كل ما يحتاجه الطالب في جميع الصفوف من أوراق عمل واختبارات ومذكرات، يجده هنا في الروابط التالية لأفضل مواقع تعليمي إماراتي 100 %

تطبيق المناهج الإماراتية | الاجتماعيات | الرياضيات

الصفحة الرسمية على التلغرام | الاسلامية | العلوم

الصفحة الرسمية على الفيسبوك | الانجليزية

التربية الاخلاقية لجميع الصفوف | اللغة العربية

التربية الرياضية

مجموعات التلغرام.	مجموعات الفيسبوك	قنوات تلغرام	قنوات الفيسبوك
الصف الأول	الصف الأول	الصف الأول	الصف الأول
الصف الثاني	الصف الثاني	الصف الثاني	الصف الثاني
الصف الثالث	الصف الثالث	الصف الثالث	الصف الثالث
الصف الرابع	الصف الرابع	الصف الرابع	الصف الرابع
الصف الخامس	الصف الخامس	الصف الخامس	الصف الخامس
الصف السادس	الصف السادس	الصف السادس	الصف السادس
الصف السابع	الصف السابع	الصف السابع	الصف السابع
الصف الثامن	الصف الثامن	الصف الثامن	الصف الثامن
الصف التاسع عام	الصف التاسع عام	الصف التاسع عام	الصف التاسع عام
الصف التاسع متقدم	الصف التاسع متقدم	الصف التاسع متقدم	تاسع متقدم
الصف العاشر عام	الصف العاشر عام	الصف العاشر عام	عاشر عام
الصف العاشر متقدم	الصف العاشر متقدم	الصف العاشر متقدم	عاشر متقدم
الحادي عشر عام	الحادي عشر عام	الحادي عشر عام	حادي عشر عام
الحادي عشر متقدم	الحادي عشر متقدم	الحادي عشر متقدم	حادي عشر متقدم
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ثاني عشر متقدم	الثاني عشر متقدم	ثاني عشر متقدم	ثاني عشر متقدم

UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

YEAR OF TOLERANCE

TEACHER EDITION

2018 - 2019

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United Arab Emirates Edition

8

Activity Lab Manual

2019
عام التسامح

عام زايد 2018

فخر الوطن

مجموعات فخر الوطن وعام زايد

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Answer Key

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Integrated Science

United Arab Emirates Edition

GRADE 8 VOLUME 3

Activity Lab Manual

مجموعات فخر الوطن وعام زايد

Mc Graw Hill Education

Brief Contents

Lesson 1 Earthquakes

Scan *Lesson 1. In your Science Journal, write three questions that you have about earthquakes. Try to answer your questions as you read.*

Main Idea — Details

What are earthquakes?

Define earthquakes.

vibrations in the ground that result from movement along breaks in Earth's lithosphere

Where do earthquakes occur?

Summarize *the distribution of* earthquakes *on Earth.*

Most earthquakes occur in the oceans and along the edges of continents.

Categorize *information about the relationship between* earthquake *events and* plate boundaries.

Boundary Type	Depth of Earthquake	Other Details Sample answers
Convergent boundaries	very deep	most devastating earthquakes
Divergent boundaries	shallow	occur along the mid-ocean ridge system
Convergent boundaries involving two continents	varying depths	can result in the formation of large, deformed mountain ranges

Illustrate *rock deformation, and write a short description of how this process works.*

Drawing	Description
Drawings should show a rock bending but not breaking.	Continuous force applied to a body of rock can cause the rock to change shape. This change can eventually result in the breaking of the rock.

Main Idea

Details

Describe *each type of* fault.

Type of Fault	Description	Location
Strike-slip	Blocks slide horizontally past each other in opposite directions.	transform plate boundaries
Normal	Forces pull blocks apart. One block drops relative to the other.	divergent plate boundaries
Reverse	Forces push blocks together. One block is uplifted relative to the other.	convergent plate boundaries

Distinguish *between an* earthquake's focus *and its* epicenter.

Sample answer: The focus is the location where rocks first move along a fault. The epicenter is the location on Earth's surface directly above the focus.

Seismic Waves

Compare *the 3 types of* seismic waves. *Provide at least three details about each type.*

Type of Fault	Description Sample answers are shown.
Primary waves (P-waves)	cause rock particles to vibrate in same direction as waves travel; fastest waves; travel through solids and liquids
Secondary waves (S-waves)	cause rock particles to vibrate perpendicular to direction waves travel; speed between p-waves and surface waves; detected after p-waves; travel through solids only
Surface waves	cause rock particles to move in a rolling motion in same direction as waves travel; slowest waves; cause most surface damage

Main Idea

Mapping Earth's Interior

Sample answers are shown.

Details

Identify *what scientists have discovered about Earth's interior by studying* seismic waves.

Inner and outer core: The outer core is liquid, and the inner core is solid. The inner and outer cores are made mostly of iron and nickel.

Mantle: Using wave speed differences, scientists have been able to map convection currents in the mantle.

Distinguish *between a* seismometer *and a* seismogram.

Seismometer	Seismogram
A seismometer measures ground motion and the distance and direction that seismic waves move.	The motion is recorded in a graphical illustration called a seismogram.

Sequence *the steps followed in locating an* earthquake's epicenter.

Find the arrival time difference.

Determine the number of seconds between the appearance of the first P-wave and the first S-wave on the seismogram.

Find the distance to the epicenter.

Use a graph to determine distance. Find the time difference on the y-axis. Read the distance from the epicenter on the x-axis.

Plot the distance on the map.

Draw a circle around the seismometer location so that all points are the same distance from the station determined in Step 2.

