Edgenuity

Warm-Up | Relative Dating

Lesson Question

What can rocks reveal about Earth's history?

Lesson Goals

Describe the law of superposition.

Explain how geologists determine the relative age of rocks.

Explain how fossils are used to date rocks.

Words to Know

Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.

B	unconformity	A. a comparison of the age of one thing to the age of another
C	absolute age	B. a gap in the geologic record of rock layers
A	relative age	C. the exact age of something
E	cross-cutting relationship	D. igneous rock that forms at Earth's surface as a result of the cooling of lava
F	principle of original horizontality	E. a principle that something has to be in existence before something can happen to it
D	extrusion	F. the principle that sedimentary rocks were originally formed in horizontal layers

© Edgenuity, Inc.

Warm-Up | Relative Dating

Words to Know

H	law of superposition	G. igneous rock that forms beneath Earth's surface as a result of the cooling of magma
I	index fossil	H. a geologic principle that states that in horizontal rock layers, each layer is younger than the one below it
G	intrusion	I. a type of fossil from an organism that lived for a short time that is widely distributed, is easy to recognize, and assists with relative dating

Fossils

Fossils are the [preserved] remains of living things.

- Remains from organisms are buried under sediment and harden into [rock].
- Fossils provide [evidence] of evolution and changes to Earth's surface and climate.

© Edgenuity, Inc.

Instruction | Relative Dating

Slide 2

Absolute Age

One way to determine the age of a rock is to find its **absolute age.**

- Absolute age is the number of [years] since a [rock] formed.

It is not always [possible] to find the absolute age of a rock.

Relative Age

Another way to determine the age of something is by finding its **relative age.**

- Relative age is a [comparison] of the ages of two things.
  - Does not provide an [exact] age
  - Describes age in terms of [older] or [younger]

The process of determining relative age is called relative [dating].

© Edgenuity, Inc.

Instruction | Relative Dating

Slide 2

Principle of Original Horizontality

The **principle of original horizontality** helps scientists determine [relative age].

- This principle states that [sedimentary] rocks were originally in horizontal layers.
- Rocks that are not in horizontal layers were shifted by some [geologic] event.

Law of Superposition

The **law of superposition** is a geologic [principle] that states that in [horizontal] rock layers, each layer is younger than the one [below] it.

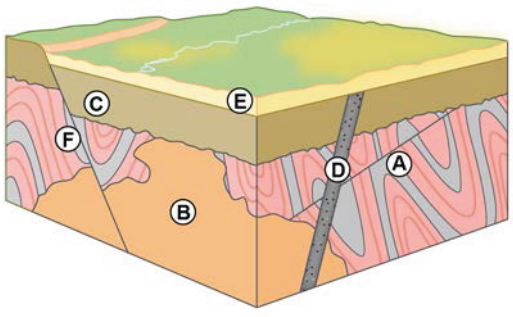
- This law is used to determine the relative ages of sedimentary [rock] layers.

Slide 5

Principle of Cross-Cutting Relationships

The principle of **cross-cutting relationships** helps determine relative age.

- This principle states that something has to be in [existence] before something can [happen] to it.



© Edgenuity, Inc.

Instruction | Relative Dating

Slide 5

Geologic Faults

A fault is a [crack] in Earth's [crust].

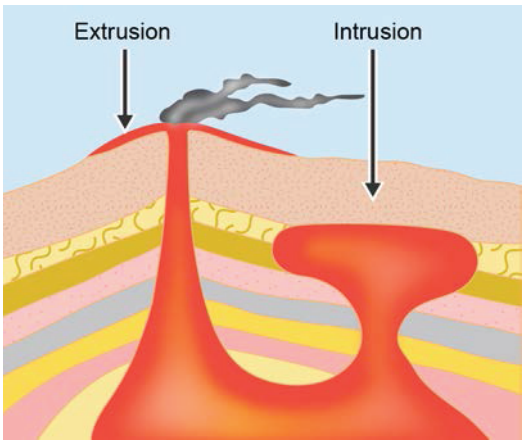
- Rocks along a fault [break] and [move].
- Faults are [younger] than the rocks that surround them.

