

# Lake

INDICATOR **Ostracods**



## Material resource

Lens

## Human resource

Ostracod Specialist

## Description

Microscopic crustaceans that live in a two-sided shell made of calcium carbonate.

You win 1 point for 'Longest history'

Ostracod valves found in the deepest sediments were radiocarbon dated, showing that the lake sediments contain 7500 years of history.



01/66

# Lake

INDICATOR **Ostracods**



## Material resource

Laboratory

## Human resource

Palaeontologist

## Description

Microscopic crustaceans that live in a two-sided shell made of calcium carbonate.

You win 1 point for 'Longest history'

Ostracod valves found in the deepest sediments were radiocarbon dated, showing that the lake sediments contain 7500 years of history.



02/66

# Lake

INDICATOR **Ostracods**



## Material resource

Laboratory

## Human resource

Palaeontologist

## Description

Microscopic crustaceans that live in a two-sided shell made of calcium carbonate.

You win 1 point for 'Longest history'

Ostracod valves found in the deepest sediments were radiocarbon dated, showing that the lake sediments contain 7500 years of history.



03/66

# Lake

INDICATOR **Ostracods**



## Material resource

ID Guide

## Human resource

Ostracod Specialist

## Description

Different ostracod species can be identified from the shape and patterning of their shell.

04/66

# Lake

INDICATOR **Ostracods**



## Material resource

Lens

## Human resource

Biologist

## Description

Ostracods live in aquatic environments, both saline and freshwater, and are excellent indicators of environmental change, such as salinity variations linked to changes in precipitation and evapotranspiration.

05/66

# Lake

INDICATOR **Ostracods**



## Material resource

Lens

## Human resource

Palaeontologist

## Description

Ostracods live in aquatic environments, both saline and freshwater, and are excellent indicators of environmental change, such as salinity variations linked to changes in precipitation and evapotranspiration.

06/66

# Lake

INDICATOR **Ostracods**



## Material resource

Lens

## Human resource

Ecologist

## Description

Ostracods feed especially on plant remains, algae and some other animals.

07/66

# Lake

INDICATOR **Ostracods**



## Material resource

ID Guide

## Human resource

Biologist

## Description

Ostracods are good environmental indicators because they have a short lifespan.

08/66

# Lake

INDICATOR **Pollen**



## Material resource

Microscope

## Human resource

Ecologist

## Description

Pollen are microscopic male reproductive organs of flowering plants (angiosperms and gymnosperms).

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# Lake

INDICATOR Pollen



## Material resource

Microscope

## Human resource

Biologist

## Description

Pollen are microscopic male reproductive organs or flowering plants (angiosperms and gymnosperms).

10/66

# Lake

INDICATOR Pollen



## Material resource

ID Guide

## Human resource

Palaeontologist

## Description

Studying pollen allows us to reconstruct the landscape (vegetation) of the past in a certain area because pollen are produced in enormous quantities.

11/66

# Lake

INDICATOR Pollen



## Material resource

Microscope

## Human resource

Palynologist

## Description

Pollen are present in almost all sediments since they are able to disperse easily through the air and water or can be transported by animals.

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# Lake

INDICATOR Pollen



## Material resource

ID guide

## Human resource

Palaeontologist

## Description

Studying pollen allows us to reconstruct the landscape (vegetation) of the past in a certain area because pollen are produced in enormous quantities.

13/66

# Lake

INDICATOR Pollen



## Material resource

Microscope

## Human resource

Geologist

## Description

Pollen are present in almost all sediments since they are able to disperse easily through the air and water or can be transported by animals.

14/66

### You win 1 point for 'Longest history'

Pollen found in the deepest sediments were radiocarbon dated, showing that the lake sediments contain 7500 years of history.



# Lake

INDICATOR Pollen



## Material resource

Laboratory

## Human resource

Palynologist

## Description

Pollen are present in almost all sediments since they are able to disperse easily through the air and water or can be transported by animals.

15/66

### You win 1 point for 'Longest history'

Pollen found in the deepest sediments were radiocarbon dated, showing that the lake sediments contain 7500 years of history.



# Lake

INDICATOR Pollen



## Material resource

Laboratory

## Human resource

Palynologist

## Description

Pollen are present in almost all sediments since they are able to disperse easily through the air and water or can be transported by animals.

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# Lake

INDICATOR Pollen



## Material resource

Laboratory

## Human resource

Biologist

## Description

Pollena indicate how vegetation changed in response to climate changes and human impacts (e.g. agriculture).

17/66

### You win 1 point for 'Longest history'

Pollen found in the deepest sediments were radiocarbon dated, showing that the lake sediments contain 7500 years of history.



# Lake

INDICATOR Diatoms



## Material resource

Microscope

## Human resource

Biologist

## Description

Diatoms are microscopic algae with a cell wall made of silica.

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# Lake

INDICATOR Diatoms



## Material resource

Microscope

## Human resource

Palaeontologist

## Description

Diatoms are microscopic algae with a cell wall made of silica.

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# Lake

INDICATOR Diatoms



## Material resource

ID guide

## Human resource

Diatom Specialist

## Description

We can tell different species of diatoms apart by the shape, size and patterning of their valves (silica structures that make up their cell wall).