Repeat these steps for at least two more seismometer locations. The epicenter is the point where the three circles intersect.

Main Idea

Determining Earthquake Magnitude

Details

Compare and contrast *the Richter magnitude scale, the moment magnitude scale, and the Modified Mercalli scale.*

Richter Magnitude Scale

The scale uses the amount of ground motion at a given distance from an earthquake to determine magnitude.

All
Measure the size, or intensity, of an earthquake

Moment Magnitude Scale

Measures the total amount of energy released by an earthquake; energy released depends on:

1. the size of the fault;
2. the motion that occurs;
3. the strength of the rocks.

Modified Mercalli Scale

Measures the amount of damage that results from shaking
Determined based on descriptions of effects

Scale ranges from I to XII

Record *four indicators that* seismologists *use to determine* earthquake *risk.*

1. past earthquake activity
2. geology around a fault
3. population density
4. types of buildings in an area

Analyze It Explain why two different earthquakes with the same Richter magnitude sca readings could have very different Modified Mercalli scale numbers.

Sample answer: The Mercalli scale is based more on damage, which can depend on hou buildings were constructed or the density of the population, rather than actual ground movement measured by the Richter scale.

Lesson 2 Volcanoes

Predict *three facts that will be discussed in Lesson 2 after reading the headings. Record your predictions in your Science Journal.*

Main Idea

What is a volcano?

Details

Define volcano. *Include in your definition the term for the molten rock beneath Earth's surface.*

Sample answer: A volcano is a vent in Earth's crust through which melted, or molten, rock flows. Molten rock below Earth's surface is called magma.

How do volcanoes form?

Identify *the cause of the formation of* volcanoes.

Cause:	Effect:
movement of Earth's tectonic plates	formation of volcanoes and the eruptions that result

Sketch *the movement of plates where* volcanoes *occur.*

Area	Sketch
Convergent boundaries	**Drawings should show two plates colliding, with the denser plate melting as it subducts beneath the less-dense plate. The resulting magma rises through cracks in the crust to form volcanoes.**
Divergent boundaries	**Drawings should show two plates moving apart, and magma rising up through the rift that forms between them.**
Hot spots	**Drawings should show a plume of mantle material under the crust, forming a volcano at the surface.**

Main Idea

Details

Where do volcanoes form?

Identify *the location of most of the world's active* volcanoes.

Most volcanoes occur close to plate boundaries.

Explain *the relationship between the Ring of Fire,* volcanoes, *and* plate boundaries.

Sample answer: The Ring of Fire represents an area of earthquake and volcanic activity that surround the Pacific Ocean and corresponds to convergent and divergent plate boundaries.

Record *4 factors that scientists monitor to determine the likelihood of a volcanic eruption* Sample answers shown.

1. earthquake activity
2. changes in the shape of a volcano
3. gas emissions
4. past eruptive history of the volcano

Types of Volcanoes

Identify *the 2 characteristics scientists use to classify* volcanoes.

1. shape
2. size

Model *the shapes and sizes of the 3 types of* volcanoes. *Label your drawings.*

Shield volcano: Drawings should indicate a large volcano with gentle, sloping sides.

Cinder cone: Drawings should indicate a small, steep-sided volcano.

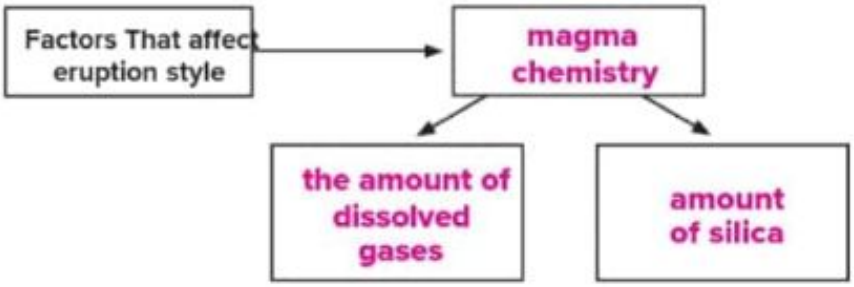
Composite volcano: Drawings should indicate a large, steep-sided volcano; they might include alternating layers of lava and ash.

Main Idea

Volcanic Eruptions

Details

Identify *3 factors that affect eruption style.*



Distinguish *among* magmas *with different silica content.*

Silica Content	Viscosity	Where these eruptions commonly occur
Low	low	mid-ocean ridges and hot spots
High	high	subduction zones and continental hot spots
Intermediate	intermediate	subduction zones and continental hot spots

Sequence *steps that lead to explosive eruptions as dissolved gases escape from* magma.

Magma moves toward the surface. Pressure caused by overlying rock decreases. The ability of gases to stay dissolved also decreases.

Bubbles begin to form. As the magma rises, the bubbles become larger, and gas begins to escape.

It is more difficult for bubbles to escape from high-viscosity lavas. This combination can result in explosive eruptions.

Main Idea — Details

Sample answers are shown.

Describe *four effects of volcanic activity.*

Activity	Effects
Lava flows	Although not usually deadly, lava flows can damage or destroy communities located near volcanoes.
Ash fall	Ash is made of particles of pulverized glass. It can disrupt air traffic and affect air quality. Large quantities of ash can affect climate.
Mudflows	Mudflows, formed when meltwater mixes with mud and ash, can bury towns and kill many people.
Pyroclastic flow	Made of a mixture of hot gas, ash, and rock, these flows move quickly and burn everything in their path.

Volcanic Eruptions and Climate Change

Identify *the effect of volcanic eruptions on climate.*

Cause:
A large volcanic eruption occurs, emitting ash and sulfur dioxide gas, which forms tiny sulfuric acid droplets in the upper atmosphere.

