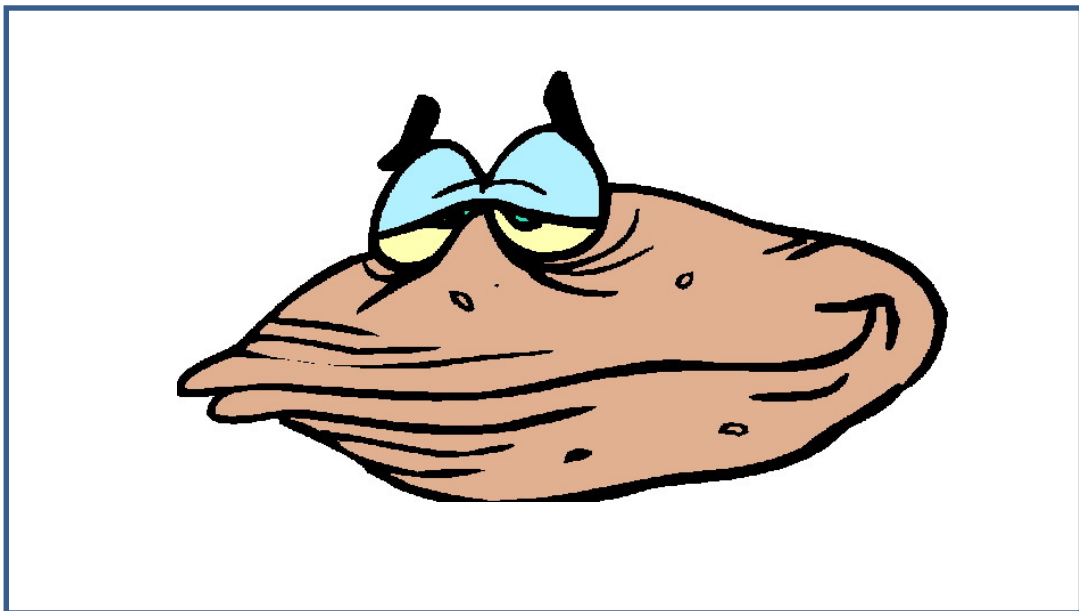


Pearls in the Classroom

These pearls of wisdom belong to

.....**Answers**.....

Draw a picture of a freshwater pearl mussel, salmon, trout or a river here...



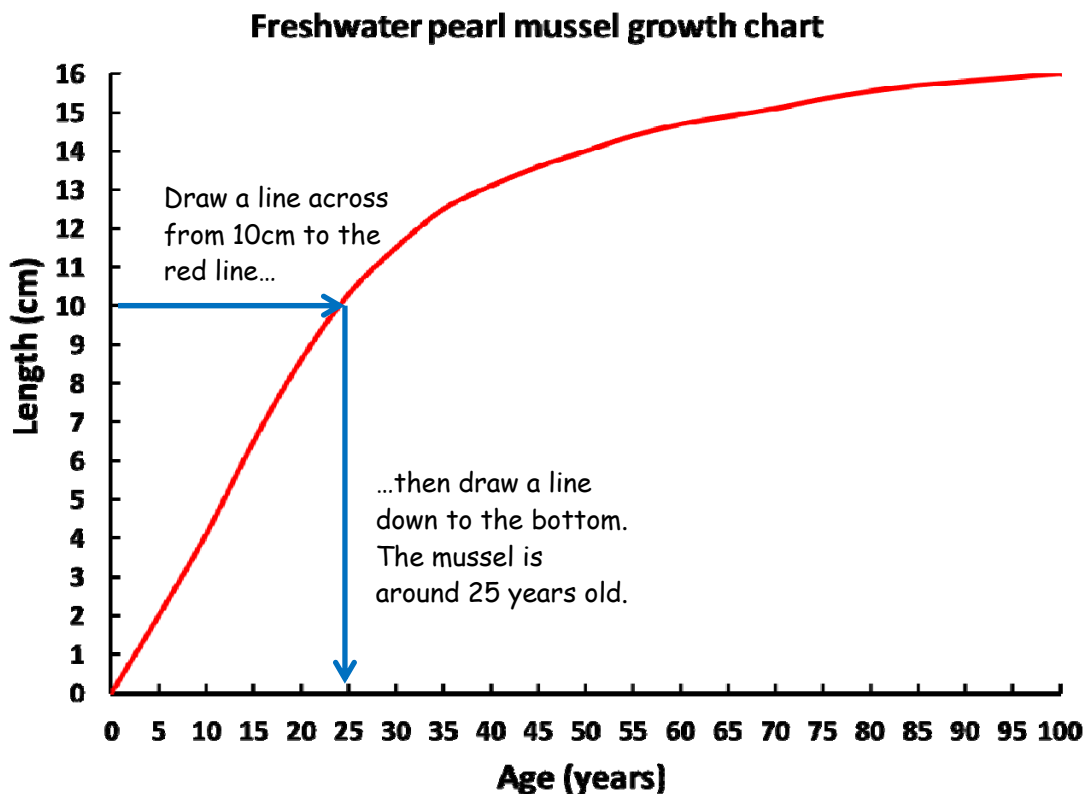
ACTIVITY: HOW DO YOU FIND OUT HOW OLD A MUSSEL IS?

