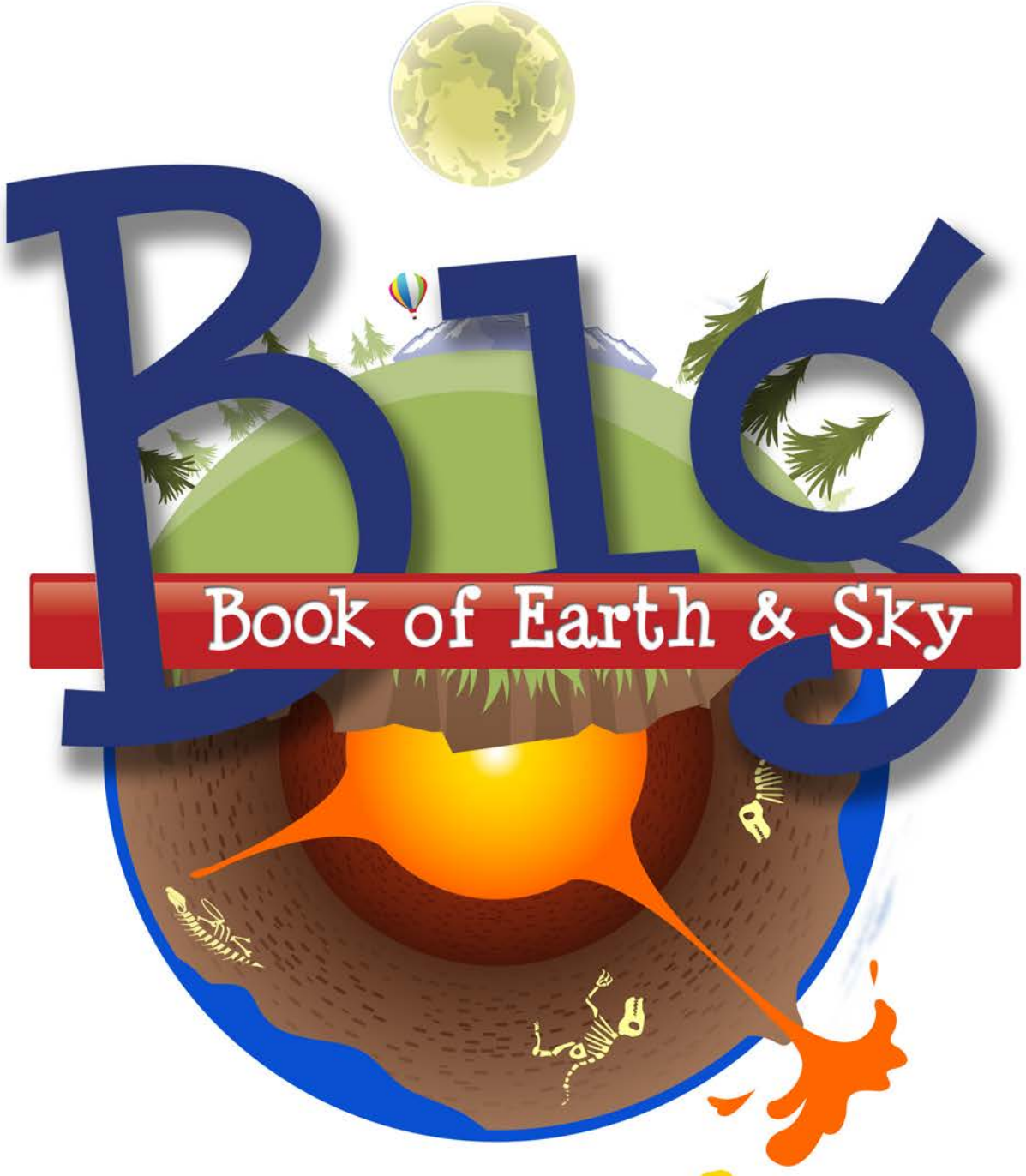
Teacher's Guide



Learning Just Became BIG Fun!

First printing: April 2013

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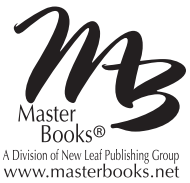
Unless otherwise noted, Scripture quotations are from the New King James Version of the Bible.

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About Big Book of Earth & Sky

The *Big Book of Earth & Sky* is a chart from the earth's core to the outer atmosphere.

Designed by the creative team that developed the innovative and award-winning *Big Book of History*, the *Big Book of Earth & Sky* unfolds as a 15-foot chart. It is removable so it can be viewed either panel-by-panel or hung on the wall as a full-length display. This allows you to explore the elements that make up the soil, the sea, and the sky. These detailed charts and graphs about the earth's crust, caves, and clouds are incredible learning tools. *The Big Book of Earth & Sky* facts are based on Master Books' best-selling Wonders of Creation series.

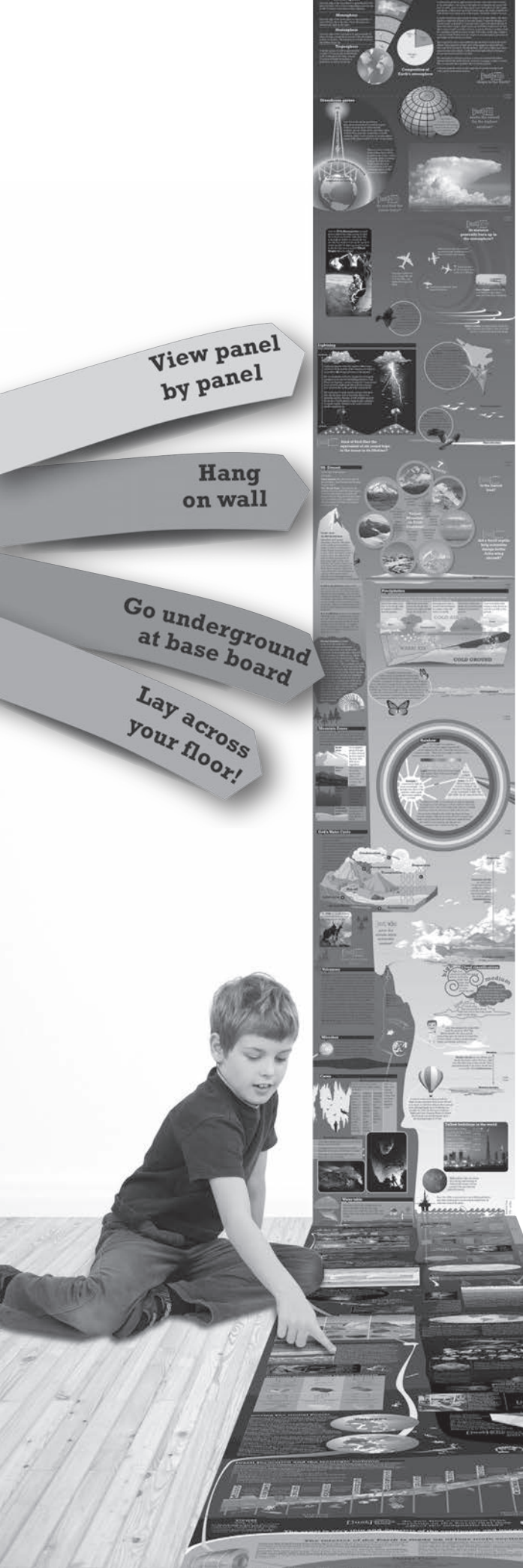
This casebound volume provides ease of storage for the chart, which is excellent for families, schools, and churches. The teacher's guide helps bring out additional insights with additional information, educational activities, and added readings, all of which enhance this excellent reference tool and help a parent or teacher utilize it within their science curriculum. This stunning chart will pique the interest of children and bring a study of God's world to brilliant life!

