Effect of Geosphere

Page 70, 74

1	Identify how the geosphere interacts with Earth's other systems.		Unit 3 Page 70	1
2	Identify how the geosphere interacts with Earth's other systems.		Unit 3 Page 70	2
3	Identify how the geosphere interacts with Earth's other systems.		Unit 3 Page 74	3

1.	Describe molten lava.
2.	Explain how islands are formed.
3.	What are minerals?

Hydrosphere

Sea
Ocean

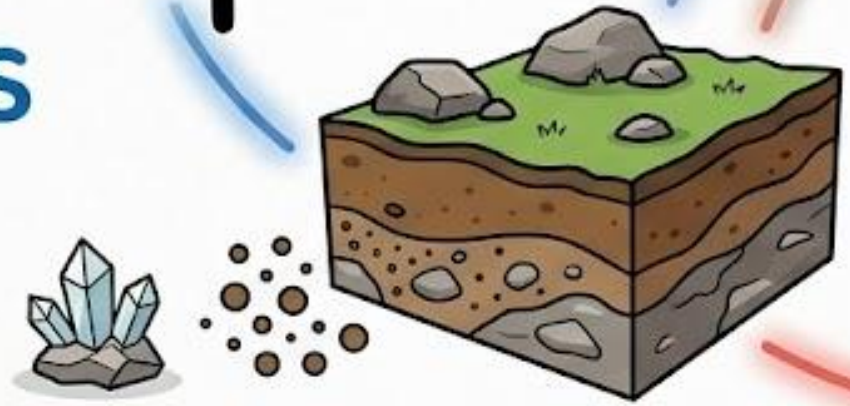
[water]

Atmosphere

air
clouds

Geosphere

rocks
Soil



Biosphere

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

Textbook - 63

5 minutes

Three friends were talking about the solid parts of Earth. They each had different ideas about where Earth's rock, soil, and sediments are found. This is what they said:

Francis: *I think the solid materials on Earth are found on land.*

Portia: *I think the solid materials on Earth are found under the oceans.*

Trent: *I think the solid materials on Earth are found on land and under the oceans.*

Who do you agree with most?

Explain why you agree.

You will revisit the Page Keeley Science Probe later in the lesson.

The Solid Earth

Vocabulary

Textbook Page - 70

Molten Rock

Very hot melted rock

Vocabulary

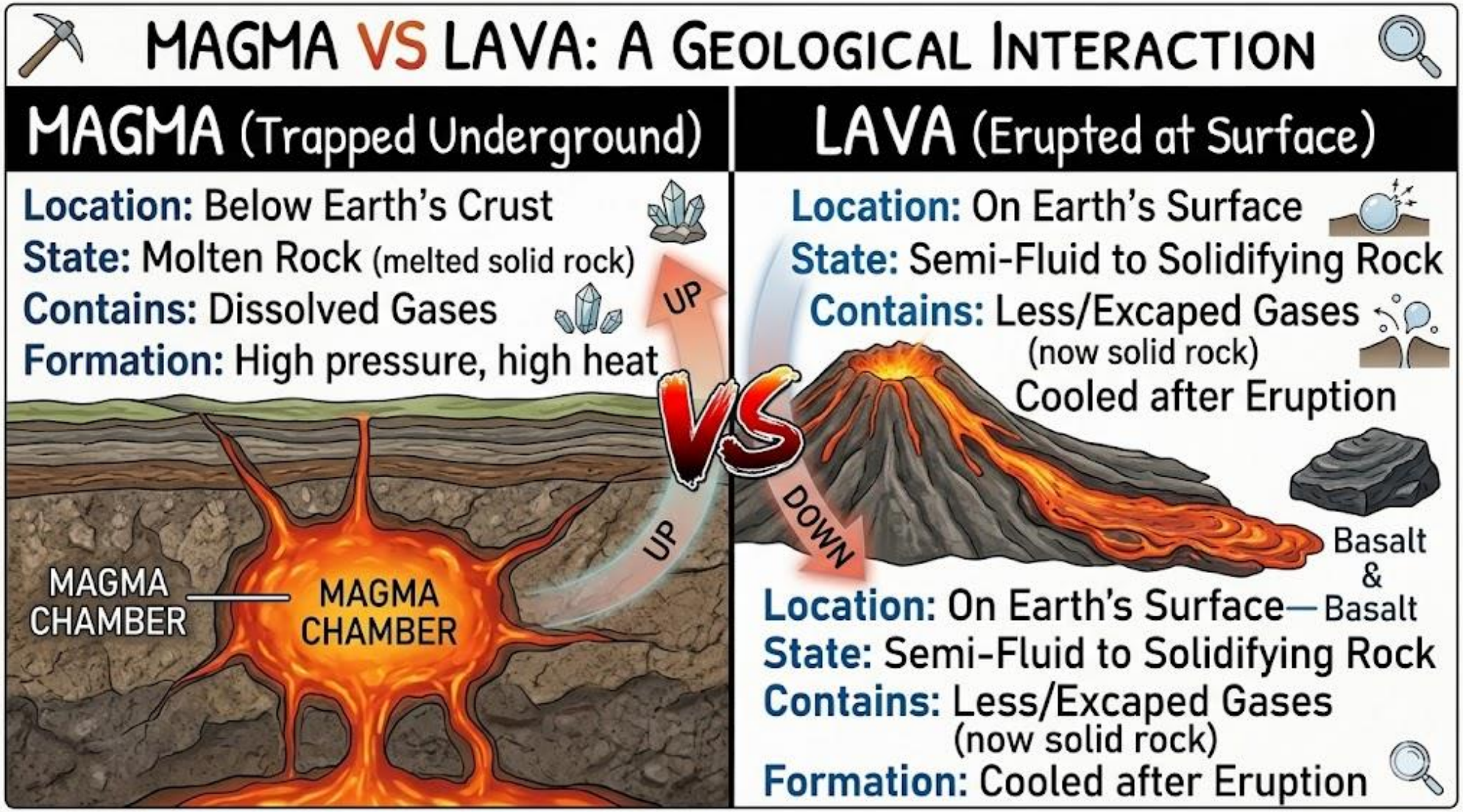
Textbook Page - 70

Lava

molten or semi-fluid rock (magma) that has broken through the Earth's surface.

Vocabulary

Textbook Page - 70

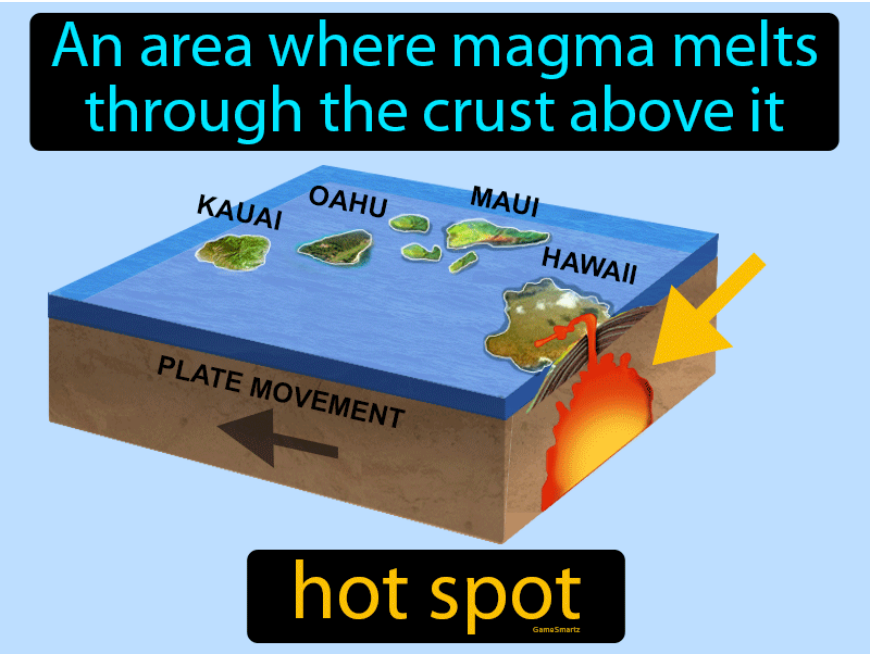


Vocabulary

Textbook Page - 70

HOT SPOT

Area where molten rock from deep within the mantle breaks through the Earth's crust