Freshwater pearl mussels grow very quickly to begin with, and you can easily see their growth rings until they are 6 to 10 years old. After that growth rate starts to slow down and the rings are too thin to count. To find out the age of an older mussel, you need to measure it.

Instructions:

1. Measure how long the shell is from end to end.
2. Match the length to the left hand side of the graph.
3. Using a ruler, draw a line straight across until it meets the red line.
4. Then draw another line straight down to the bottom of the graph- this tells you how old your mussel is.

Example: Your mussel is 10cm long...



Freshwater pearl mussel questions

Where can freshwater pearl mussels be found?

Freshwater rivers and streams. Fast flowing, cool, clean water with high oxygen levels. They like clean sand and gravel behind large stones and boulders. Found in UK, Europe, Russia and eastern USA.

Where are the last places in England you can find freshwater mussels?

River Ehen or the River Irt (here in Cumbria)

What age can these animals live to?

They can live for over 100 years. The oldest known specimen in Europe was caught in Estonia when it was 134 years old.

Mussels don't have back bones. What is the name for the group of animals that don't have back bones?

Invertebrates

And what is the name for the group of soft-bodied animals that often (but not always) live in shells? Can you name one that doesn't have a shell?

Molluscs. Slugs, squids, octopuses and cuttlefish and sea slugs are shell-less molluscs

Lifecycle questions

How many larvae can one pearl mussel release?

1-4 million

How do the larvae stick to the gills of the fish?

They snap their shells shut on the gills to hold on

What are the chances of a larvae meeting a suitable fish?

Very low – four out of one million

How long do the mussel larvae stay on the host fish?

9 months. July to the following May or June

The river ecosystem

Do you know what an ecosystem is?

An ecosystem is made up of a community of all the living organisms (plants, animals and microbes), along with the non-living parts of their environment (things like air, water and soil). The living and non-living parts of the ecosystem are all closely linked together, so if something changes it can affect everything else in the ecosystem.

Here is a list of things you might find in a river ecosystem.
For each one, say whether it is living or non-living.

For the living things, find out

- what do they eat?
- what eats them?
- what environmental conditions do they like to live in?

For the non-living things, find out who likes to live there and why?

1. Juvenile salmon and trout

Living. Eats adult and juvenile insects (terrestrial and aquatic), amphipods (shrimps) and other crustaceans. Is eaten by birds such as herons and kingfishers, and by other fish. They like clean water with a high oxygen content. They like sheltering in spaces between stones, and under the cover of overhanging trees, plants and riverbanks.



2. Insect larvae

Living. Some eat other insect larvae, others are filter feeders that filter small organic particles such as algae, plant and animal debris out the water. Are eaten by birds such as dippers, fish and by other invertebrates. They like clean water with a high oxygen content. Some can live in quite fast flowing water as they can attach to, or hide behind rocks. Some attach to plants or hide in amongst them.



3. Sand and gravel

Non-living. Juvenile freshwater pearl mussels and some invertebrate larvae live there. Sand and gravel provides protection, and the gaps allow animals to burrow down and water and oxygen to flow through. Salmon and trout will lay their eggs here.



4. Juvenile freshwater pearl mussels

Living. Filters tiny organic particles out of the water. Is eaten by crayfish and fish such as eels. They like clean water with a high oxygen content and a steady flow. They live in clean sand and gravel beds with lots of spaces between the grains so they can burrow into the sediment for safety.



5. Adult salmon and trout

Living. Eats adult and juvenile insects (terrestrial and aquatic), amphipods (shrimps) and other crustaceans. Is eaten by seals, otters, people. They like clean water with a high oxygen content. They need clean gravel to lay their eggs in.



6. Cool clean water

Non-living. Home to aquatic plants, fish, adult and juvenile invertebrates such as insects and freshwater pearl mussels. Clean water allows plants to get light for photosynthesis, and allows fish and invertebrates with gills to breath. Our river dwellers are adapted to cooler temperatures, and may struggle if the water gets too warm.



7. Overhanging trees

Living. “Feeds” by taking nutrients from the soil through their roots and by photosynthesis using sunlight. Insects living in trees may fall into the water, or they lay their eggs in water – many insect larvae are aquatic – providing food for fish. Small bits of tree (such as dead leaves) are food for filter feeders. Trees provide shade to keep water cool. They grow on the riverbank where they get nutrients in water washed off the land (runoff) and from the soil.



8. Adult freshwater pearl mussels

Living. Filters tiny organic particles out of the water. May be eaten by otters if stranded at low water, but not usually predated – humans are the biggest threat through pearl fishing. They like clean water with a high oxygen content and a steady flow. They live in sand and gravel beds, often sheltered behind rocks and boulders.