How to Use this Resource

The *Big Book of Earth & Sky* can be used as a reference tool or it can be a springboard to a myriad of educational activities that involve reading, writing, science, and biblical studies. Sample activities and additional terms to know are included within this study guide to serve as a starting point or source of ideas for ways you can use the *Big Book of Earth & Sky* in your education program. This includes information on caves, weather, and oceans, as well as some extras on archaeology, which explores how people have lived and thrived on God's earth since the Garden of Eden. There are word matching quizzes in the back, as well as a search and find quiz that covers the *Big Book* top to bottom!

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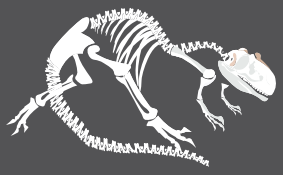
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INTRO TO SPELEOLOGY









Cave Studies

Speleology is the study of caves, or "karsts" as they are often called. If you explore caves yourself, you would be called a "spelunker" and you would be considered "spelunking." If you've never visited a cave, see if you can take a field trip with your parents to a public cave near you!

Terms to Know and Spell about Caves

Use this quick reference of terms to learn a bit more about cave terms, and then find some additional reference books in your home or local library to further your study!

active caves — live caves that have a flowing stream in them

anthropods — an invertebrate animal; some live on land and some in water (including crustaceans, centipedes, millipedes, spiders, scorpions, and insects)

cave — considered a natural opening in rocks, accessible to humans, which is longer than it is deep and is at least 33 feet in length

cave paintings — either simple outlines of charcoal or mineral pigment, or true paintings with outlines, shading, and vivid pigment fills

cenote — a water-filled shaft

cul-de-sac — cave with only one entrance

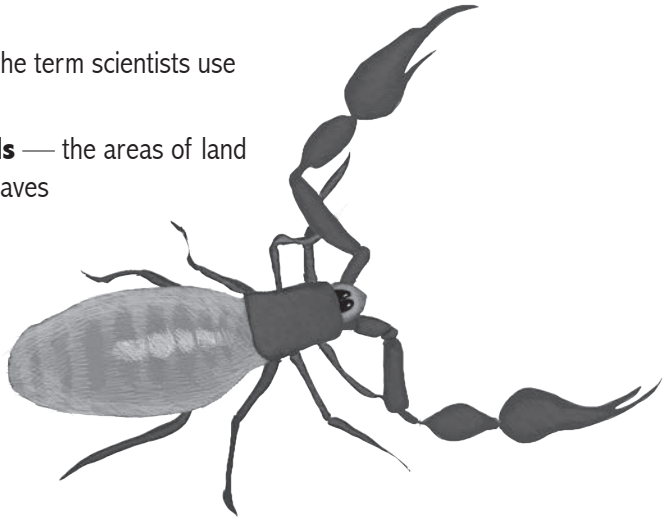
dripping speleothems — stalactites, stalagmites, and columns that are growing

echolocation —sound waves such as those sent out by bats that hit an object and an echo comes back, helping them identify the object

engravings — usually made on soft limestone surfaces

karst — the term scientists use for caves

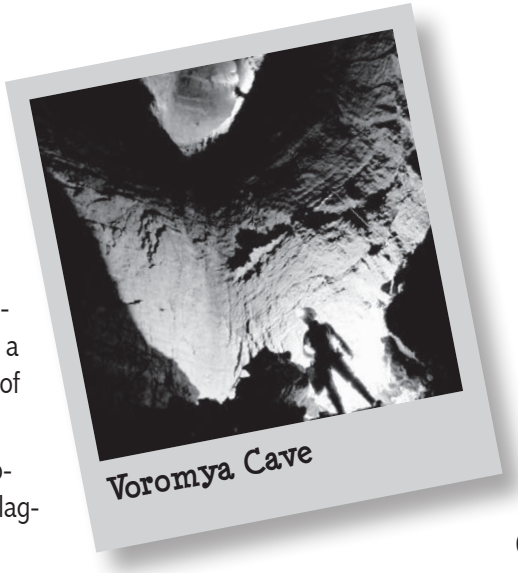
karstlands — the areas of land that host caves



relict caves — caves without a flowing stream, which may have ponds or dripping water

sinkholes — funnel-shaped hollows, from a few feet to hundreds of feet in diameter

spleothems — dripstones; especially stalagmites and stalactites



Voromya Cave

troglobites — creatures which live only in caves (from Greek for "cave dwellers")

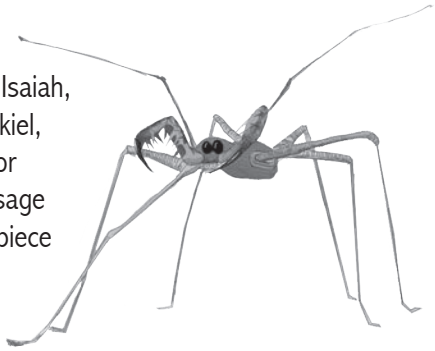
troglophiles — creatures which spend some part of their life in caves (from Greek for "who like caves")

trogloxenes — creatures that got into a cave by accident and which try to leave (from Greek for "foreign to caves")

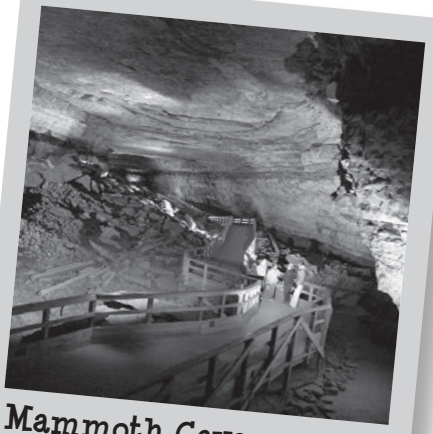
vadose caves — those above the water table