Effect:
Ash and droplets reflect sunlight back into space, which causes a decrease in average global temperature.

Connect It The Cascade Range in the northwestern United States has many volcano These mountains are at a convergent plate boundary. Identify the type of volcano you wo most expect to find in the Cascade Range and the nature of its eruptions.

Accept all reasonable responses. Sample answer: Because this is a convergent plate boundary, I would expect to find volcanoes that erupt magma high in silica. These eruptions would likely be explosive, as gases would have a difficult time escaping fro the sticky lava. The type of volcano would likely be composite, as lava and ash would form large, steep-sided cones.

Review

Earthquakes and Volcanoes

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned. Complete the **What I Learned** *column on the first page of the chapter.*

Use this checklist to help you study.

- ❑ Complete your Foldables® Chapter Project.
- ❑ Study your *Science Notebook* on this chapter.
- ❑ Study the definitions of vocabulary words.
- ❑ Reread the chapter, and review the charts, graphs, and illustrations.
- ❑ Review the Understanding Key Concepts at the end of each lesson.
- ❑ Look over the Chapter Review at the end of the chapter.

THE BIG IDEA

Summarize It Reread the chapter Big Idea and the lesson Key Concepts. Use what you have learned about earthquakes and volcanoes to explain why these natural phenomena often occur in the same areas.

Accept all reasonable responses. Sample answer: Volcanic and earthquake activity are associated with plate boundaries. As these plates move past each other, the rocks bend and sometimes break, causing earthquakes. At other boundaries, plates converge, and either crash together to form high mountains, or one subducts under the other. Crashing plates cause earthquakes. Subducting plates cause earthquakes and volcanoes as the sinking plate moves and melts.

Challenge *Use available resources to identify earthquake and volcanic activity over the last six months. Plot this data on a world map. What patterns can you identify?*

Lesson 1 Fossils

Scan *Lesson 1. Write three questions that you have about fossils in your Science Journal. Try to answer your questions as you read.*

Main Idea

Evidence of the Distant Past

Details

Define fossil. *Include two types of preserved clues in your definition.*

Fossils are the preserved remains or evidence of ancient living things.

Summarize *the principles of* catastrophism *and* uniformitarianism.

Catastrophism	Uniformitarianism
Catastrophism credits changes to Earth to quick, violent events over a short time period.	Uniformitarianism states that geologic processes that occur today are similar to those that have occurred in the past; it credits changes to Earth to slower processes over a longer time.

Formation of Fossils

Identify *factors that promote fossilization. Cross out terms that do not support the likelihood of* fossil *formation.*

buried quickly
~~soft tissue~~
~~microscopic~~
~~decay easily~~
hard parts
~~very large~~
~~exposed~~
~~rotting~~
~~eaten~~

Sequence *three probable steps of* fossil *fish formation.*

A fish dies and falls to a river bottom. → The fish is rapidly covered with sediment. → The fish's body decomposes, and hard parts change to rock over time.

Main Idea

Types of Preservation

Details

Summarize *the processes of fossil formation. Name and describe each process.*

Fossil Preservation	
Process	**Description**
Preserved remains	Actual remains of an organism are preserved in a substance that keeps it from being exposed to air or bacteria.
Carbon films	Pressure on the buried organism drives off gases, leaving a thin outline of carbon.
Mineral replacement	Minerals in groundwater fill in pore spaces or replace tissues of dead organisms.
Molds	Sediment hardens around a buried organism; the organism leaves an impression.
Casts	A fossil copy is made when sediment or mineral deposits fill a mold of an organism.
Trace fossils	Evidence of the activity of an organism is preserved, such as footprints.

Ancient Environments

Complete *the concept below.*

If a fossil of an organism resembles a modern organism, the ancient organism might have lived in a similar environment.

Classify *evidence of past climates.*

Climate	Evidence
Warm	fossils of ferns and tropical plants
Cool	fossils of coarse grasses and mammoths

Connect It Fossils provide clues to what happened in the ancient past. Identify a clu about what might have happened in the recent past in your current environment, and tell h long that clue is likely to last.

Accept all reasonable responses. Sample answer: The stump of a tree is evidence of where a tree once grew. Depending on effects of the weather and the size of the tree, t stump might be around for a few decades.

Lesson 2 Relative-Age Dating

Predict *three facts that will be discussed in Lesson 2 after reading the headings. Write your predictions in your Science Journal.*

Main Idea

Relative Ages of Rocks

Details

Explain *why a single rock cannot be described in terms of* relative age.

Relative age is the age of rocks and geologic features with respect to other nearby rocks and features. Other rocks must be included in the comparison to describe a rock's relative age.

Model *the principles of* relative age *dating below in drawings and descriptions.*

Concept	Drawing	Description
Superposition	Drawings should show multiple layers arranged oldest to youngest from bottom to top.	Layers of rock are arranged oldest to youngest from bottom to top.
Original horizontality	Drawings should show sediments deposited in flat layers. Students might also show the same layers tilted.	Layers of rock can be tilted or folded, but they originated as flat, horizontal layers.
Lateral continuity	Drawings should show same layers as above with the addition of a river cutting through the layers.	Layers of rock are deposited as flat sheets in all directions. Erosion can cut into the rock, but the order of layers does not change.
Inclusion	Drawings should show any rock shape with smaller fragments in the rock.	A piece of an older rock becomes part of a newer rock mass.