9. Rocks and boulders

Non-living. Provides shelter from flow and from predators for fish and insect larvae. Freshwater pearl mussels like sand and gravel patches sheltered behind boulders. Algae grows on rock surfaces that some insect larvae and aquatic snails eat.



10. Steady water flow and depth

Non-living. Home to aquatic plants, fish, adult and juvenile invertebrates such as insects and freshwater pearl mussels. Steady flow means sediment habitats are stable, so animals don't get washed away. Steady depth helps to regulate temperature - our river dwellers are adapted to cooler temperatures, and may struggle if the water gets too warm. It stops animals being exposed to air and sunlight which could lead to suffocation.



Freshwater pearl mussel research

Using what you know about note-taking, find out what you can about the following freshwater pearl mussel topics:

Julius Caesar

Julius Caesar's desire for pearls is one of the recorded reasons for the first Roman invasion of Britain in 55BC. He invaded Britain twice, and also conquered Gaul (France).

He was born in the year 100BC. He was the first Roman to be given the status of a god. His face was on Roman coins, and he introduced the Julian calendar. He was assassinated by his senators who stabbed him to death.

Scottish Crown Jewels

The Honours of Scotland (or Scottish Crown Jewels) date from the 15th and 16th centuries and are the oldest royal regalia in the British Isles. They are kept in Edinburgh Castle having been used in the coronation of Scottish Monarchs from 1543 (Mary I) to 1651 (Charles II). They are partly decorated with pearls harvested from Scottish freshwater pearl mussels.

Pearl fishing

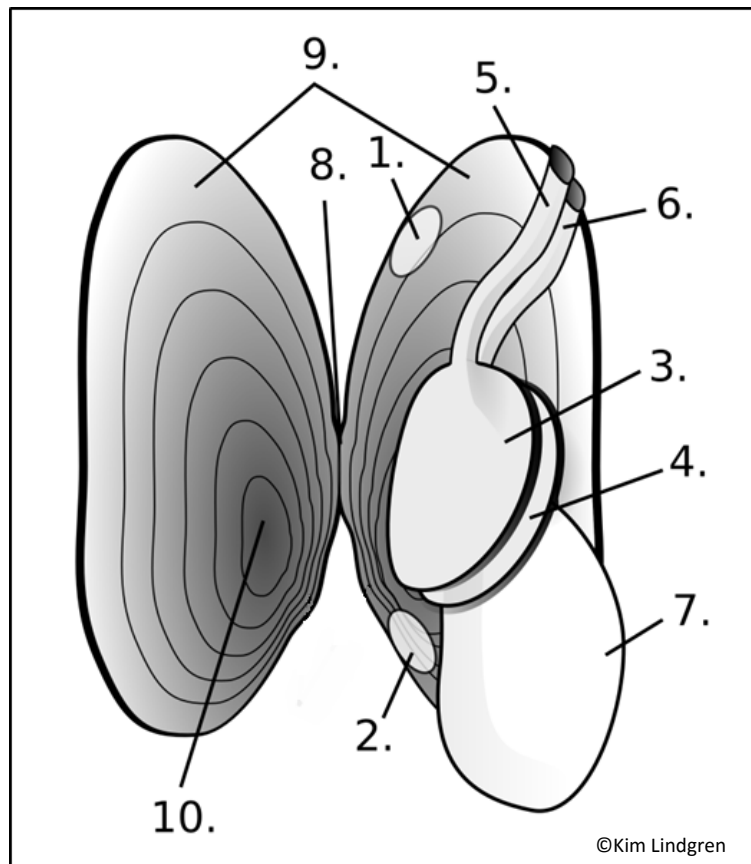
Pearl fishing has gone on for over 2000 years, since pre-roman times. The 12th Century when Alexander I, King of Scots was said to have the best pearl collection of any man living. Pearl fishing was an important industry in Britain. In the 17th century King James claimed the right to all pearl fishing. There is a tradition of travellers fishing for pearls. Freshwater pearl mussels started declining in the 18th century. Pearl fishing has been illegal since 1998.

Scotland's biggest pearl

The Kellie/Kelly Pearl was found in 1621 in a tributary of the River Ythan in Aberdeenshire. It is part of the Scottish Crown Jewels.

Another large pearl - the most famous and perfect pearl - was found in 1967 by Bill Abernethy in the River Tay. It is about the size of a marble/Malteser. It is on display in Cairncross Jewellers in Perth.

Name the parts of the freshwater pearl mussel



- | | |
|-------------------------------------|---|
| 1. Muscle for opening/closing shell | 6. Syphon for sucking in |
| 2. Muscle for opening/closing shell | 7. Foot |
| 3. Front gill | 8. Hinge |
| 4. Back gill | 9. Mantle |
| 5. Syphon for squirting out | 10. The Umbo - thickest part of the shell |