Cave Activities

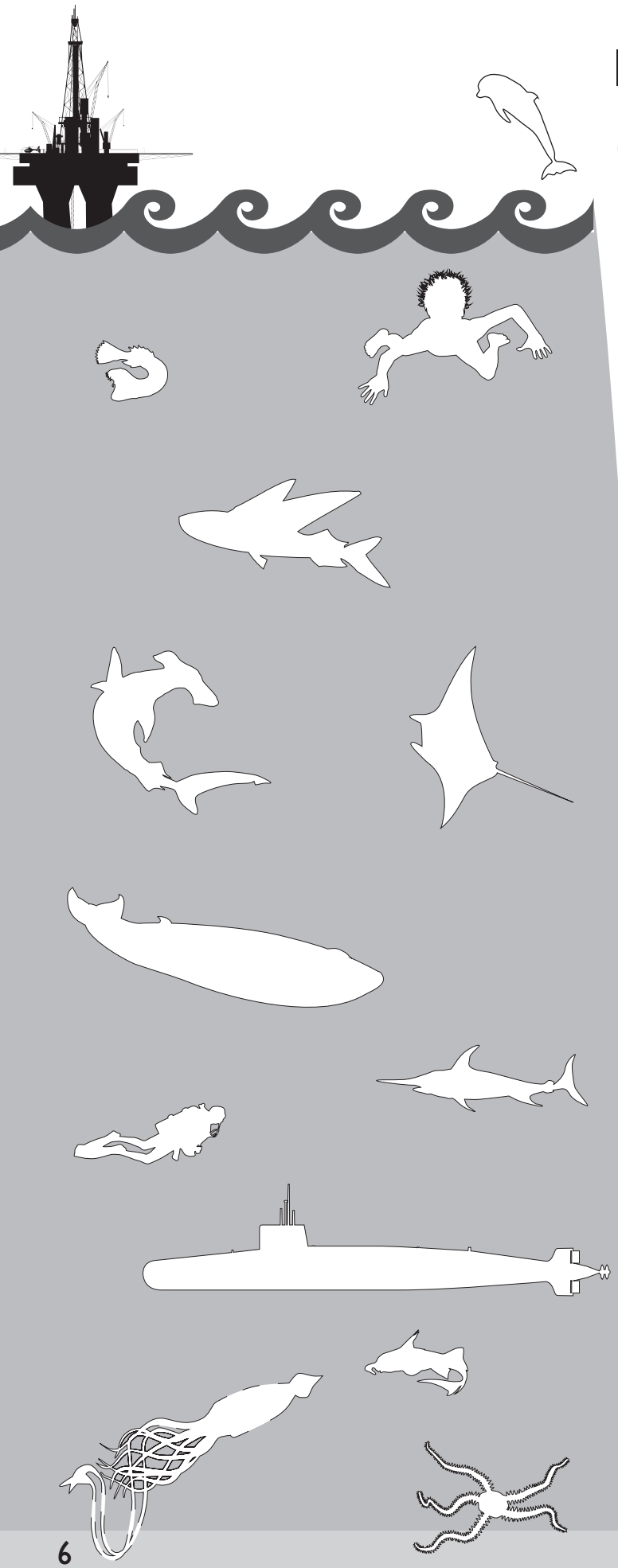
1. Do a keyword search for the word "cave(s)" in the Bible using a Bible concordance or online search. Examine the various reasons people used caves during the biblical period.
2. Use a plastic knife to carve a bar of soap into a stone axe head. Examine the different uses for an axe in a book or online resource.
3. With a large sheet of paper and paints (or chalk), recreate the look of cave paintings. You might consider using a dark room or garage with candles (under parental supervision), to sense the dark cave atmosphere.
4. The Dead Sea Scrolls contained fragments from the Old Testament books of Genesis, Exodus, Leviticus, Numbers, Deuteronomy, 1 and 2 Samuel, Psalms, Job, Isaiah, Daniel, Jeremiah, Ezekiel, and parts of the Minor Prophets. Pick a passage and write it out on a piece of paper. Roll it up to reconstruct the look of a scroll fragment that would have been discovered in the Qumran cave system.



5. Build a cave model with clay. Try to include forms that represent stalagmites and stalactites.
6. Do further research on cave creatures and list the various types of creatures one might expect to find in a cave system. For example, see what you can find out about how bats find the bugs and insects that they eat!
7. Complete online research on cave systems around the world. Compile information on at least one system per continent, print off photos of each one, and use a world map to pinpoint their locations.
8. Build a three-dimensional cave model utilizing a cardboard box (shoebox). Draw small pictures of the various cave formations (including stalagmites, stalactites, columns, flowstones, cave coral, etc.), then glue or tape the various drawings into the cardboard shell, labeling each structure.
9. Find old or broken items (with a parent's permission) and have someone bury them in your backyard. Set up a specific perimeter with strings staked in the ground (as they would in an archeological excavation site). Carefully dig up the "artifacts" and catalog where they were found and what use they may have served.
10. After completing a study of caves, consider taking a tour of a local cave system with your parents. Exploring caves on private property on your own is very, very dangerous and you should never do it. There are lots of public caves designed to be toured with helpful guides to help you learn more about caves.



Mammoth Cave



Ocean Studies

Oceanography is the study of oceans and their influence on earth. It includes a study of the diverse life that God has placed with the oceans, as well as currents, geology of the ocean floor, weather that is affected by the ocean, as well as the chemical changes that can occur here. So many fields of science are a part of this wonderful study!

Terms to Know and Spell about Oceans

Use this quick reference of terms to learn a bit more about ocean terms, and then find some additional reference books in your home or local library to further your study!

abyssal plain — basin on the bottom of the ocean which extends for miles

algae — various kinds of oceanic plants; includes yellow, red, brown, and green

aquatic mammals — warm-blooded, air-breathing sea creatures; include whales, dolphins, seals, sea lions, sea otters, walruses, and more

atoll — circle-shaped coral reefs that enclose a lagoon; often formed around sunken volcanoes

barrier reef — an offshore coral reef with a deep, wide lagoon between it and the shore

bathysphere — a hollow steel ball lowered from a ship by a cable; first used in the 1930s

bathyscaph — a technologically advanced submersible that can maneuver up and down without the use of cables

beach — sloping coastland covered by sand between the sea and the coast

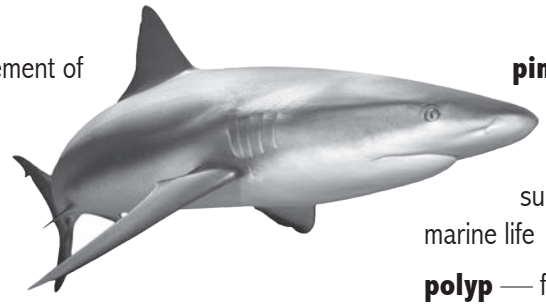
bioluminescence — a living organism's ability to produce its own light, usually via electricity

bony fish — sea creatures, other than mammals, that have a structure made of bone; largest class of fish

brackish water — part freshwater , part saltwater

coast — the region behind the shoreline; the geographic line where land ends and sea begins

crustacean — marine arthropods commonly called shellfish; includes krill, barnacles, shrimp, crayfish, lobster, crab, daphnia



current — massive movement of water beneath the surface

dehydration — the process of removing water; drying out

diving bell — one of the first submersibles, used for observing underwater habitat

dredging — a fishing technique which harvests bottom dwellers

El Niño — a warm-water current that appears at Christmastime

estuary — an area at the mouth of a river, where fresh water mixes with salt water

eye of a hurricane — the relatively windless center of the hurricane spiral, approximately ten miles wide

Great Barrier Reef — largest, world-famous reef located off the coast of Australia

harbor — a naturally or artificially sheltered area of water with few or low waves

hurricane — a severe storm characterized by very strong winds and heavy rainfall

hydrothermal vent — a chimney-shaped formation that releases jets of poisonous, dark, mineral-rich water from the ocean floor

kelp — a type of algae, commonly called seaweed

lagoon — a shallow body of still ocean water, mostly separated from the ocean by a sand bar, coral reef, or barrier island