Main Idea

Details

Order *the features in the illustration from youngest to oldest.*

dike fault inclusion sedimentary layers

youngest
fault
dike
inclusion
sedimentary layer
oldest

Define unconformity, *and identify and describe 3 types.*

Unconformities

Unconformity: a surface where rock has worn away, producing a gap in the rock record

Type: disconformity
Description: Younger sedimentary layers are deposited on top of older, horizontal sedimentary layers that have eroded.

Type: angular unconformity
Description: Sedimentary layers are deposited on top of tilted or folded sedimentary layers that have eroded.

Type: nonconformity
Description: Younger sedimentary layers are deposited on older igneous or metamorphic rock layers that have eroded.

Main Idea

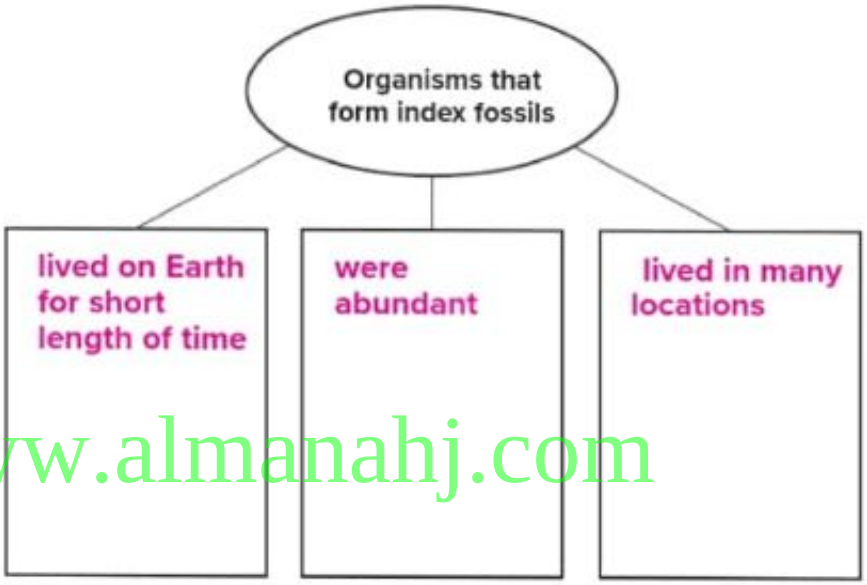
Correlation

Details

Complete *the rock-dating concept in the diagram below.*

matching rocks and fossils
+
separate locations
=
correlation

Characterize *organisms that form* index fossils.



Analyze *the usefulness of* index fossils. *Write the correct terms.*

Index fossils allow scientists to learn the relative ages of rock formations that are very far apart or on different continents. Scientists infer that layers with index fossils found in different locations are of similar age.

Synthesize It Museums all over the world collect samples of rocks and fossils. What is the benefit to scientists of these collections?

Accept all reasonable responses. Sample answer: Because a great deal about Earth's past is learned from comparisons, access to many samples collected from many locations is helpful to scientists.

Lesson 3 Absolute-Age Dating

Scan *Lesson 3. Read the lesson titles and bold words. Look at the pictures. Identify three facts that you discover about absolute-age dating. Write these facts in your Science Journal.*

Main Idea

Absolute Ages of Rocks

Details

Define absolute age.

Absolute age: the numerical age, in years, of a rock or other object

Summarize absolute age *and relative age.*

Ways to describe the ages of objects

Absolute Age	Relative Age
numerical age determined using radioactivity	age described with respect to another object or person

Atoms

Describe *the makeup of an atom.*

An atom is the smallest part of an element that has all the properties of the element. Each atom contains smaller particles called protons, neutrons, and electrons. Protons and neutrons are located in an atom's nucleus. Electrons surround the nucleus.

Define isotopes.

Isotopes: atoms of the same element that have different numbers of neutrons

Explain *how* radioactive decay *releases energy from unstable atoms.*

Radioactive isotopes decay releasing energy and forming new, more stable atoms.

The element that decays is called the parent isotope.	The new element that forms is called the daughter isotope.

Main Idea

Details

Calculate *the change in* isotopes *during* radioactive decay.

	Percent Parent	Percent Daughter
Original materials	100	0
One half-life	50	50
Two half-lives	25	75
Three half-lives	12.5	87.5
After many more half-lives	close to 0	close to 0

Radiometric Ages

Describe *why radiometric dating can be used to determine an object's age.*

Radiometric Dating

Radioactive isotopes decay at a constant rate

so they can be used to measure age

The ratio of parent isotope to daughter product is used as a measure.

Explain *how radiocarbon dating uses decay to help determine age.*

Organism	Description
Alive	• The organism takes in C-14. • The ratio of radioactive carbon, or C-14 to C-12, remains constant.
Dead	• C-14 begins to decay. • The ratio of C-14 to C-12 changes.

Main Idea

Details

Identify *two reasons that radiocarbon dating can be used to measure the ages of once-living things accurately.*

1. The ratio of C-14 to C-12 is used to determine how long the organisms have been dead.
2. With a half-life of 5,730 years, C-14 is useful for measuring the age of remains up to 50,000 years old.

Explain *why radiometric dating is not useful for determining the age of sedimentary rock.*

Sample answer: Radioactive isotopes would probably measure the ages of the grains that make up the rock, not the time when the sediments were deposited.

Identify *five radioactive* isotopes *that can be used for dating rocks. Circle the two* isotopes *with the longest* half-lives.

1. uranium-235
2. uranium-238
3. rubidium-87
4. potassium-40
5. thorium-232

Summarize *the conclusions that scientists have made about Earth's age.*

Earth, the Moon, and meteorites formed at about the same time → Radiometric dating of Moon rocks indicates that Earth is 4.5 billion years old.