It can be difficult to determine relative age because the rocks have moved.

Igneous Rock Formations

Igneous rocks are created by hot [molten] rock.

- [Intrusion] – igneous rock that forms beneath Earth's surface as a result of the cooling of magma
- [Extrusion] – igneous rock that forms at Earth's surface as a result of the cooling of lava



Igneous formations are younger than the [surrounding] rock.

© Edgenuity, Inc.

Instruction | Relative Dating

Slide 7

Gaps in Geologic Record

An [unconformity] causes gaps in the geologic record.

Unconformities occur for two reasons:

1. Rocks [erode], and [sediment] is deposited.
2. No sediment is [deposited] over a long time.

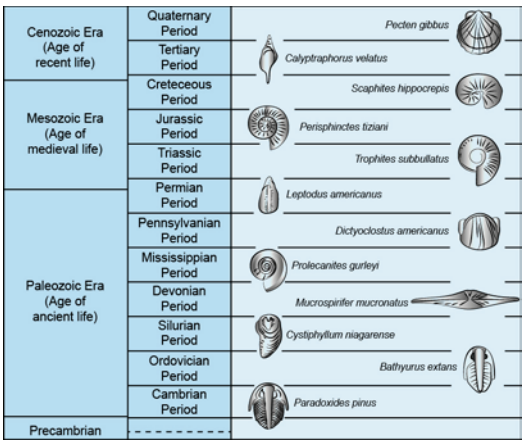
Slide 10

Index Fossils

Fossils that help with [relative] dating are called **index fossils.**

Index fossils formed from [organisms] that

- were alive for only a [short] period of geologic time.
- are extinct.
- had hard parts such as shells, bones, and teeth.
- lived across a wide [geographic] area.



© Edgenuity, Inc.

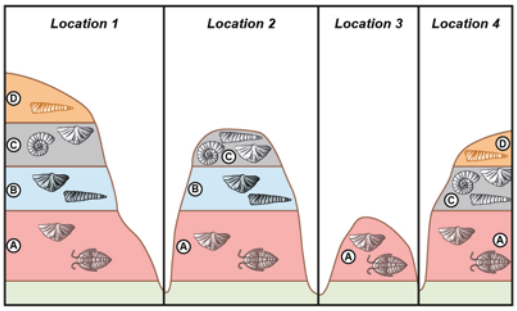
Instruction | Relative Dating

Slide 10

Relative Dating Using Index Fossils

Index fossils can help geologists compare rock [layers] at distant [locations].

- First, geologists give a relative age to a layer at one location.
- Index fossils help identify where [unconformities] may have occurred.
- Then that layer can be [compared] to other locations.



© Edgenuity, Inc.

Summary | Relative Dating

Lesson Question

What can rocks reveal about Earth's history?

Answer

(Sample answer) Rocks can contain fossils. The position of the fossils within rock layers provide evidence of evolution and the environment in which those organisms lived. The rocks and their position in layers also indicate changes to Earth's surface and climate.

Slide 2

Review: Key Concepts

Geologists use the [position] of rock layers to determine the relative age of rocks.

Principle of Original Horizontality	Law of Superposition	Principle of Cross-cutting Relationships	Unconformities
• Sedimentary rocks were originally in horizontal layers.	• In horizontal layers, the oldest layer is at the bottom.	• Faults and igneous intrusions and extrusions are younger than the rock they cut through.	• Deposition of sediment stops, erosion occurs, and then deposition resumes.

© Edgenuity, Inc.

Summary | Relative Dating

Slide 2

Review: Key Concepts

Fossils can be used to assign relative ages to rock layers at different locations.



- Determine the relative age of a layer of rock at one location.
- Identify index fossils of organisms that were alive for a short period and had widespread distribution.
- Use index fossils to define how layers at different locations relate to one another.

Use this space to write any questions or thoughts about this lesson.

© Edgenuity, Inc.