La Niña — a cold-water condition that may interfere with the role of plankton in the food chain

neap — the lowest low and the highest high tides

nutrient upswelling — a curious movement of water that carries nutritious deep water toward the surface for marine animals to consume

oceanic ridges — underwater mountain ranges

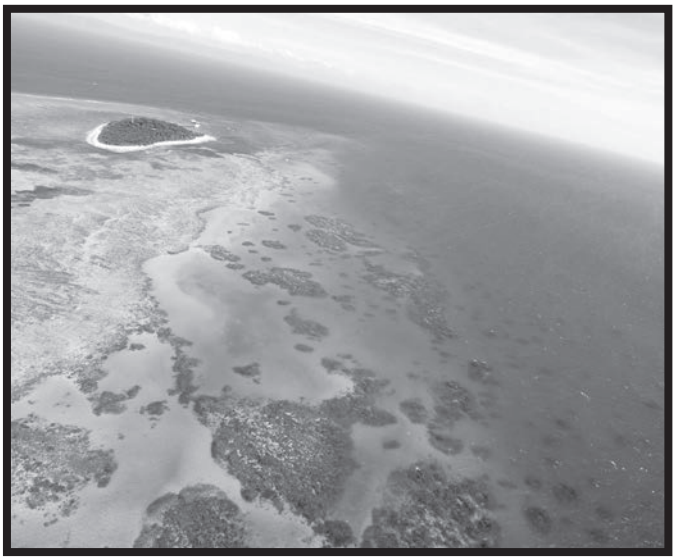
pinnacle iceberg — an iceberg that sticks up, like a mountain shape

plankton — tiny organisms that inhabit the sunlit zone and function as a food source for other marine life

polyp — free-floating immature stage of a coral that will attach itself to a rock or dead coral, feed, and grow

purse seining — a fishing technique which uses a type of large net that spreads out and then closes around all marine life and deposits them on the ship

riptide — a dangerous surface current that carries large amounts of water back to sea



Ariel view of the Great Barrier Reef

salinity — the measure of the amount of dissolved salt in seawater

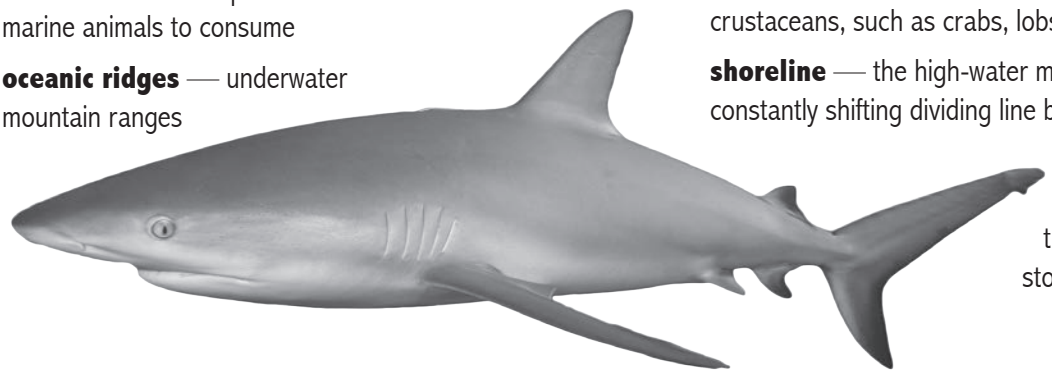
salt marsh — a swampy coastal area with plants washed by low waves from the sea, otherwise known as wetlands

sedimentation — particles of varying sizes transported and deposited in a liquid environment to later form rock

shellfish — clams, oysters, scallops; also some crustaceans, such as crabs, lobsters

shoreline — the high-water mark of the tide; the constantly shifting dividing line between land and sea

storm surge — the high waves and pronounced surf that accompanies a heavy storm



submarine canyon — a deep, steep-sided underwater valley

surf — surface water that crashes onto shore in rhythmic fashion

syzygy — occurs when the sun, moon, and earth all line up, resulting in very high or very low "spring" tides

tabular iceberg — an iceberg that is long and flat, like a table

tide — the periodic rise and fall of the level of water relative to the beach

trawling — a fishing technique which drags lines or nets to the side or stern of a ship

trench — a deep area of the ocean, some have steep valleys

tropical storm — a storm that has resulted from a tropical depression, yet is not strong enough to be called a hurricane.

tsunami — a gigantic, devastating wave caused by landslides, earthquakes, volcanic activity, or hurricanes

undertow — a type of current that occurs after a breaker crashes on a beach

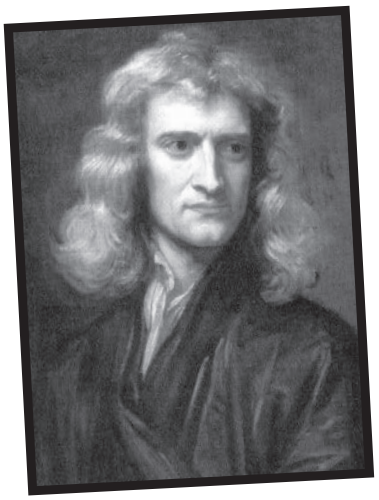


Ocean Activities

1. On a blank map of the world, label: Arctic Ocean, Atlantic Ocean, Indian Ocean, Pacific Ocean, Arabian Sea, Bay of Bengal, Bering Sea, Caribbean Sea, Coral Sea, East China Sea, Greenland Sea, Great Barrier Reef, Gulf of Mexico, Labrador Sea, Mediterranean Sea, North Sea, Norwegian Sea, Philippine Sea, Red Sea
2. Memorize Bible verses that tell how God reveals Himself in His creation. Some verses to start with: Romans 1:20, Colossians 1:16–17, Hebrews 1:3.
3. Research the Mount St. Helens eruptions of 1980 and 1982. Although the sediments laid down were of volcanic origin, scientists know the thousands of layers were clearly formed over a short time period.
4. Choose one branch of oceanography that interests you. Do 1–3 hours of research on the subject and jot down some notes.



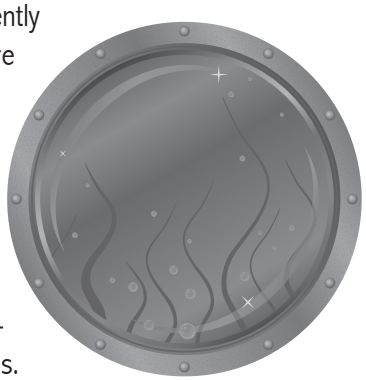
5. Discuss what physical features or forces cause coastlines to differ in appearance.
6. Gather information from news media or the Internet about beach cities affected by erosion or suddenly changing coastlines. What other challenges are oceans and coastlines facing, and why?
7. Memorize and recite Matthew 5:13.
8. Use an etymological (word origins) dictionary to find the origin of the word "salary." What did you learn about the importance of salt throughout history that would explain what the words "not worth his salt" or "salary" means in today's culture?
9. Float an ice cube in a clear glass or measuring cup. Using a centimeter ruler, measure how much of the ice cube protrudes above the water's surface and how much extends below. Is this similar to what happens with icebergs where 10 percent is above the surface of the water and 90 percent is beneath?
10. Research how submarines and aircraft carrier crews are able to furnish a large number of soldiers with fresh water while they are at sea for extended periods.
11. Find out which oceans are the least salty and the most salty.
12. Research the life and writings of Sir Isaac Newton. Find out if he was a creation scientist because it was the fashion of the day, because scientific observation supported his conclusions, or because of some other matter.