Connect It You find a piece of petrified wood. Explain whether radiocarbon dating could be used to date your find. If not, what could be used?

Sample answer: Petrified wood was once a living organism, and radiocarbon dating works on once-living objects. However, during the fossilization process, the organic material of the wood was replaced with rock-forming minerals, so radiocarbon dating would not work. Instead, radiometric dating with any of the other radioactive isotopes could be used.

Review

Clues to Earth's Past

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned.

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THE BIG IDEA

Summarize It Reread the chapter Big Idea and the lesson Key Concepts. To illustrate how geology is a type of detective work, write a summary of the kinds of changes that have affected Earth's surface according to geological clues. Identify at least three types of changes.

Accept all reasonable responses. Sample answers: Layers of rock are bent upward to form mountains. Large cuts erode into rock and form canyons. Earth's climate has changed over time.

Challenge *Build a three-dimensional model representing geological layers. Include features such as unconformities, inclusions, faults, and fossil clues in your model. Show and explain your model to your class.*

Lesson 1 Geologic History and the Evolution of Life

Scan *Lesson 1. Then write three questions that you have about geologic history in your Science Journal. Try to answer your questions as you read.*

Main Idea

Developing a Geologic Time Line

Details

Organize *units of geologic time from longest to shortest.*

eons	eras	periods	epochs

Longest → Shortest

Categorize *units of time in the Phanerozoic* eon.

	Eras	Periods
Phanerozoic	Cenozoic	Quaternary
		Tertiary
	Mesozoic	Cretaceous
		Jurassic
		Triassic
	Paleozoic	Permian
		Carboniferous
		Devonian
		Silurian
		Ordovician
		Cambrian

Explain *the relationship among fossils, rock layers, and the divisions of the geologic time scale.*

Rock layers contain different types of fossils. Fossils provide clues about living conditions during a given time span. Sudden changes in the fossil record mark major changes in the environment. Scientists use these major changes to divide geologic time into eras and periods.

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Main Idea	Details
Responses to Change	**Identify** *the cause of a* mass extinction.

Cause:	Effect:
a catastrophic change in the environment that organisms cannot adapt to	many species on Earth become extinct within a short period of time

Cite *an example of a catastrophic event linked to a* mass extinction.

Scientists hypothesize that a large meteoric impact 65.5 mya caused the mass extinction of the dinosaurs.

Contrast *2 ways that geography can affect evolution.*

Land Bridge	Geographic Isolation
Two previously separated landmasses connect. Over time, organisms move across the bridge and evolve as they adapt to new environments.	A population is separated from the rest of its species by a physical barrier. The separated populations evolve with different characteristics.

Precambrian Time

Identify *the* 3 eons *of Precambrian time.*

1. Hadean	2. Archean	3. Proterozoic

Main Idea

Details

Identify *Precambrian life-forms.*

Many were single-celled organisms, much like present-day bacteria. About 600 mya, large, soft-bodied, multicellular organisms appeared.

Analyze *the effects of the Cambrian explosion on the fossil record.*

There was a sudden appearance of new multicellular life-forms.

↓

First organisms to have hard body parts

↓

These hard parts were more easily preserved.

↓

These hard parts left more evidence in the fossil record.

Analyze It Explain three ways that geologic time units compare with the time units you use to organize events in your life.

Accept all reasonable responses. Sample answer: Geologic time periods are vastly longer than the seconds, minutes, hours, days, weeks, months, and years that I use to organize events in daily life. The same types of geologic time units vary significantly in length. For example, the Paleozoic, the Mesozoic, and the Cenozoic are all eras, but the Paleozoic is longer than either the Mesozoic or the Cenozoic. This contrasts with minutes, which are all 60 seconds long. The passing of geologic time cannot be observed directly by people because the human life span is too short.

Lesson 2 The Paleozoic Era

Predict *three facts that will be discussed in Lesson 2 after reading the headings. Record your predictions in your Science Journal.*

Main Idea

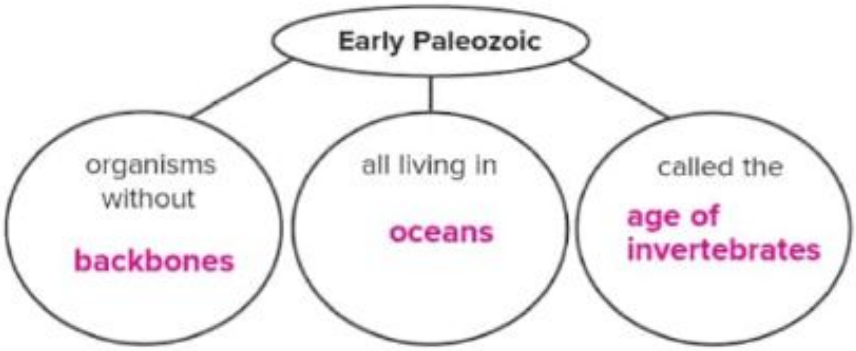
Early Paleozoic

Details

Summarize *the extent of the* Paleozoic era.

The Paleozoic era lasted for more than 290 million years, from 542 mya to 250 mya.

Characterize *the Early* Paleozoic era *in the organizer below.*



Contrast *the Early* Paleozoic era *with the present.*

	Then	Now
Life on land	no land-based life-forms	diverse land-based life-forms
Amount of land mass	flooded by rising seas	much exposed

Point out *the differences between present-day North America and the same landmass during the* Paleozoic era.

