

Curriculum Learning Outcomes:

3rd and 4th class

Science

Living things: Plant and animal life

- Develop an increasing awareness of plants and animals from wider environments
- Become aware of some of the basic life processes

Environmental awareness: Science and the environment

- Identify the interrelationship of the living and non-living elements of local and other environments

Mathematics

Measures: Length

- Measure and record lengths using appropriate metric units

Data: Representing and interpreting data

- Collect, organise and represent data using bar charts
- Use data sets to solve and complete practical tasks and problems

Geography

Natural environments: Rocks and soils

- Compare and contrast materials, focusing on certain criteria
- Begin to explore the influence of soils and rocks on animal and plant life

5th and 6th class

Science

Living things: Plant and animal life

- Recognise that there is a great diversity of plants and animals in different regions and environments
- Become aware of some of the basic life processes
- Observe and explore some ways in which plant and animal behaviour is influenced by, or adapted to, environmental conditions
- Identify the interrelationships and interdependence between plants and animals in local and other habitats plants and animals depend on, and compete

Environmental awareness: Science and the environment

- Identify the interrelationship of the living and non-living elements of local and other environments

Mathematics

Measures: Length

- Estimate and measure length using appropriate metric units

Data: Representing and interpreting data

- Collect, organise and represent data using bar charts

Geography

Natural environments: Rocks and soil

- Learn about the characteristics of some common rock types and where they may be found in Ireland and in other parts of the world

Learning Intentions:

- The students will understand that fossils are the remains of ancient animals and plants.
- The students will understand that rocks and fossils can tell us about ancient environments.
- The students will be aware that fossils can tell us about how environments changed over time.
- The students will understand that as the environment changes so does biodiversity.

Skills development:

- Working scientifically
 - Questioning
 - Observing
 - Investigating and experimenting
 - Analysing – sorting and classifying
 - Recording and communicating

Evaluation of lesson

After the end of the lesson the facilitator will distribute a Likert survey to each student.

Primer

Resources:

- Laminated cards with animations of each stage of fossilisation
 - Death
 - Transport
 - Deposition
 - Burial
 - Uplift
- Laminated cards with well-known historical people/events
 - Queen Elizabeth 1600 AD
 - Normans 1100 AD
 - Vikings 800 AD
 - St Patrick 500 AD
 - Romans 27 BC
 - Egyptians 3100 BC
 - First humans in Ireland 33000 years ago
- String
- Pegs
- Measuring tape

Description of Activity:

Introduction

- This lesson will introduce the students to what fossils are, how they form, how old they are and where you can find them. The facilitator will emphasise that lots of different types of fossils can be found in Ireland.

Progression of lesson

Activity 1) Fossilisation processes

- Students will be sorted into groups of 4 or 5. Each group will be given a set of animated cards with one stage of fossilisation on each card. They group will be asked to arrange the cards in chronological order, from the first stage of fossilisation to the last.

Activity 2) Geological Timescale

- Each group will be given a long piece of string, some pegs and laminated cards with pictures of historical people and the dates they were alive.
- Each group will be asked to create a timeline by arranging the cards along the string in chronological order using a scale of 1 cm = 100 years.

Conclusion of lesson:

Facilitators will circulate a Likert survey to assess students understanding of the learning outcomes for this lesson.

Lesson 5: Environmental Change Through Time

Resources:

- 10 x small boxes (per group) each containing several fossils and labelled with an age
- Laminated sheets with pictures of rocks
 - Mudstone
 - Sandstone
 - Ash
- Geological Log
- Fossil legend to identify fossils in boxes
- Fabric Markers
- Large fabric poster (A0) with a picture of the Earth showing the continents
- Extra-large poster (2 m x 2 m) with a picture of the Earth showing the continents
- Simplified geological timescales showing the Jurassic and Cretaceous periods
- Fossils from the Jurassic and Cretaceous periods
- Wheel of misfortune – self-standing spinning games wheel with coloured segments
- Game cards with fossil characters