13. Construct an artificial beach with clay, sand, and water in a large pan and experiment with the force and motion of waves.

14. If a hurricane is currently developing somewhere in the ocean, obtain several satellite photos that show its progression. See if you can predict its precise landfall before it is reported by newscasters.



15. Learn more about fishing techniques, such as dredging, drift netting, gill netting, longlining, purse seining, and trapping. Research the purpose, equipment, method, and product of the technique, as well as statistics on the amount of marine produce harvested (in tons).

16. What kinds of fish or shellfish are sold at your local supermarket? Find out how they are harvested and brought to market.

17. Learn more about how hydroelectricity is produced from tidal power.

18. If you live near the coast, plan a field trip to a tidal pool or aquarium or other marine park.

19. Read the labels on pet food and yard fertilizers to see if they contain marine products.

20. Some sharks look like bony fish. Research the swimming and "breathing" capabilities of sharks and bony fishes to discover identifying behaviors.



21. Do reading on recent research concerning whale migration patterns and use of echolocation.

22. If you live in a "land-locked" state, contact a local pet store to find the location of the nearest saltwater aquarium. Or view a documentary on an underwater excursion at a coral reef.

23. Research your local library for more information about the types of fish that inhabit coral reefs. Where do they live? What do they eat? Why are they suited for living among coral?

24. Memorize and recite Psalm 139:9–10.

25. Obtain articles, with photos, of various kinds of submersibles.

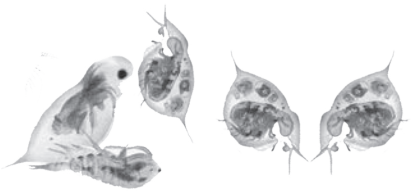
26. View a documentary film or video on oceanographic research by Jacques Cousteau, or talk with a sailor who has served aboard a submarine.

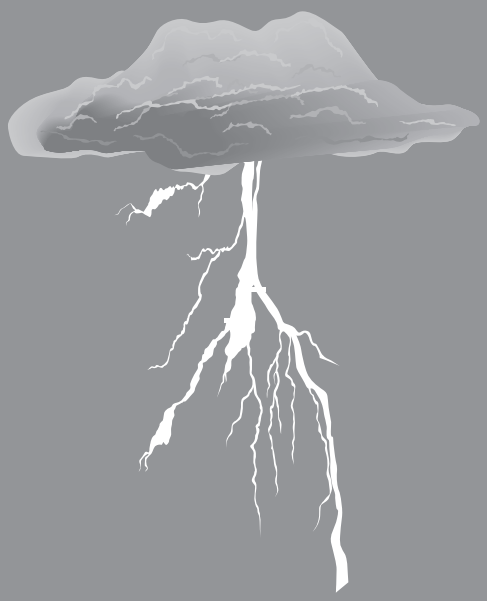


27. Contact a personal acquaintance or Navy recruiter to learn about the particular training or preparation needed to live and work on a submarine for extended tours at sea.

28. Visit a dry dock area at a seaport. Study the size of the ships and the shapes of their hulls.

29. Prepare a drawing of Noah's ark on a large sheet of paper. Think about what it might have looked like in real life not the funny illustrations you sometimes see.





Weather Studies

Meteorology is the study of weather. From sunny, warm days that produce perfect conditions for growing plants, to rain, snow, tornadoes, and hurricanes that all impact our lives, understanding weather helps us be prepared and protected from any trouble that storms can bring.

Terms to Know and Spell about Weather

Use this quick reference of terms to learn a bit more about weather terms, and then find some additional reference books in your home or local library to further your study!

arid — a dry climate lacking moisture

atmosphere — the body of gasses surrounding earth

axis — an imaginary straight line through the center of the earth on which it rotates

ball lightning — a glowing ball of red, orange, or yellow light found during a thunderstorm

barometer — a weather instrument used to measure the pressure of the atmosphere

blizzard — a very heavy snowstorm with violent winds

bogs — soft, waterlogged ground such as a marsh

carbon dioxide — a colorless, odorless gas formed during respiration, combustion, and organic decomposition

cirrus clouds — a high altitude cloud made of ice crystals that appear thin, white, and feathery

climate — the weather conditions that are particular to a certain area, such as wind, precipitation, and temperature

cold front — a boundary of cold air, usually moving from the north or west, which is displacing the warm air

condensation — the act of water vapor changing from a gas to a liquid

convection clouds — clouds that occur in a rising updraft, usually when the sun's radiation warms the earth

cumulus clouds — low clouds that are thick, white, and puffy with flat bottoms and rounded tops

dew point — the temperature at which air becomes saturated and dew forms

Doppler radar — a special type of radar used to track severe weather by detecting wind speed and direction

electricity — a moving electric charge, such as in a thunderstorm

electrons — a subatomic particle with a negative electrical charge

environment — the surrounding circumstances or conditions around us

equator — an imaginary line dividing the Northern and Southern Hemispheres of the earth

evaporation — to change into a vapor such as the evaporation of water by the warming of the sun

flash flood — a flood caused by a thunderstorm that deposits an unusual amount of rain on a particular area

fog — clouds that form on the surface of the ground

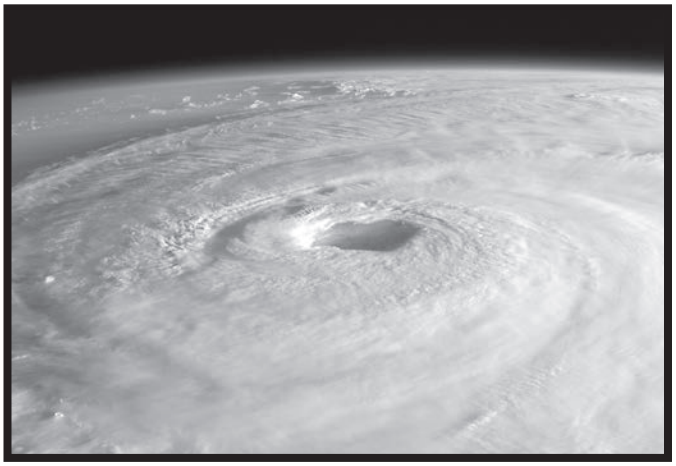
fossil fuels — coal and oil derived from the remains of plant and animal organisms

greenhouse warming — the phenomena of a steady, gradual rise of temperatures due to the increase of carbon dioxide in the atmosphere. This could result in natural catastrophes such as droughts, flooding, and a meltdown of the ice sheets.

hailstones — precipitation in the form of ice and hard snow pellets

humid — a weather condition containing a large amount of moisture or water vapor

hurricane — the strongest storm found in the tropics, with heavy rain and winds of 75 mph or greater