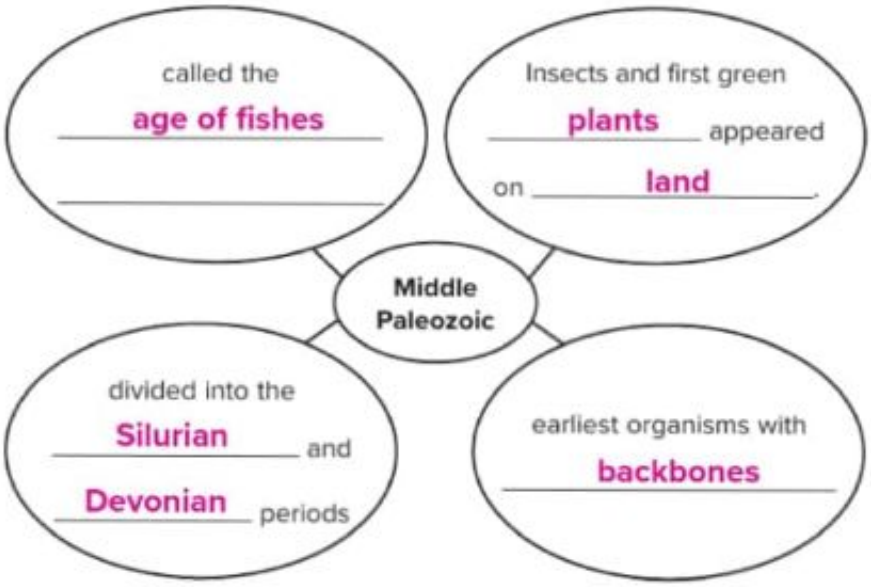
The North American continent is now situated fully north of the equator and consists of mostly dry land. The same land mass straddled the equator during the Paleozoic and was mostly covered by shallow sea water.

Main Idea

Details

Middle Paleozoic

Characterize *the Middle* Paleozoic era *in this organizer.*

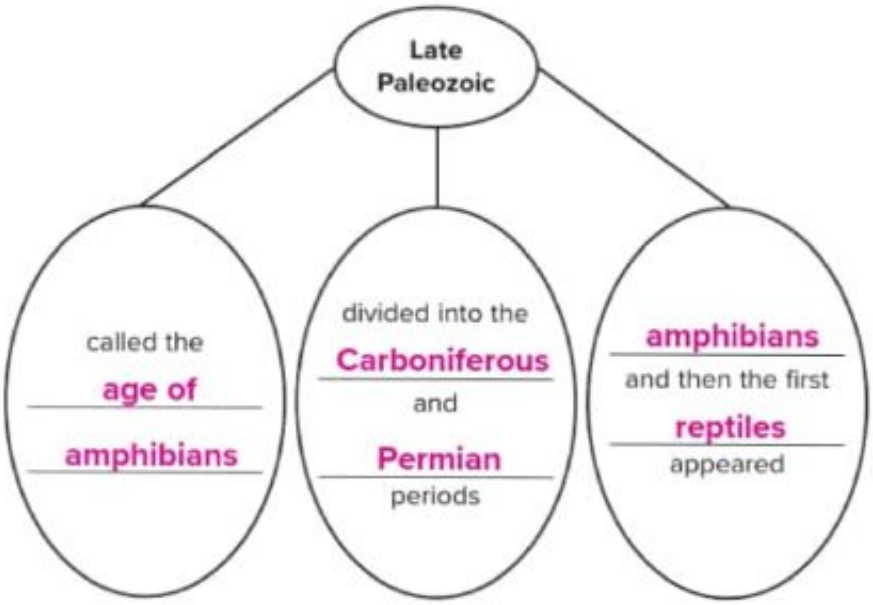


Identify *the cause of the formation of the Appalachian Mountains.*

Cause:	Effect:
Several land masses collided with the east coast of North America.	Added land heaved upward and formed the Appalachian Mountains.

Late Paleozoic

Characterize *the Late* Paleozoic era.



Main Idea

Details

Sequence *the development of coal in* coal swamps.

1. Dense forests grew in swamps along shallow inland seas.
2. When plants died, they sank into tropical swamps (or coal swamps).
3. Plant matter changed into coal over time.

Define *Pangaea, and explain its formation.*

Pangaea was a supercontinent formed near the end of the Paleozoic era when Earth's continents had moved together and formed one land mass, or supercontinent.

Summarize *possible causes of the Permian mass extinction.*

Possible Cause	Related Effect
Formation of Pangaea	A decrease in marine habitat changed ocean currents, resulting in drier land interior.
Meteorite impact	Ash and rock in the atmosphere blocked sunlight and changed climate, resulting in collapsed food webs.
Volcanic eruption	Ash and rock in the atmosphere blocked sunlight and changed climate, resulting in collapsed food webs.

Connect It Summarize the overall evolution of life forms during the Paleozoic era.

Accept all reasonable responses. Sample answer: The earliest life forms were soft invertebrates that lived only in oceans. These were followed by animals with hard parts, then by vertebrates—fish. The first life forms on land were plants and insects. Then some fish adapted to breathe air and move about on land—the first amphibians. These amphibians gave way to the earliest reptiles, which could live and reproduce fully on land

Lesson 3 The Mesozoic Era

Scan *Lesson 3. Read the lesson titles and bold words. Look at the pictures. Identify three facts that you discovered about the Mesozoic era. Record your facts in your Science Journal.*

Main Idea

Geology of the Mesozoic Era

Details

Arrange *the periods of the Mesozoic era in the table below.*

Periods of the Mesozoic Era		
Triassic	Jurassic	Cretaceous

from 251 mya to 65.5 mya

Organize *information about the breakup of Pangaea.*

Pangaea began to break apart in the late Triassic

Southern continent: Gondwanaland would become the modern continents of South America, Africa, Antarctica, and Australia