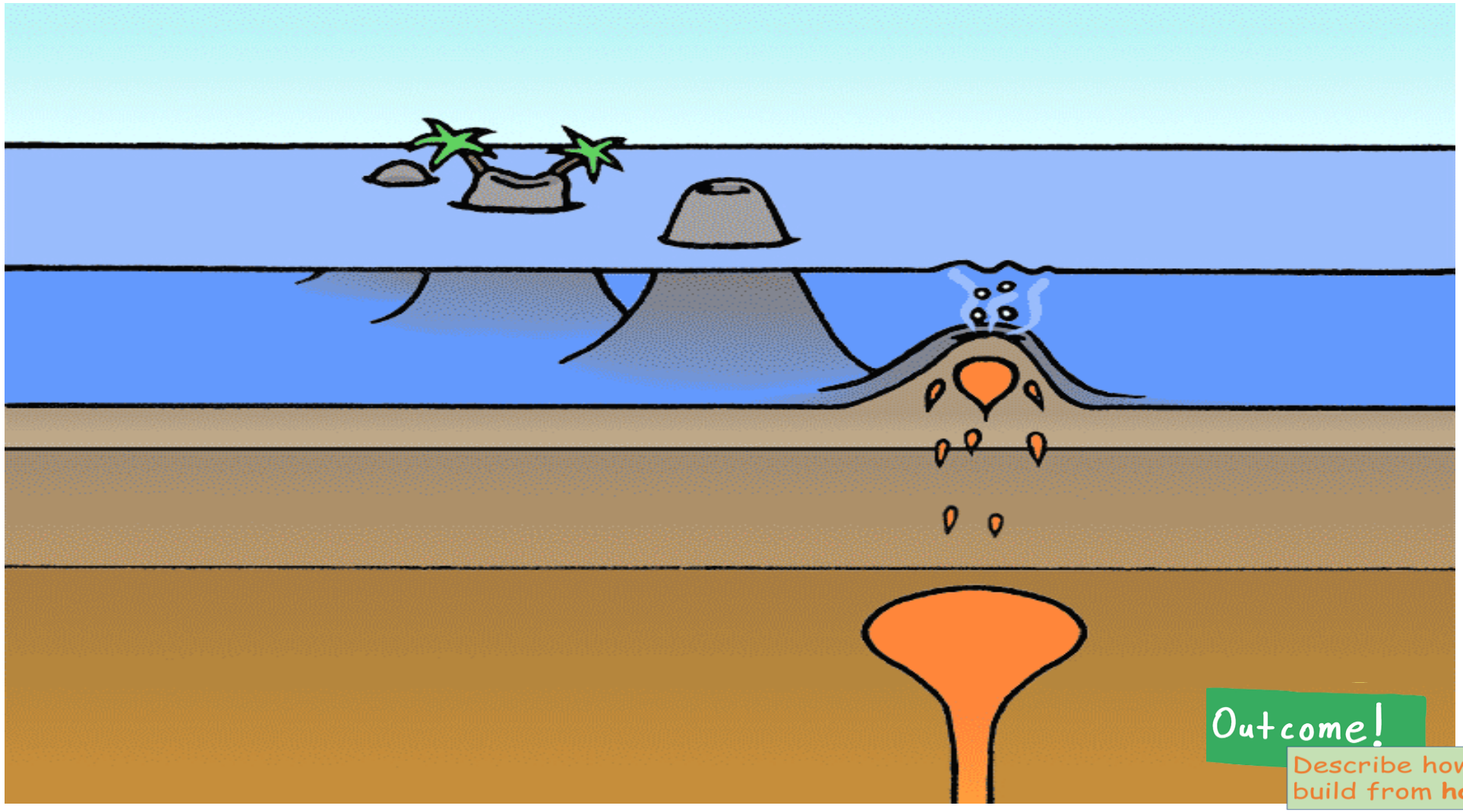


Class itinerary
Starter
Outcomes
Vocabulary
Explanation
Exit card

Features of the Geosphere

Textbook Page - 70

Island building



Outcome!

Describe how **island** build from **hot spot**

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

Features of the Geosphere

Textbook Page - 70

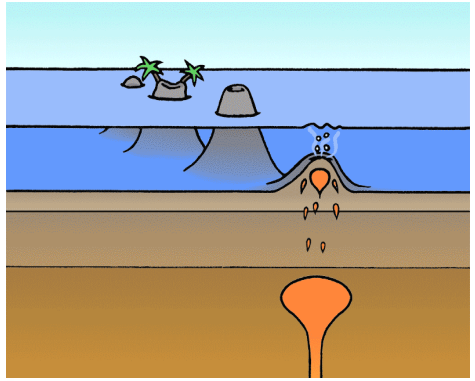
Island building

Outcome!

Describe how **island** build from **hot spot**

Island Building

The Hawaiian Islands in the Pacific Ocean rest on a slowly moving plate. As it moves, the plate passes over a **hot spot**. A hot spot is an area where molten rock from deep within the mantle breaks through to the Earth's crust. Over millions of years, lava erupting from the underwater hot spot formed a mountain. Eventually, the mountain grew taller than the ocean's surface and became a volcanic island. As the plate moved, the island moved away from the hot spot, and a new island formed.