NASA image of a hurricane

Ice Age — a period of time marked by extensive glaciers on the face of the earth

ice cap — an extensive covering of ice and snow

ice storm — a storm caused by rain falling into a lower atmosphere that is below freezing



latitudes — the distance north or south of the equator measured with imaginary lines on a map or globe

meteorologist — a person that interprets scientific data and forecasts the weather for a specific area

monsoon — a wind system that causes periods of wet and dry weather in India and southern Asia

nitrogen — a naturally occurring element that is responsible for around four-fifths of the earth's atmosphere

northeaster — a storm that moves northeast along the east coast

oxygen — a colorless, odorless gas in our atmosphere that is essential for plant and animal respiration

ozone — a gas in the earth's upper atmosphere that is responsible for screening most of the sun's harmful ultraviolet radiation

permafrost — permanently frozen subsoil found around polar regions

pollution — harmful or unsafe waste products

precipitation — falling moisture in the form of rain, sleet, snow, hail, or drizzle

rain gauge — a weather instrument used to measure the amount of rainfall over a particular period of time

relative humidity — the amount of water vapor in the air compared to the amount of water vapor the air can contain at the point of saturation

sleet — precipitation that consists of frozen raindrops





static electricity — a build-up of electrical charge on an insulated body

St. Elmo's fire — a condition caused by a high charge of electricity in the air that causes pointed objects to glow slightly

stratus clouds — low altitude gray clouds with a flat base

subarctic — a region just south of the Arctic Circle

supercell — a severe, well-organized thunderstorm with warm moist air spiraling upward

thermometer — an instrument used to indicate the temperature

thunderstorm — a condition of weather that produces thunder, lightning, and rain

tide — a raising and lowering of the water in the oceans and seas caused by the gravitational pull of the moon.

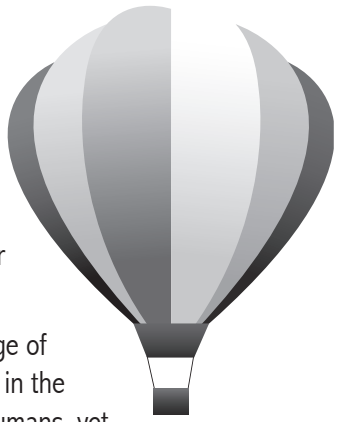
tornado — a funnel-shaped column of air rotating up to 300 mph, touching the ground

tropical — a warm climate located near the equator, usually having lots of precipitation

tropical depression — rainstorms with winds of 38 mph or less

tropical storm — a storm of heavy rain and winds between 39 and 74 mph





tundra — a region usually located at high altitude. The ground is permanently frozen.

typhoon — another name for a hurricane

ultraviolet light — the range of wavelengths just beyond violet in the visible spectrum. Invisible to humans, yet capable of causing skin cancer.

warm front — a boundary of warm air which is pushing out cold air in the atmosphere

water vapor — invisible water distributed throughout the atmosphere

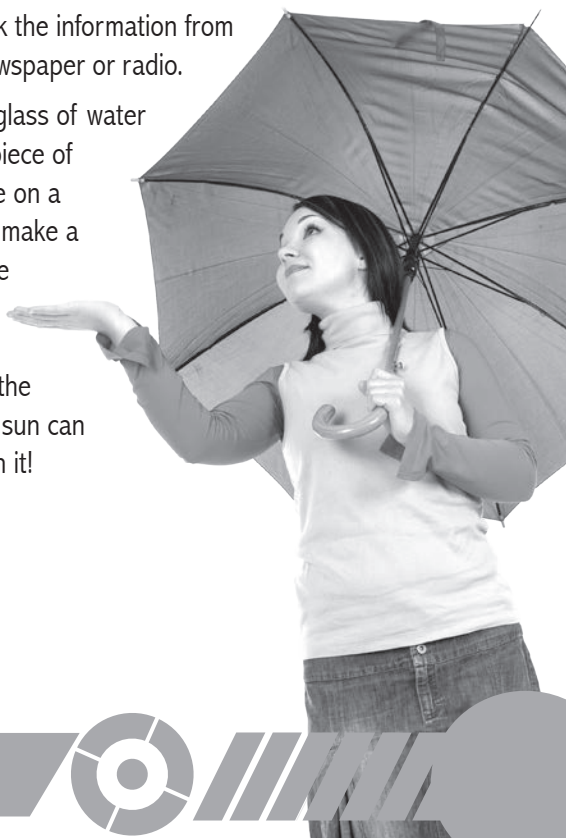
weather balloons — balloons used to carry weather instruments into the atmosphere to gather data

weather vane — an instrument used to indicate wind direction

wind chill factor — the temperature of windless air that would have the same cooling effect on exposed skin as a combination of wind speed and air temperature

Weather Activities

1. Create your own weather tracking chart to measure wind direction, wind speed, temperature, precipitation, and types of clouds observed. You may track the information from your local newspaper or radio.
2. Take a clear glass of water and a white piece of paper outside on a sunny day to make a rainbow. While holding the glass, move it over the paper so the sun can shine through it!