Northern continent: Laurasia would become the modern continents of North America, Europe, and Asia

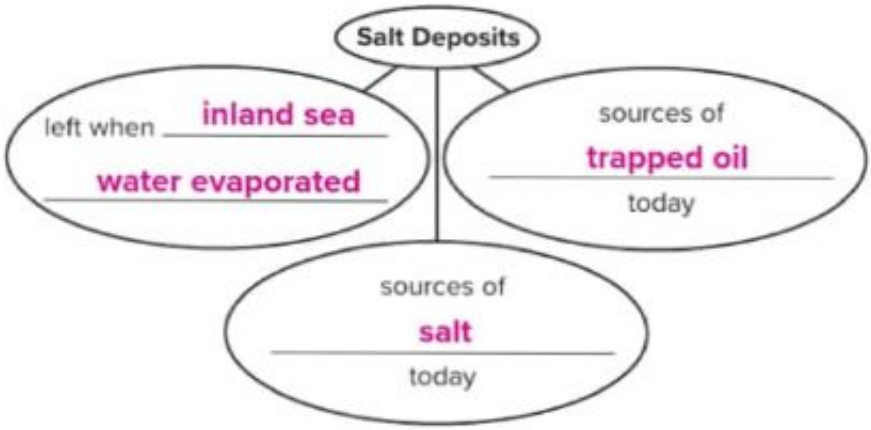
Sequence *the events that formed the Atlantic Ocean.*

1. The climate was warm during the Mesozoic.
2. Ocean levels rose.
3. Pangaea began to split apart.
4. Ocean water flowed onto the continents.
5. Narrow channels formed.
6. As continents moved apart, the channels became oceans.

Main Idea

Details

Categorize *salt deposits in North America.*



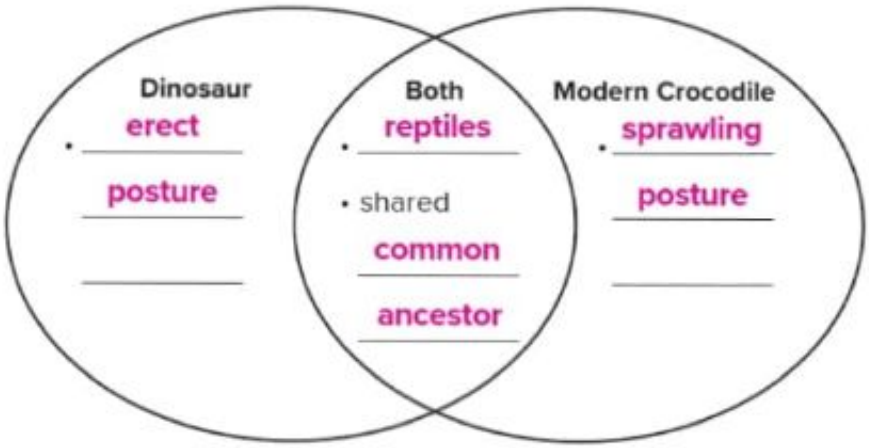
Explain *the geologic changes in North America during the Mesozoic.*

North America moved westward and collided with landmasses on an ancient oceanic plate.

- In the west... the crust buckled inland, forming the Rocky Mountains.
- In the southwest... windblown sand formed dunes.
- In the middle of the continent... a warm inland sea formed.

Mesozoic Life

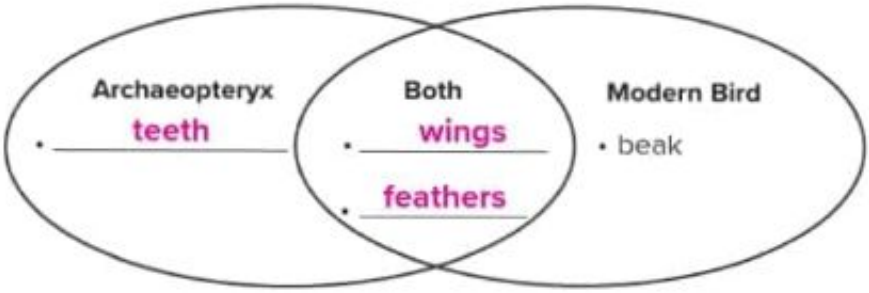
Compare and contrast dinosaurs *with modern crocodiles.*



Main Idea

Details

Compare and contrast *the archaeopteryx with present-day birds.*



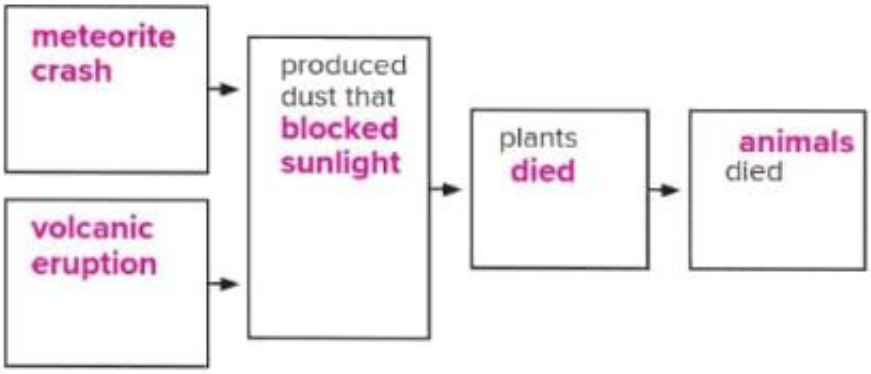
Identify *3 types of Mesozoic reptiles.*

Land	Sea	Air
dinosaurs	plesiosaurs	pterosaurs

Describe *the size of Mesozoic mammals.*

Most were smaller than present-day cats.