Lava erupting → Mountain → Mountain grew taller → Volcanic island

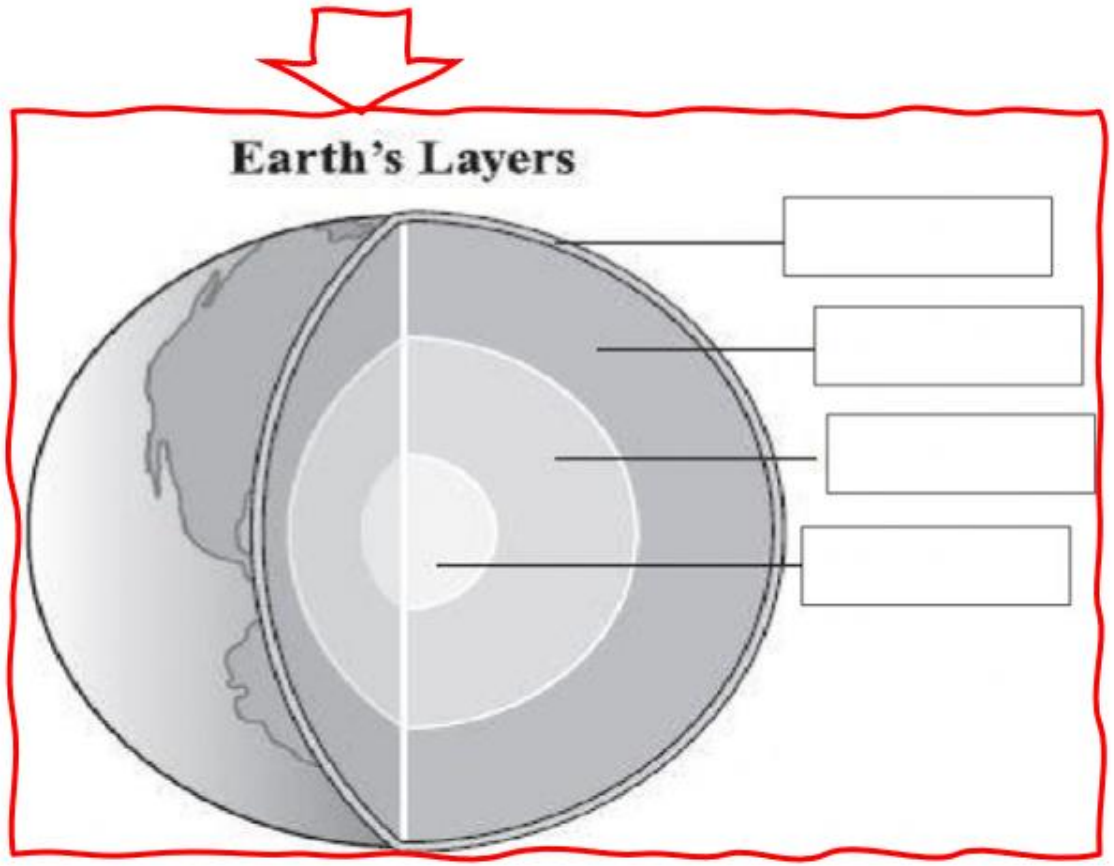
Plenary

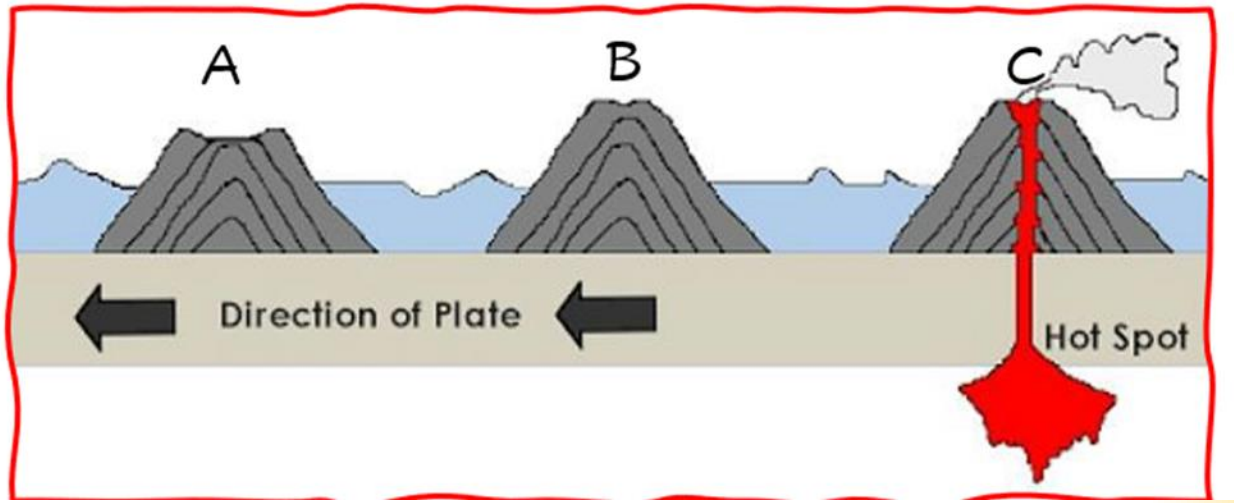
Features of the Geosphere

Textbook Page 70

5minutes

Crust,
inner Core,
Outer Core,
Mantle





The oldest island is ------

The youngest island is ----

Island created because of -------

Put (Island Formation process) in correct arrange:

( ) Mountain

( ) Lava eruption

( ) Volcanic island

( ) Mountain grew taller

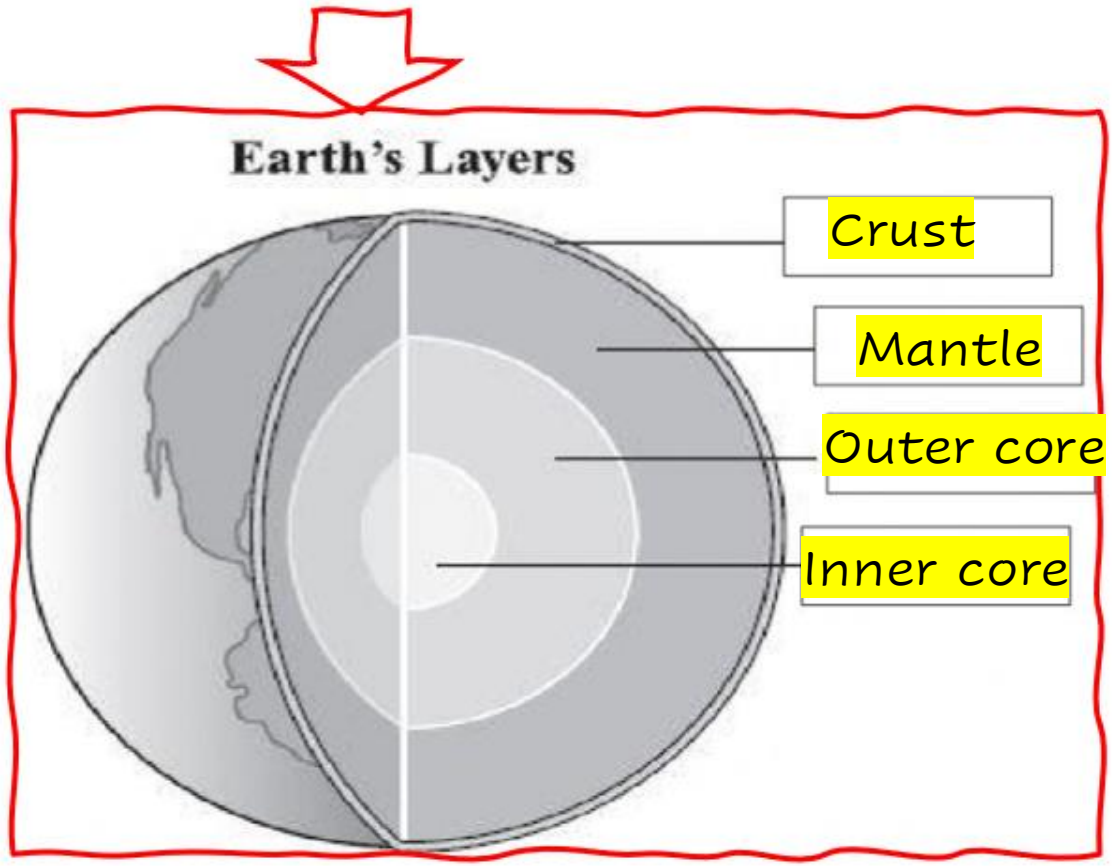
Plenary

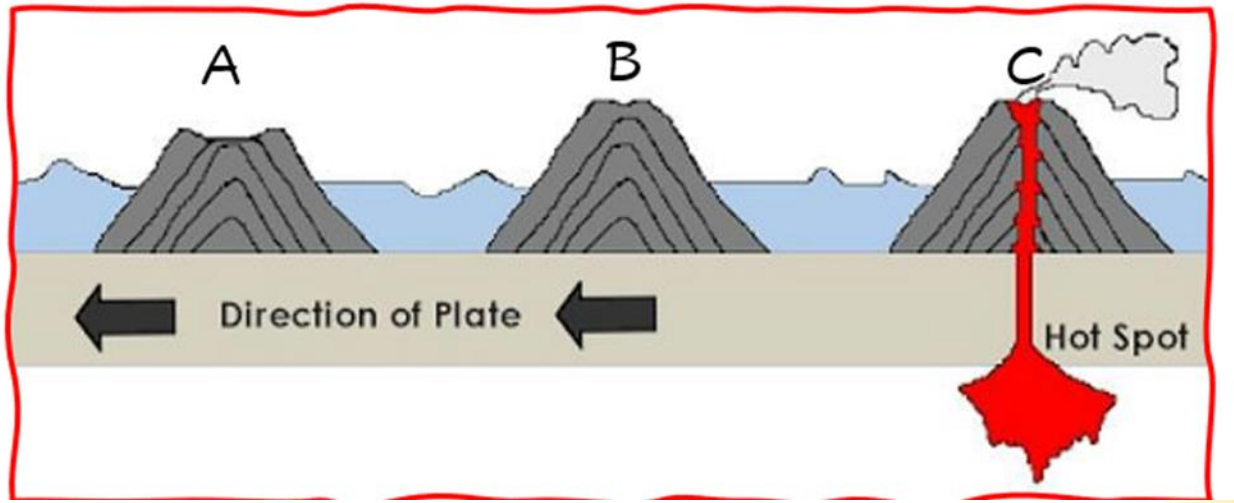
Features of the Geosphere

Textbook Page 70

5minutes

Crust,
inner Core,
Outer Core,
Mantle





The oldest island is ------ A

The youngest island is ---- C

Island created because of -- Hotspot

Put (Island Formation process) in correct arrange:

(2) Mountain → (1) Lava eruption → (4) Volcanic island → (3) Mountain grew taller

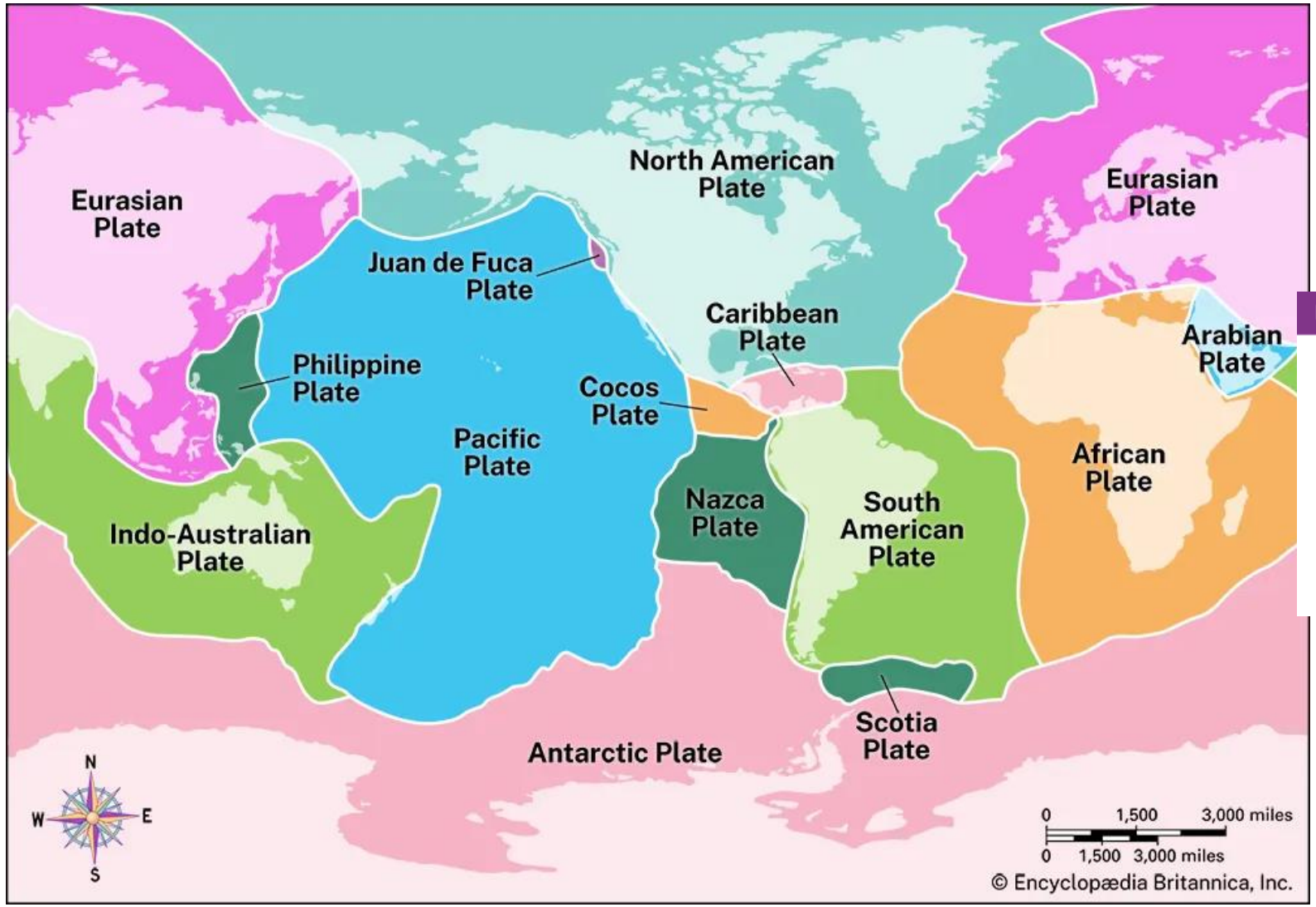
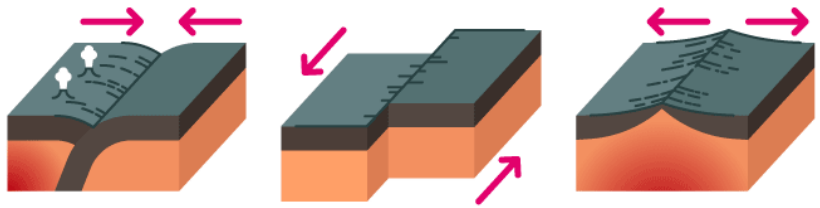


PLATE TECTONICS

BYJU'S The Learning App



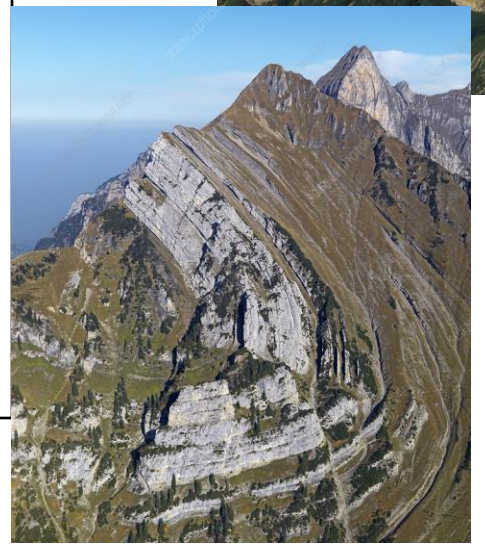
Subduction | Lateral sliding | Spreading