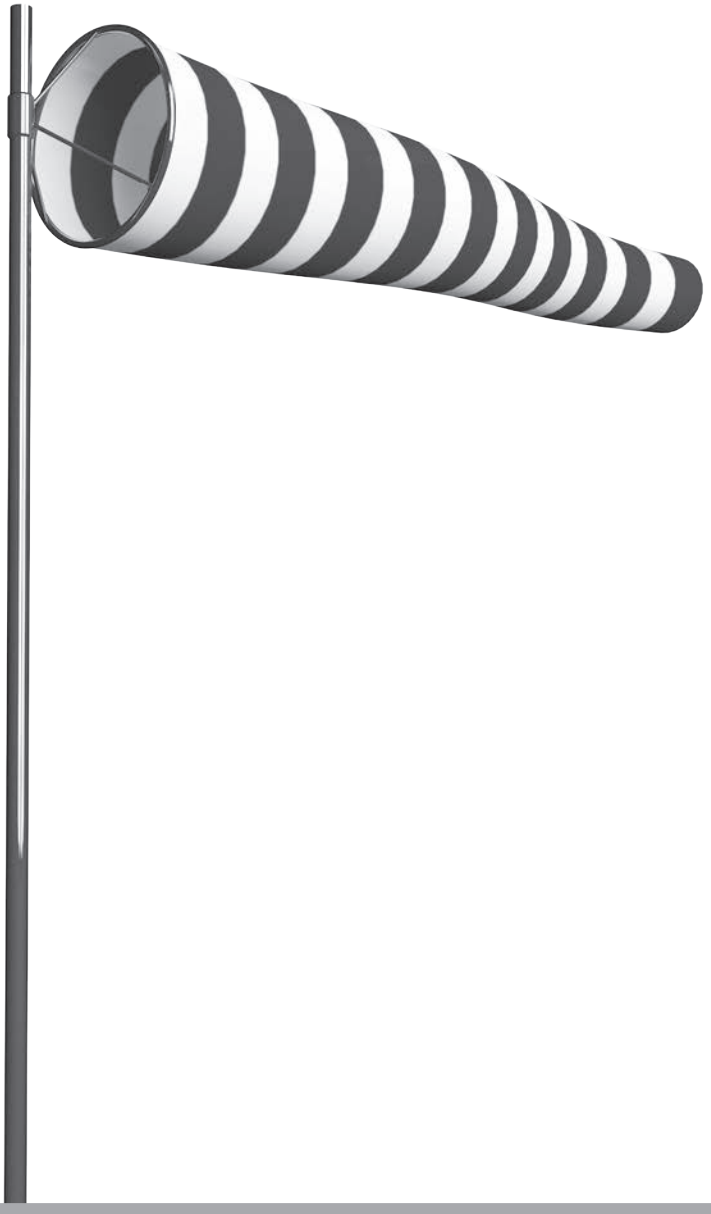




3. Read Genesis 9:8-17. Talk about how thunderstorms can remind us of God's promises.
4. It is important to know how to prepare for and stay safe in bad weather. Have your family create a list of safety precautions for the type of severe weather experienced in your location. In addition, create an emergency supply kit for your family to have on hand in case you experience weather related issues such as power outages or blocked roadways.
5. See if you can create a hurricane! Visit the National Weather Service website (www.noaa.gov) and search for Create-a-Cane. This is an interactive tool that allows you to create a hurricane. After you have successfully created your hurricane, make a list of the conditions necessary for a hurricane to develop.
6. In 2012, The Weather Channel began "naming" significant winter storms. Look up some of the names they have used so far.
7. Watch a flags' movement on a windy day to see the direction the wind is travelling. Also, if you live near an airport, go there to watch the wind sock move with the wind.
8. On a rainy day, put out a rain gauge to see how much rainfall there was in your area.
9. You are able to observe the current weather situation in just about any part of the world by searching weather.com. For one week, chart the weather pattern of a place on the opposite side of the world from where you live. How does it compare to the weather in your area?



10. Look up the details about the stages of hurricanes in a book or online. It starts with a tropical wave. This becomes more powerful as a tropical disturbance, tropical cyclone, tropical depression, tropical storm, and finally a hurricane.





INTRO TO PALEONTOLOGY

Cultural Studies

Paleontology is the study of fossils. Fossils have fascinated humans for centuries. From the smallest diatoms to the largest dinosaurs, finding a fossil is an exciting and rewarding experience. Learning about fossils, their origins, and how to collect them can be both fun and educational.



Terms to Know and Spell about Fossils

Use this quick reference of terms to learn a bit more about fossil terms, and then find some additional reference books in your home or local library to further your study!

arthropod — all creatures with jointed legs and a tough outside skeleton (exoskeleton) made of chitin: insects, crabs and shrimp, spiders, centipedes, and millipedes

cephalopods — means "head-footed," since their tentacles come out of their heads, the most complex of all the invertebrates are the squid and octopus in the mollusk class

diatoms — microscopic, one-celled plants whose walls are decorated with glass (Si02) in exquisite patterns, mined and sold as diatomaceous earth

echinoderms — meaning "spiny-skinned," members of the starfish/sea star group usually have bony plates and spines

gastropods — means "stomach-footed," since they walk on their stomachs, mollusk class which snails belong

living fossils — creatures found alive today that evolutionists thought became extinct millions of years ago

nautiloids — fossils with tapered, chambered shells. Some are coiled like the modern nautilus, others are curved like bananas, and still others are straight, like ice cream cones

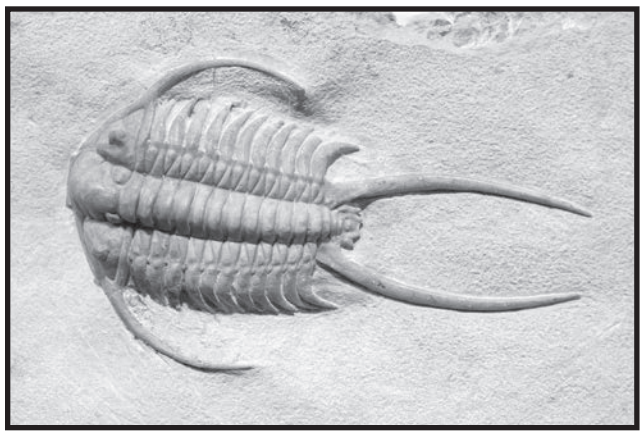


paleontologist — a person who studies fossils

protozoan — one-celled shelled animals

spicules — Sponges that have hard skeletal structures of crystal-like spines

trace fossils — are not remains of plant or animal parts, but show evidence of once-living things



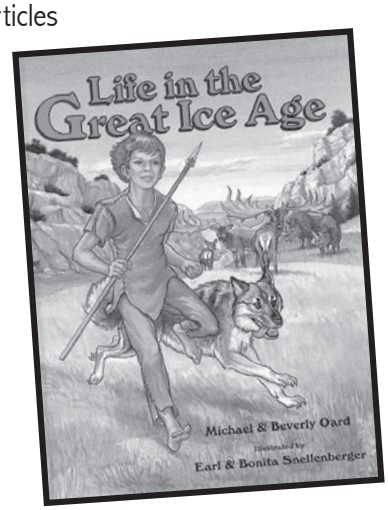
Trilobite fossil with thorns and spines

trilobite — a crab-like creature was the first fossil found buried in abundance around the world

vertebrates — animals with backbones

Archaeology Activities

1. Take a field trip to your local natural history museum. Take along a sketch pad and pencil and draw different fossil types.
2. Find out if you live near a coal mine that offers tours, and plan a visit with family.
3. Make your own fossil with the help of your parents. Materials needed: Plaster of paris or play dough, paper plates or aluminum pie plates, objects to press into medium (leaves, dinosaur toys, etc.). Pour the plaster of paris into aluminum pie plates or paper plates (or pass out jars of play dough and a paper plate)—one plate or jar per child. Have children press objects (or hands) into the plaster or play dough and lift them off, leaving the imprint behind. Allow to dry. Paint if desired.
4. Have someone bury your fossil and go on an excavation!
5. Find out more information on the Ice Age by reading *The Weather Book* and *Life in the Great Ice Age*.
6. Read the newspaper for articles about newly-discovered fossils. Clip out each article, place them in a journal, and then try and understand them from a biblical perspective.







AN EDUCATIONAL ADVENTURE!

The following section contains sample quizzes, handouts, and a quick index by panel of the *Big Book of Earth & Sky*. Focus on core areas, like caves, or do a more generalized test for comprehension. Use scientific terms or concepts as a springboard for additional study or research. These are examples of the kinds of testing and study resources you can use to turn this fun chart into a unique and fully-customizable educational adventure! You can tear out the following pages for use in your education programs or just make copies as needed.

GUIDE TO HELPFUL HANDOUTS

The following charts, diagrams, and illustrations are found on the *Big Book of Earth & Sky*, but with a simple twist. The answers are gone! Use these as fun Earth & Sky fill-in-the-blank quizzes!

* 21 - Layers of atmosphere
* 23 - Mountain zones
* 25 - Water cycle
* 27 - How precipitation happens
* 29 - Erosion
* 31 - Dirt layers
* 33 - Layers of interior earth



CAVE QUIZ!

Fill-in-the-blank Quiz for Caves

Study the quick reference of terms for caves then see how many you can fill in correctly!