Sequence *the likely events of the Cretaceous extinction event.*



Summarize It Summarize the overall evolution of life during the Mesozoic era.

Accept all reasonable responses. Sample answer: Cone-bearing and flowering plant life evolved. A diverse range of reptiles thrived on the land, in the air, and in the seas. Mammals existed but remained small. The collective number of species dropped sharply at the end of the era.

Lesson 4 The Cenozoic Era

Scan *Lesson 4. Read the lesson titles and bold words. Look at the pictures. Identify three facts that you discovered about the Cenozoic era. Record your facts in your Science Journal.*

Main Idea

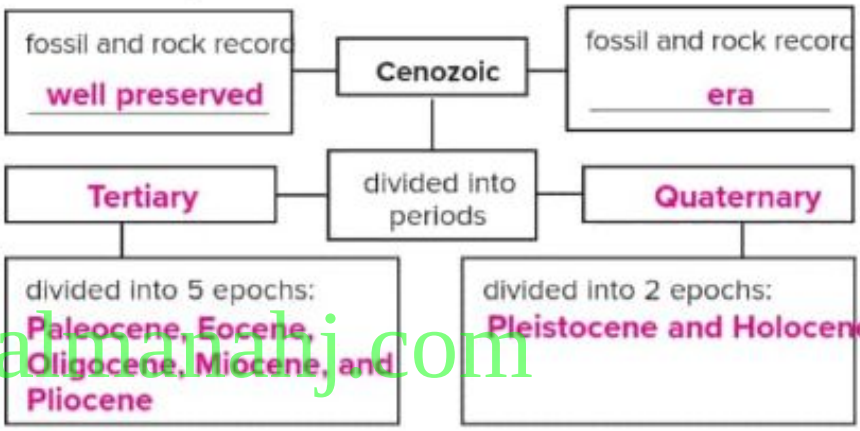
Geology of the Cenozoic Era

Details

Examine *the extent of the Cenozoic era.*

The Cenozoic era began 65.5 million years ago, at the end of the Cretaceous period of the Mesozoic era, and continues today.

Organize *information about the Cenozoic era below.*



Summarize *Cenozoic mountain building activity.*

Range	Activity
Himalayas	began forming as India crashed into Asia
Alps	began forming as Africa pushed into Europe
Rockies	continued to grow as North America pushed westward
Cascades	began to form as North America pushed westward
Sierra Nevada	began to form as North America pushed westward
Appalachians	erosion started in the Cenozoic and continues today

Main Idea

Details

Analyze *why the* ice age *that occurred during the* Pleistocene epoch *resulted in more dry land.*

Glaciers covered **up to 30%** of land surfaces.

↓

Water from oceans water was trapped **in glaciers**.

↓

Sea level **dropped**.

Inland seas **drained**.

Cenozoic Life—The Age of Mammals

Order *the evolution of life during the Cenozoic era.*

1. Flowering trees and plants **spread out and diversified**.
2. A new type of plant, **grass**, appeared.
3. New food sources allowed evolution of **many animals**.
4. **Mammals** thrived, and the Cenozoic became known as **the "age of mammals"**.

Contrast *the size of Cenozoic mammals with that of Mesozoic mammals.*

Mesozoic	Cenozoic
remained very small	grew very large

Identify *three examples of* mega-mammals.

1. woolly mammoths	2. giant sloths	3. saber-toothed cats

Main Idea

Details

Analyze *the relationship between land bridges and evolution.*

Sample answer: Land bridges allowed ancestral animals to migrate from one continent to another. When land bridges disappeared, the separated populations evolved differently.

Summarize *the evolution and migration of humans.*

1. Human ancestors appeared nearly 6 million years ago in Africa.
2. Homo sapiens evolved during the Pleistocene epoch.
3. Early Homo sapiens migrated from Africa to Europe and Asia.
4. They later migrated to North America across a land bridge.

Identify *the cause of* Pleistocene *extinctions.*

Cause:	Effect:
organisms could not adapt quickly enough to climate change	extinction of mega-mammals

Describe *the changes occurring on present-day Earth.*

Sample answer: The planet is in a global warming climate change.

Analyze It Explain how the Cenozoic fossil record differs from the Mesozoic and Paleozo records and why.

Accept all reasonable responses. Sample answer: Because the Cenozoic time period is recent in comparison with the others, its fossils are better preserved, so people know more about the era's diversity of life.

Review Geologic Time Scale

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned.

Use this checklist to help you study.

- ❑ Complete your Foldables® Chapter Project.
- ❑ Study your *Science Notebook* on this chapter.
- ❑ Study the definitions of vocabulary words.
- ❑ Reread the chapter, and review the charts, graphs, and illustrations.
- ❑ Review the Understanding Key Concepts at the end of each lesson.
- ❑ Look over the Chapter Review at the end of the chapter.

THE BIG IDEA **Summarize It** Reread the chapter Big Idea and the lesson Key Concepts. Write a description of how moving land masses and climate change have affected the evolution of life throughout Earth's history. How are these factors likely to affect life on Earth in the future?

Accept all reasonable responses. Answers should express that Earth's dynamic environment causes the evolution of new species and the extinction of others. Future events will continue to both increase and decrease the diversity of life over time.

Challenge *On a long sheet of roll paper, draw a geologic time line to represent the Phanerozoic era, including all of its smaller units through the present. Write a detail and include a picture for each unit of geologic time represented.*