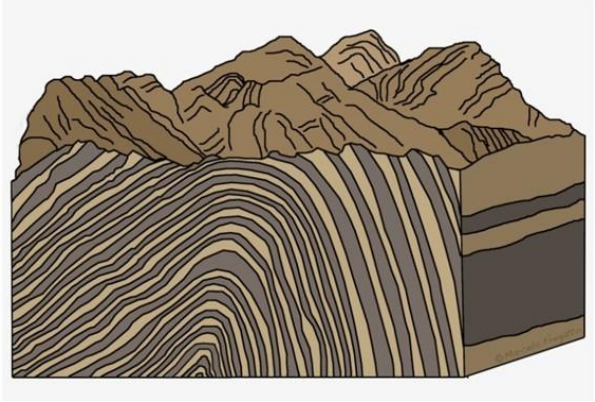
Vocabulary

Textbook Page - 71

Folded Mountain

created where two of Earth's tectonic plates are **pushed** together



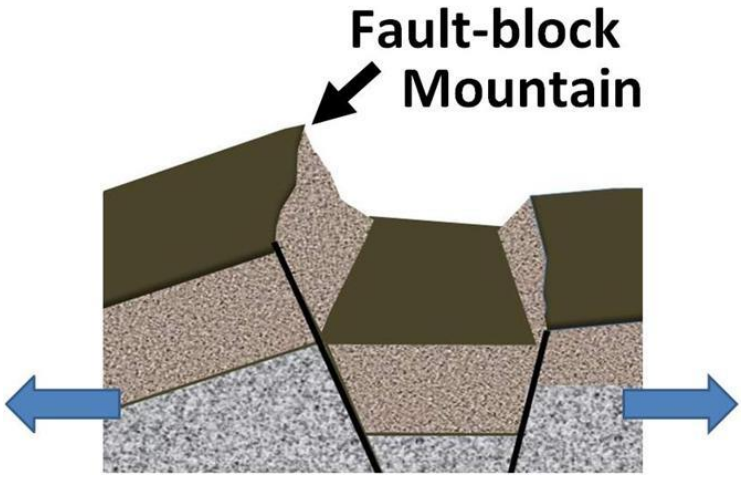


Vocabulary

Textbook Page - 71

Fault- block Mountain

created where two of Earth's tectonic plates are **pulled** away from each other



Class itinerary

Starter

Outcomes

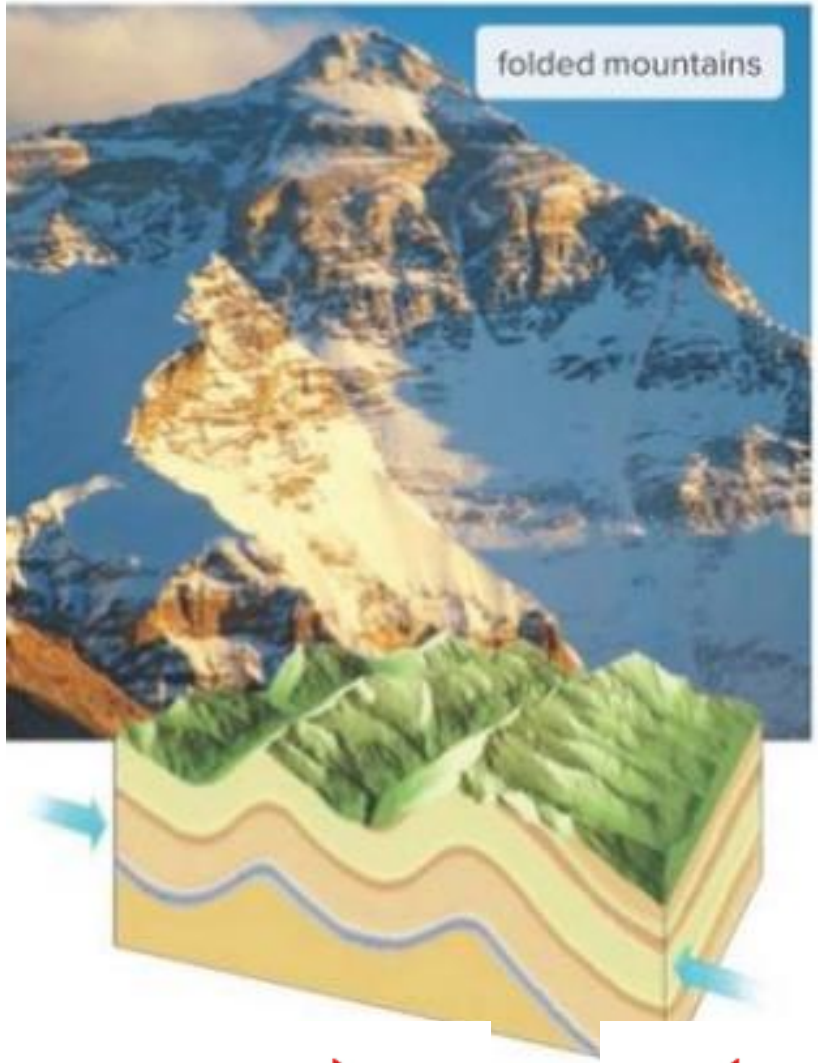
Vocabulary

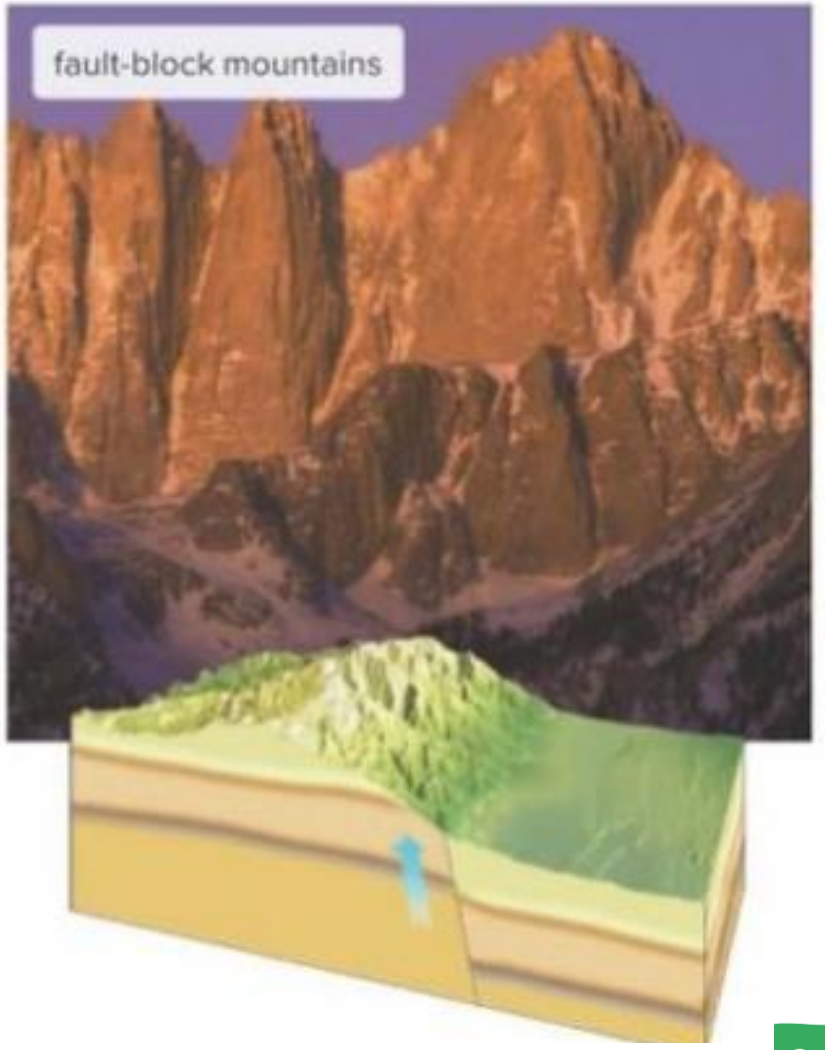
Explanation

Exit card

Features of the Geosphere

Textbook Page - 70





Outcome!

Relate plate tectonic process to **mountain** formation

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

Features of the Geosphere

Textbook Page - 70

Mountains

You have learned that huge plates of solid rock lie beneath the continents and ocean floor. These plates can move, which results in mountain building, earthquakes, and volcanoes.

Tension is a force that pulls things apart. It moves [illegible] can also be moved by pushing forces. When plate[illegible]r, the crust is forced upward, producing folded mountains.

The Himalayas in the Eastern Hemisphere are folded mountains. They began forming millions of years ago as India and Asia collided. As the plates continue to push into each other, the Himalayas grow about 5 millimeters (0.2 in.) taller every year.

Pushing Force → Folded Mountain

Tension Force (Pull) → Fault-block Mountain

Outcome!

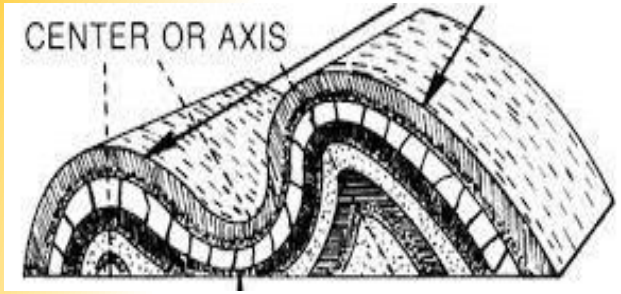
Relate plate tectonic process to **mountain** formation

Plenary

10 minutes

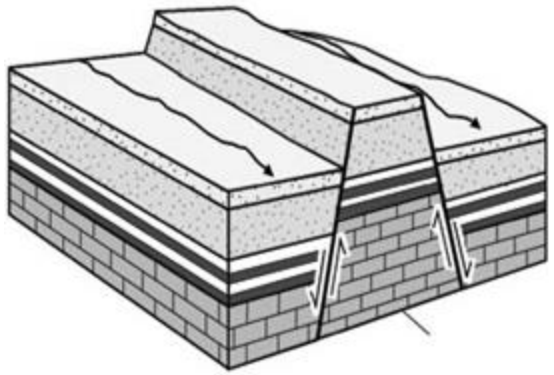
Mountains

Textbook Page 71



( )

Mountain



( )

Mountain

Pushing Force
( )

( )
Mountain

Example:

Pull Force
( )