Description of Activity:

Introduction

- This lesson will explore how rocks record changes in the environment long ago. Fossils tell us how many animals and what type of animals, lived in a particular place along ago. Rocks can tell us about how environmental change affects biodiversity over millions of years.
- In the lesson primer students will have learned how fossils lived and died. This lesson will build on that knowledge introducing the concept of mass extinctions. These are defined as a loss of 75% or more of all species worldwide over a relatively short geological period of time (i.e. less than 2.8 million years).
- The facilitator will begin the lesson by recapping what rocks and fossils can tell us about ancient environments giving examples of various fossils from different environments. The facilitator will then suggest that by looking at the changes in rocks and fossils over time we can see how the environment has changed.

Progression of Lesson

Activity 1) Local Environmental Change 10 min):

- Students will be presented with laminated sheets with a simplified version of a geological timescale which shows two time periods (Jurassic and Cretaceous) and two rock types (mudstone and greensands). Each group will be given pictures of fossils with ages labelled.
- The groups will have to match each fossil to the relevant time period.
- The groups will then discuss why there are more fossil in the Jurassic and very few in the Cretaceous – low oxygen levels in greensands.

Activity 2) Stratigraphic Log (15 min):

- Students will be sorted into groups of 4 or 5. Each group will be given ten boxes, each of which will have an age written on one side, e.g. 405 Ma (million years old), 406 Ma, 407 Ma, and a rock type written on the other. Each box will contain a selection of Irish fossils.
 - Boxes 1 - 5 – 10 fossils
 - Boxes 6 – 8 – 3 fossils
 - Box 9 – 0 fossils
 - Box 10 – 1 fossil
- The students will first arrange the boxes in chronological order.
- The students will then be provided with laminated sheets with pictures of rock types, mudstone, sandstone, and volcanic ash. Each picture will correspond with one of the ages written on the side of the boxes. The students will then match each rock type with each age/box.
- The students will then be invited to open each box one by one and record the number of fossils in each box and the type of fossils (using images provided to help identify the types). The age, rock type, number of fossils and types of fossils will be recorded by the students on a Geological Log.
- Th students will be asked to report their results from each time period and the facilitator will encourage a discussion on the change in biodiversity through time and the possible reasons for this – a large volcanic eruption leading to a mass extinction and a prolonged ecological recovery period.

Activity 3) Meteorite Impact (25 – 30 min):

- Students will remain in their small groups. Each group will be given a poster with a simplified image of the Earth drawn on it. The facilitator will introduce the concept of meteorite impacts and ask the class what kind of effects they think a meteorite impact would have on the planet, e.g. initial impact, a rain of small meteorites, earthquakes, etc.
- The facilitator will list all these potential impacts in the PowerPoint presentation. The students will then be tasked with estimating how far they think the various impacts of the meteorite collision would reach. The site of the impact will be drawn on the posters for them and they will be told how big the meteorite was.
- Each student in the group will have a different colour marker and will be responsible for drawing a circle on their poster to show how far each impact is felt.
- Once every group has drawn on the circles the facilitator will roll out a large poster showing the scientific estimates of how far each impact would reach.

Activity 4) Wheel of Misfortune (30 min):

- Each student in the group will be given a card with a fossil character on it, including details about where it lived, what it's mode of life was and if it was carnivorous or herbivorous.
- The facilitator will present a larger spinning wheel with several categories on it, including local volcanic eruption, large igneous province, meteorite impact, rising sea level, storm etc.
- Each spin of the wheel will cause some of the players to 'loss points' as their fossil character is damaged or goes extinct.
- At the end of the game the facilitator will ask what fossil characters have survived and then stimulate a discussion on why that fossil survived while no other ones did, recapping all the topic covered in this lesson.

Conclusion of lesson:

Facilitators will circulate a Likert survey to assess students understanding of the learning outcomes for this lesson.