20/66

# Lake

INDICATOR Diatoms



## Material resource

ID guide

## Human resource

Biologist

## Description

We can tell different species of diatoms apart by the shape, size and patterning of their valves (silica structures that make up their cell wall).

21/66

# Lake

INDICATOR Diatoms



## Material resource

Laboratory

## Human resource

Ecologist

## Description

Diatoms live in aquatic environments, both fresh and brackish, and this makes them excellent indicators of environmental changes, such as salinity variations linked to changes in precipitation and evapotranspiration.

22/66

# Lake

INDICATOR Diatoms



## Material resource

ID guide

## Human resource

Palaeontologist

## Description

Diatoms live in aquatic environments, both fresh and brackish, and this makes them excellent indicators of environmental changes, such as salinity variations linked to changes in precipitation and evapotranspiration.

23/66

# Lake

INDICATOR Diatoms



## Material resource

Microscope

## Human resource

Geologist

## Description

Changes in the concentration of diatoms in sediments can indicate changes in lake productivity through time. These algae need light and nutrients to grow.

24/66

# Lake

INDICATOR Diatoms



## Material resource

Microscope

## Human resource

Biologist

## Description

Changes in the concentration of diatoms in sediments can indicate changes in lake productivity through time. These algae need light and nutrients to grow.

25/66

# Lake

INDICATOR Diatoms



## Material resource

Laboratory

## Human resource

Palaeontologist

## Description

Diatoms are good environmental indicators because they have a short lifecycle. Sometimes they only live a few hours!

26/66

# Lake

INDICATOR Charcoal



## Material resource

Microscope

## Human resource

Archaeobotanist

## Description

Charcoal particles are the carbonised (burned) remains of woody plants.

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# Lake

INDICATOR Charcoal



## Material resource

Laboratory

## Human resource

Archaeologist

## Description

Charcoal particles are the carbonised (burned) remains of woody plants.

28/66

# Lake

INDICATOR Charcoal



## Material resource

Microscope

## Human resource

Palynologist

## Description

Together with other indicators, charcoal concentrations in the geological record indicate the occurrence of fires.

29/66

# Lake

INDICATOR Charcoal



## Material resource

Microscope

## Human resource

Archaeobotanist

## Description

Together with other indicators, charcoal concentrations in the geological record indicate the occurrence of fires.

30/66

# Lake

INDICATOR Charcoal



## Material resource

ID Guide

## Human resource

Palynologist

## Description

Charcoal can indicate the vegetation that existed around the lake through time.

31/66

# Lake

INDICATOR Charcoal



## Material resource

Laboratory

## Human resource

Geologist

## Description

Charcoal particles can radiocarbon dated to indicate the age of the sediments.

32/66

### You win 1 point for 'Longest history'

Charcoal found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



# Lake

INDICATOR Charcoal



## Material resource

Laboratory

## Human resource

Palynologist

## Description

Charcoal particles can radiocarbon dated to indicate the age of the sediments.

33/66

### You win 1 point for 'Longest history'

Charcoal found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



# Lake

INDICATOR Charcoal



## Material resource

Laboratory

## Human resource

Geologist

## Description

Charcoal particles can radiocarbon dated to indicate the age of the sediments.

34/66

# Lake

INDICATOR Sediments



## Material resource

Elemental analyser

## Human resource

Geochemist

## Description

Sediments are the result of the accumulation of particles of different origins. Changes in the types of particles in a sediment core can tell us about environmental changes.

35/66

# Lake

INDICATOR Sediments



## Material resource

Elemental analyser

## Human resource

Geochemist

## Description

Sediments are the result of the accumulation of particles of different origins. Changes in the types of particles in a sediment core can tell us about environmental changes.

36/66

### You win 1 point for 'Longest history'

Charcoal found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



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# Lake

INDICATOR Sediments



## Material resource

Grain-size analyser

## Human resource

Sedimentologist

## Description

The grain size of different particles can vary through a sediment core, indicating changes in the environment.

37/66

# Lake

INDICATOR Sediments



## Material resource

Grain-size analyser

## Human resource

Sedimentologist

## Description

In a lake, coarse grains can indicate dry periods and fine particles can indicate humid periods.

38/66

# Lake

INDICATOR Sediments



## Material resource

Laboratory

## Human resource

Geochemist

## Description

Sediments can contain varying amounts of organic matter. Usually the more organic matter, the darker the sediment. Organic matter can be dated to provide the age of the lake sediments.

### You win 1 point for 'Longest history'

Organic matter found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



39/66

# Lake

INDICATOR Sediments



## Material resource

Laboratory

## Human resource

Sedimentologist

## Description

Sediments can contain varying amounts of organic matter. Usually the more organic matter, the darker the sediment. Organic matter can be dated to provide the age of the lake sediments.

### You win 1 point for 'Longest history'

Organic matter found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



40/66

# Lake

INDICATOR Sediments



## Material resource

Coring platform

## Human resource

Geologist

## Description

Sediments that accumulate at the bottom of lakes are an archive of environmental changes that occurred in that area.