( )
Mountain

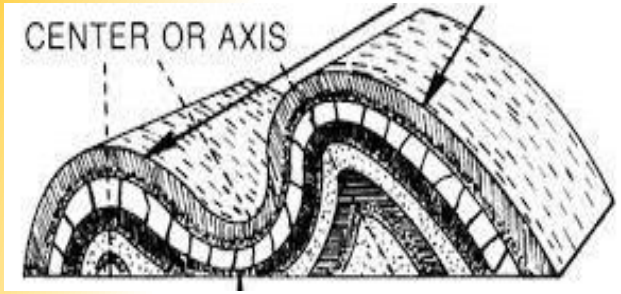
Example

Plenary

10 minutes

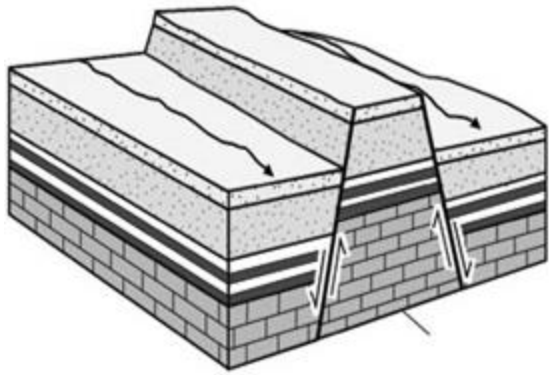
Mountains

Textbook
Page 71



(Folded)

Mountain



(Fault -block)

Mountain

Pushing Force
(Colloid)

(Folded)
Mountain

Example:
Himalaya

Pull Force
(Tension)

(Fault -block)
Mountain

Example
Sierra Nevada

Vocabulary

Textbook Page - 74

Soil

is a mixture of sand, silt, clay, nonliving plants and animal material and minerals **support life**

Living things + nonliving things

Vocabulary

Textbook Page - 73

Minerals

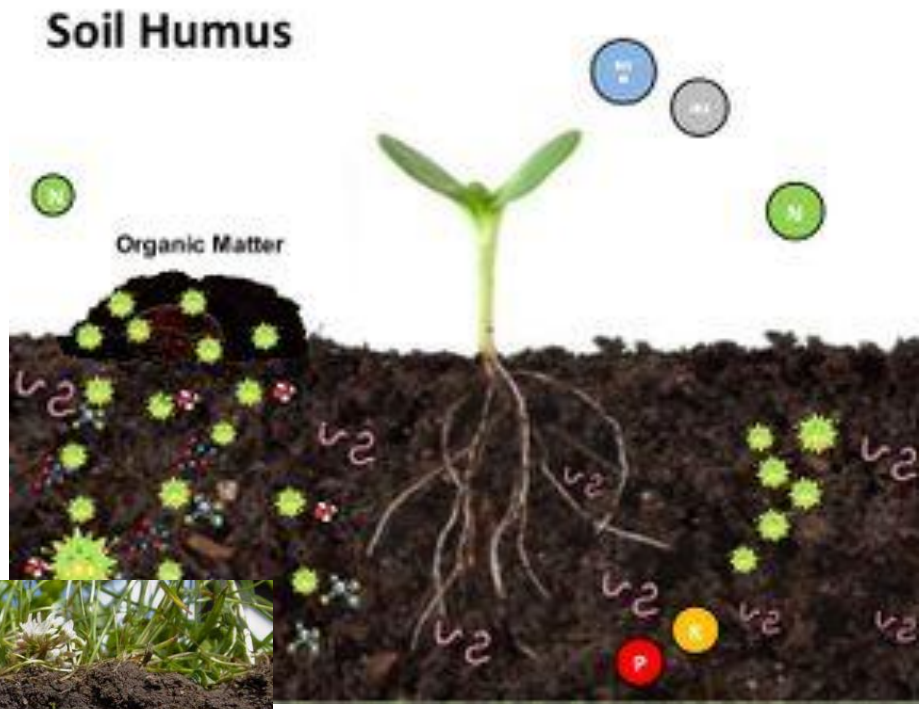
Solid, nonliving substances found in nature.

Vocabulary

Textbook Page - 73

Humus

A dark-brown or black organic substance made up of decayed plant or animal matter



Class itinerary

Starter

Outcomes

Vocabulary

Explanation

Exit card

Earth's Soil

5 minutes

Textbook Page - 74

If soil is wet it will be more plastic or "sticky".

- What is the difference between these soil?
- **Does they behave the same?**

Outcome!

- Identify **soil**
- Classify **soil types** according to soil ability in supporting life

Class itinerary

Starter

Outcomes

Vocabulary

Explanation

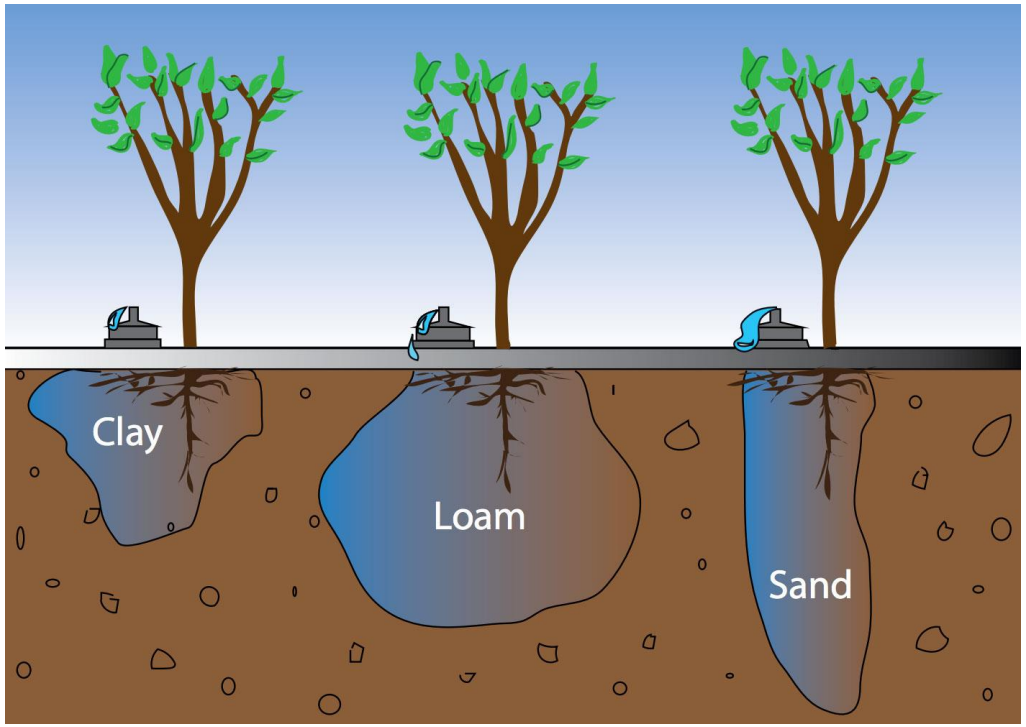
Exit card

Earth's Soil

5 minutes

Textbook Page - 74

Different types of soil have different properties. Soils can be different colors. They can also have particles of different sizes. Various types of soil behave differently when you add water. Sandy soils hold very little water while medium-textured soils soak up water and hold air very well. Remember, many plants need to grow in soil. The different properties of soil result in different groups of plants being able to grow.



Holding water	High Hold water	Hold water	Poor hold water
Air	**poor air**	**good air**	**high air**

- What is the difference between these soil?
- **Does they behave the same?**

Outcome!

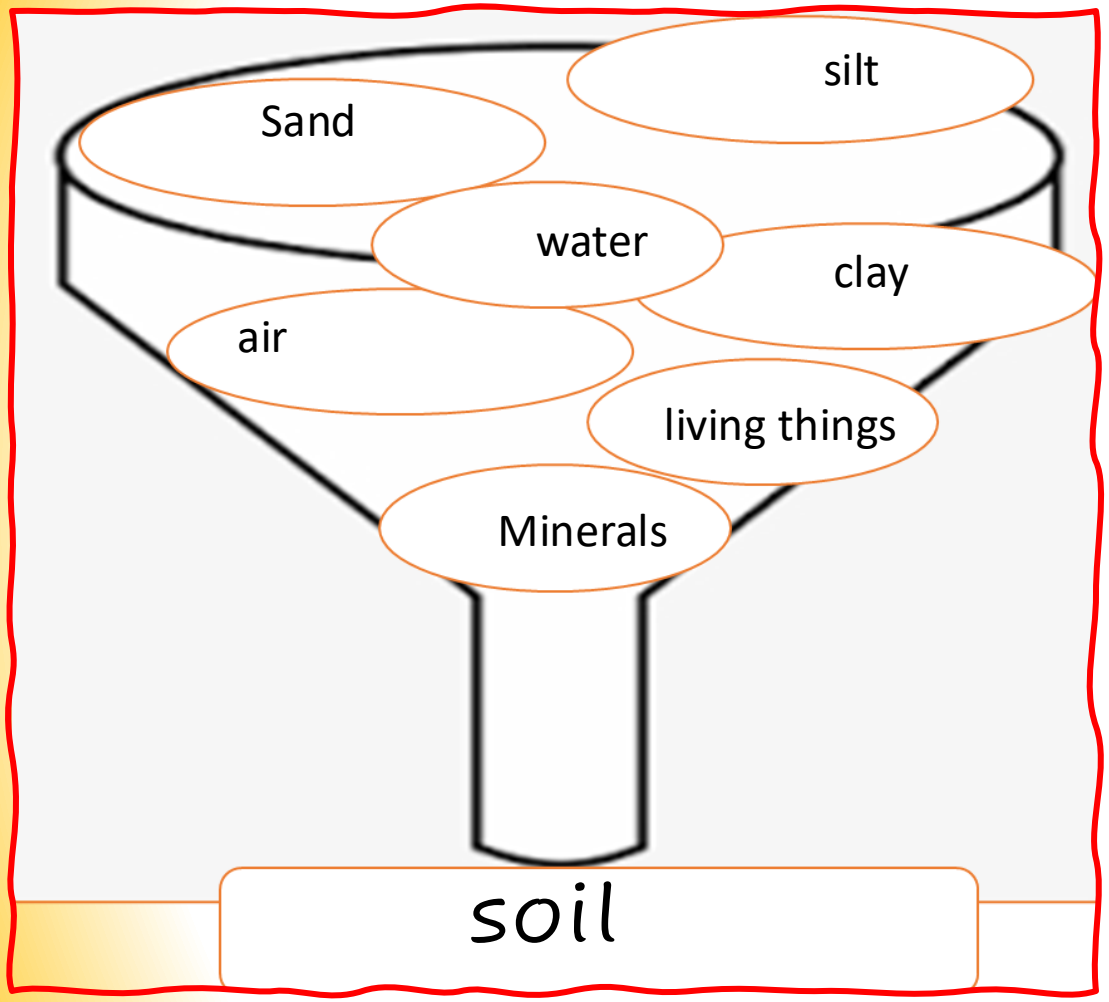
- Identify **soil**
- Classify **soil types** according to soil ability in supporting life

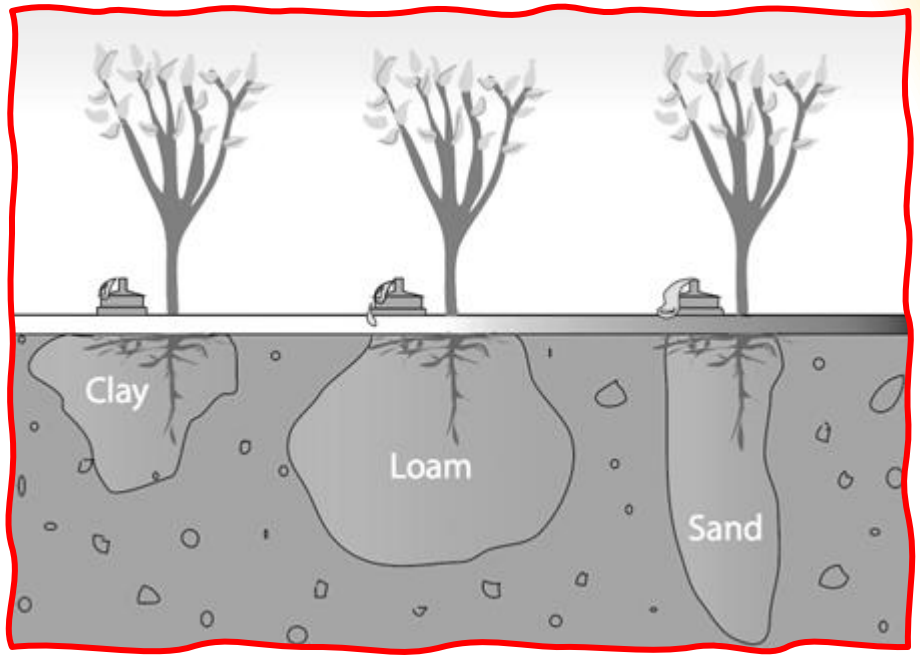
Plenary

SOIL

5minutes

Textbook Page 74





Soil	**Clay**	**Loam**	**Sand**
Holding water	High Hold water	Hold water	Poor hold water
Air	**poor air**	**good air**	**high air**
Plants	**Grapes, watermelon**	**Crops**	**Desert plants**

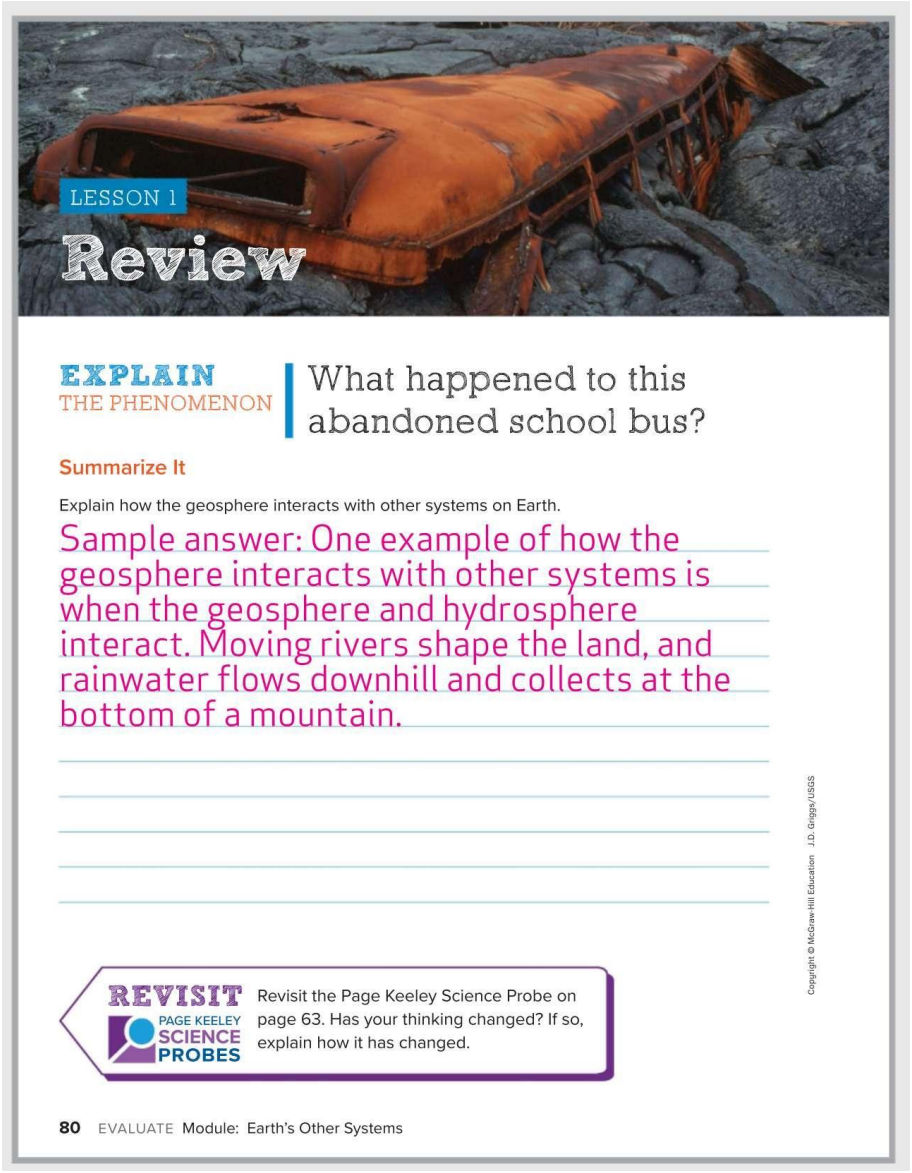
Outcome!