41/66

# Lake

INDICATOR Sediments



## Material resource

Sediment corer

## Human resource

Geologist

## Description

Sediments that accumulate at the bottom of lakes are an archive of environmental changes that occurred in that area.

42/66

# Lake

INDICATOR Gastropods



## Material resource

Lens

## Human resource

Biologist

## Description

The calcium carbonate shells of these molluscs can be found in various shapes and sizes in the lake sediments.

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# Lake

INDICATOR Gastropods



## Material resource

Lens

## Human resource

Geologist

## Description

The calcium carbonate shells of these molluscs can be found in various shapes and sizes in the lake sediments.

44/66

# Lake

INDICATOR Gastropods



## Material resource

ID guide

## Human resource

Palaeontologist

## Description

Gastropods live in aquatic and saline environments, and are good indicators of changing lake levels caused by variations in precipitation and evapotranspiration through time.

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# Lake

INDICATOR **Gastropods**



## Material resource

Laboratory

## Human resource

Geochemist

## Description

Chemical analysis of gastropod shells can tell us how water temperatures changed over time.

46/66

# Lake

INDICATOR **Gastropods**



## Material resource

Laboratory

## Human resource

Geologist

## Description

Gastropod shells can be radiocarbon dated to tell us the age of the sediments.

You win 1 point for 'Longest history'

A gastropod shell found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



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# Lake

INDICATOR **Gastropods**



## Material resource

Laboratory

## Human resource

Geochemist

## Description

Gastropod shells can be radiocarbon dated to tell us the age of the sediments.

You win 1 point for 'Longest history'

A gastropod shell found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



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# Lake

INDICATOR **Gastropods**



## Material resource

Laboratory

## Human resource

Geologist

## Description

Gastropod shells can be radiocarbon dated to tell us the age of the sediments.

You win 1 point for 'Longest history'

A gastropod shell found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



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# Lake

INDICATOR **Bivalves**



## Material resource

ID guide

## Human resource

Palaeontologist

## Description

Bivalve molluscs live in saline and freshwater environments aquatic and saline environments, and are good indicators of changing lake levels caused by variations in precipitation and evapotranspiration through time.

50/66

# Lake

INDICATOR **Bivalves**



## Material resource

Lens

## Human resource

Biologist

## Description

Bivalve shells, in two parts made of calcium carbonate, can be found in various shapes and sizes in the lake sediments.

51/66

# Lake

INDICATOR **Bivalves**



## Material resource

Laboratory

## Human resource

Geochemist

## Description

Chemical analysis of bivalve shells can tell us how water temperatures changed over time.

52/66

# Lake

INDICATOR **Bivalves**



## Material resource

Laboratory

## Human resource

Geologist

## Description

Bivalve shells can be radiocarbon dated to tell us the age of the sediments.

You win 1 point for 'Longest history'

A bivalve shell found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



53/66

# Lake

INDICATOR **Bivalves**



## Material resource

Laboratory

## Human resource

Geochemist

## Description

Bivalve shells can be radiocarbon dated to tell us the age of the sediments.

You win 1 point for 'Longest history'

A bivalve shell found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



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# Lake

INDICATOR **Bivalves**



## Material resource

Laboratory

## Human resource

Geologist

## Description

Bivalve shells can be radiocarbon dated to tell us the age of the sediments.

### You win 1 point for 'Longest history'

A bivalve shell found in the deepest sediments was radiocarbon dated, showing that the lake sediments contain 7500 years of history.



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# Lake

INDICATOR **Present-day Flora**



## Material resource

Laboratory

## Human resource

Geochemist

## Description

In order to interpret data from the past in the sediment cores, we need to know about the present environment.

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# Lake

INDICATOR **Present-day Flora**



## Material resource

Laboratory

## Human resource

Biologist

## Description

In order to interpret data from the past in the sediment cores, we need to know about the present environment.

57/66

# Lake

INDICATOR **Present-day Flora**



## Material resource

Laboratory

## Human resource

Palynologist

## Description

In order to interpret data from the past in the sediment cores, we need to know about the present environment.

58/66

# Lake

INDICATOR **Lake water characteristics**



## Material resource

Multiparameter probe

## Human resource

Ecologist

## Description

In order to interpret data from the past in the sediment cores, we need to know about the present environment.

59/66

# Lake

INDICATOR **Lake water characteristics**



## Material resource

Multiparameter probe

## Human resource

Geologist

## Description

In order to interpret data from the past in the sediment cores, we need to know about the present environment.

60/66

# Lake

INDICATOR **Lake water characteristics**



## Material resource

Multiparameter probe

## Human resource

Biologist

## Description

In order to interpret data from the past in the sediment cores, we need to know about the present environment.

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# Lake

INDICATOR **Shape of the lake**



## Material resource

Field notebook

## Human resource

Geomorphologist

## Description

Studying the morphology of the lakes is the key to understanding how they formed.

62/66

# Lake

INDICATOR **Shape of the lake**



## Material resource

Digital elevation model

## Human resource

Geomorphologist

## Description

Studying the morphology of the lakes is the key to understanding how they formed.

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