- Identify **soil**
- Classify **soil types** according to soil ability in supporting life

Lesson 4 review

10 minutes

Textbook
Page - 80



LESSON 1

Review

EXPLAIN THE PHENOMENON | What happened to this abandoned school bus?

Summarize It

Explain how the geosphere interacts with other systems on Earth.

Sample answer: One example of how the geosphere interacts with other systems is when the geosphere and hydrosphere interact. Moving rivers shape the land, and rainwater flows downhill and collects at the bottom of a mountain.

REVISIT PAGE KEELEY SCIENCE PROBES Revisit the Page Keeley Science Probe on page 63. Has your thinking changed? If so, explain how it has changed.

REVIEW

Three dimensional thinking ?

25 minutes

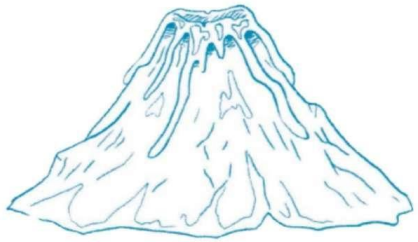
Textbook
Paae -81-82

Three-Dimensional Thinking

1. Explain one of the interactions of the geosphere and another one of Earth's systems that you learned about in the lesson. Include how this interaction results in change over time.

2. Which is an example of a process in the geosphere that causes slow changes?

- earthquakes
- glaciers
- volcanoes
- landslides



Extend It

OPEN INQUIRY

The geosphere includes the ocean floor. Over ninety-five percent of the ocean floor has not been explored by humans. Ask a question about the ocean floor that you would like to know the answer to. Use multimedia to organize your research and present it to the class.

Make a plan to research the answer to your question.
Record your research below.

KEEP PLANNING

STEM Module Project
Science Challenge

Now that you have learned about the effects of the geosphere, go to your Module Project to explain how the information will affect your design of a desert oasis.

🌋 Part 1: Molten Lava & Its Behavior (Outcomes 1)

Q1. What is molten rock called while it is still trapped completely beneath Earth's surface?

- A) Lava
- **B) Magma**
- C) Mineral
- D) Crust

Q2. Which of the following best describes the physical state of lava as it flows out of a volcano?

- A) Completely solid crystalline rock
- **B) Molten or semi-fluid liquid rock**
- C) High-pressure vapor gas
- D) Decayed organic matter

Q3. What happens to the temperature of molten lava after it breaks through the Earth's crust into the open air?

- A) It stays hot indefinitely because of atmospheric pressure.
- B) It heats up even more due to oxygen in the air.
- **C) It loses heat to the cooler environment and begins to drop in temperature.**
- D) It immediately drops to 0°C.

🌋 Part 1: Molten Lava & Its Behavior (Outcomes 1)

Q4. When molten lava cools down completely and solidifies on Earth's surface, it transforms into:

- A) Liquid water bodies
- B) Loose organic soil
- **C) Solid igneous rock**
- D) Atmospheric clouds

Q5. In what temperature range does molten lava typically flow when it erupts?

- A) 0°C to 100°C
- B) 200°C to 500°C
- **C) 700°C to 1,200°C**
- D) 5,000°C to 10,000°C

Q6. Lava erupting onto Earth's surface represents a massive mass transfer from the interior of the planet. This directly adds fresh material to which Earth sphere?

- A) Atmosphere
- B) Biosphere
- **C) Geosphere**
- D) Hydrosphere

🏝️ Part 2: How Volcanic Islands Form (Outcome 2)

Q7. Where do the volcanic eruptions that build oceanic islands begin?

- A) High up in the atmospheric clouds
- **B) On the ocean floor (deep underwater)**
- C) On dry continental landmasses
- D) In the biosphere's forest canopies

Q8. Which sequence correctly explains how a brand new volcanic island is formed from scratch?

- A) Ocean water evaporates, leaving behind salt pillars that form dry land.
- B) Severe wind storms pile up sand dunes until they break the water's surface.
- **C) Underwater eruptions pile up layers of cooled lava over time until the rock breaks the ocean surface.**
- D) Earthquakes break continental pieces off and pull them into deep oceans.

Q9. When an underwater volcano pours out lava directly into ocean water, what happens to that lava almost instantly?

- A) It stays liquid forever because it is underwater.
- B) It dissolves completely into the saltwater.
- **C) It cools down rapidly and hardens into solid rock.**
- D) It boils away the entire ocean layer.

🏝️ Part 2: How Volcanic Islands Form (Outcome 2)

Q10. The Hawaiian Islands are an excellent real-world example of which geological process?

- A) Glacial ice deposits melting away
- **B) Shield volcanoes building up from the ocean floor over a hotspot**
- C) Ancient trees petrifying into rock structures
- D) Wind erosion carving out deep continental valleys

Q11. Why does it usually take a very long time (often thousands or millions of years) for a volcanic island to appear above the waves?

- A) Lava flows move fast but dissolve back into water easily.
- **B) The ocean is incredibly deep, so many successive layers of erupted lava must stack up first.**
- C) Volcanoes only erupt once every million years.
- D) The atmosphere keeps pushing the rock back down.

Q12. If a volcanic island stops erupting completely,

🏝️ Part 2: How Volcanic Islands Form (Outcome 2)

Q12. If a volcanic island stops erupting completely, what natural process will slowly work to shrink its size or wear it back down over time?

- **A) Weathering and erosion by ocean waves and rain**
- B) Tectonic rising of the island landmass
- C) Continuous accumulation of more lava
- D) Photosynthesis by new plant life

Q13. Which of the following is the most accurate definition of a mineral?

- A) A liquid liquid mixture made up of decayed plant roots.
- **B) A naturally occurring, inorganic solid with a definite chemical composition and crystalline structure.**
- C) A man-made plastic compound used to build structures.
- D) Any type of organic soil that holds water well.

🏝️ Part 3: what is minerals (Outcome 3)

Q14. What does the term "inorganic" mean when describing the properties of a mineral?

- A) The mineral can grow and reproduce under the right conditions.
- B) The mineral must contain liquid water components.
- **C) The mineral is non-living and was not formed by living organisms.**
- D) The mineral was created inside a modern scientific laboratory.

Q15. How do minerals relate to the rocks found within the geosphere?

- A) Rocks are made out of living organisms, while minerals are made of water.
- **B) Minerals are the fundamental building blocks that combine to form rocks.**
- C) Rocks turn into minerals when they get wet.
- D) There is no structural connection between rocks and minerals.

🏝️ Part 3: what is minerals (Outcome 3)

Q16. Quartz, feldspar, and diamond are all examples of what?

- A) Volcanic lava variations
- B) Types of organic soil components
- **C) Naturally occurring minerals**
- D) Atmospheric gases

Q17. Why is a piece of wood or a leaf NOT considered a mineral?

- A) Because they are found on dry land.
- **B) Because they are organic materials created by living organisms.**
- C) Because they do not contain any atoms.
- D) Because they are made out of solid rock.

Q18. Which structural characteristic gives a mineral its distinct crystal shape?

- A) The color of the volcano it erupted from
- **B) The neat, orderly internal arrangement of its atoms**
- C) The amount of organic water trapped inside it
- D) How sticky it becomes when mixed with soil

🔄 Part 4: Integrated System Questions (Synthesis)

Q19. Read the statements from your science probe lesson slide:

Francis says solid rock materials are only found on land.

Portia says solid rock materials are only found under the oceans.

Trent says solid rock materials are found on land AND under the oceans. **Which friend is completely correct based on your class material?**

- A) Francis
- B) Portia
- **C) Trent**
- D) None of them are correct.

Q20. When minerals inside solid rock are slowly broken down by rain and plant roots into fine particles, they mix with decayed organic matter to create:

- A) Molten lava
- B) Deep magma chambers
- **C) Earth's soil**
- D) Atmospheric air