Active caves, anthropods, cave, cave paintings, cenote, cul-de-sac, dripping speleothems, echolocation, engravings, karst, karst-lands, relict caves, sinkholes, spleothems, troglobites, troglophiles, trogloxenes, vadose

1. _____some of these creatures live on land and some in water (including crustaceans, centipedes, millipedes, spiders, scorpions, and insects)
2. _____caves without a flowing stream, which may have ponds or dripping water
3. _____the term scientists use for caves
4. _____stalactites, stalagmites, and columns that are growing
5. _____bats send out sound waves that hit an object and an echo comes back, helping them identify the object
6. _____creatures which live only in caves (from Greek for "cave dwellers")
7. _____creatures which spend some part of their life in caves (from Greek for "who like caves")
8. _____creatures that got into a cave by accident and which try to leave (from Greek for "foreign to caves")
9. _____those caves above the water table
10. _____either simple outlines of charcoal or mineral pigment, or true paintings with outlines, shading, and vivid pigment fills
11. _____the areas of land that host caves
12. _____ live caves that have a flowing stream in them
13. _____a water-filled shaft
14. _____usually made on soft limestone surfaces
15. _____considered a natural opening in rocks, accessible to humans, which is longer than it is deep and is at least 33 feet in length
16. _____funnel-shaped hollows, from a few feet to hundreds of feet in diameter
17. _____dripstones; especially stalagmites and stalactites
18. _____cave with only one entrance

SEEK AND FIND QUIZ!

Search the Big Book of Earth & Sky to find the answers to just WHO, WHAT, WHERE, WHAT, and HOW!

1. Just where does lava come from?

2. Just where do you find the ozone layer?

3. Just who gave the clouds their scientific names?

4. Just what is the fastest bird?

5. Just where do you find convection-type currents in the earth that may affect the magnetic field?

6. Just who were the first to reach the deepest part of the ocean?

7. Just who broke the record for the highest skydive?

8. Just where is the deepest part of the world's oceans?

9. Just where is the deepest mine in the world?

10. Just what are the four types of algae named by color?

11. Just where do meteors generally burn up in the atmosphere?

12. Just what percentage of water on earth is fresh or “sweet”?

13. Just how deep can you go underwater?

14. Just what shape is the earth?

15. Just how did a fossil reptile help scientists design better delta-wing aircraft?

Layers of Atmosphere

Fill in the blank with the correct layer of atmosphere.

1. _____

From the edge of the thermosphere to nearly 40,000 miles (64,000 km) where some molecules float out into space.

2. _____

From the edge of the mesosphere to approximately 350 miles (563 km), this is where temperatures can reach up to 440° F because of the intense solar radiation.

3. _____

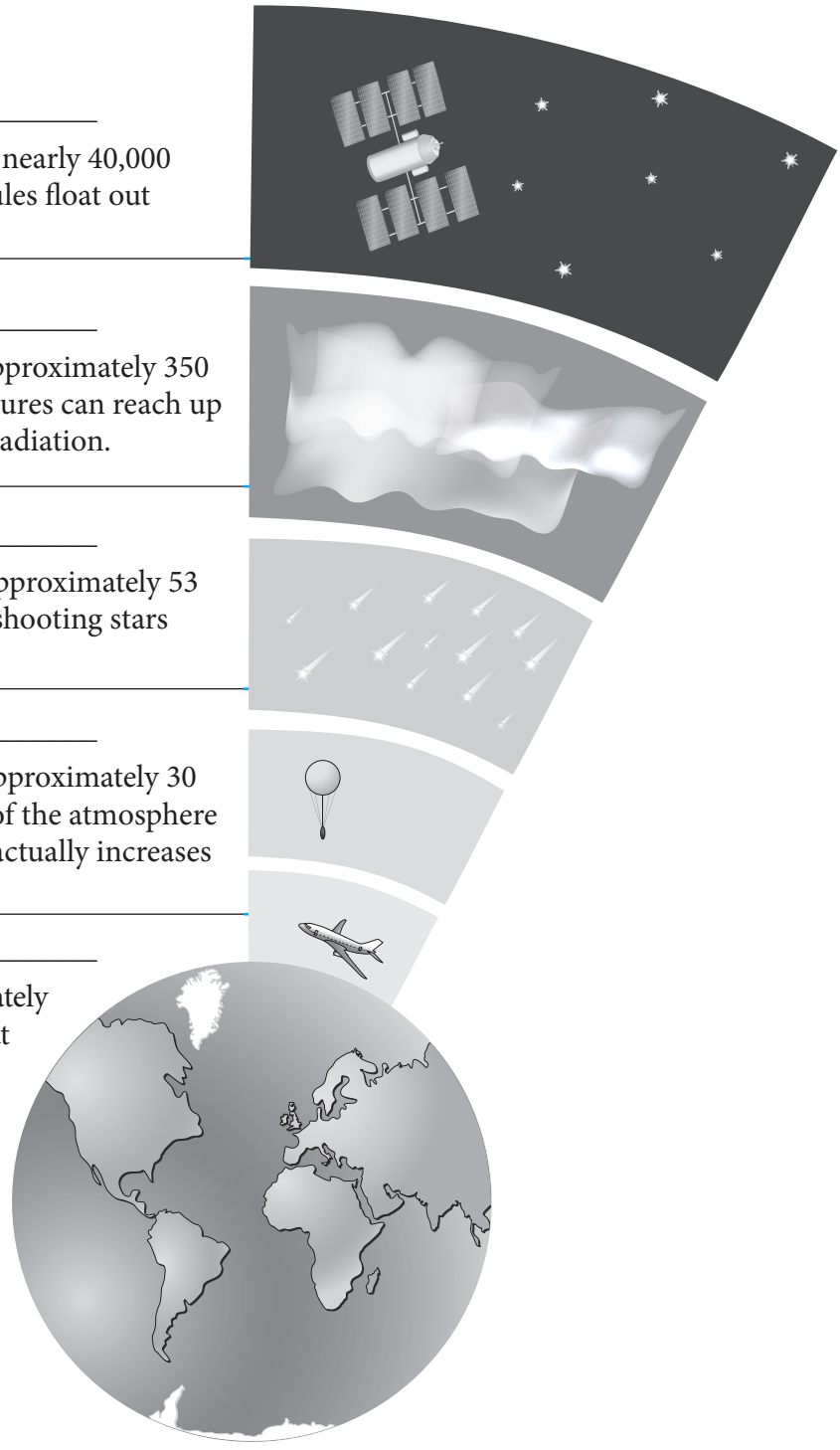
From the edge of the stratosphere to approximately 53 miles (85 km), this is the place where shooting stars (meteoroids) light up the night.

4. _____

From the edge of the troposphere to approximately 30 miles (50 km), containing 24 percent of the atmosphere and the ozone layer. The temperature actually increases the farther you go up.

5. _____

From the surface of Earth to approximately 11 miles (17 km) up, and about half that at the North and South Poles. Around 75 percent of Earth's atmosphere is found here, as well as the storms.



1. _____

2. _____

3. _____

4. _____

5. _____

Mountain Zones

Fill in the blank with the correct zone of mountains.

Mountains of the world have various zones or regions because of the varying soils, elevations, and precipitation levels. Many high mountain areas of the world display the following characteristics:

1. _____ zone



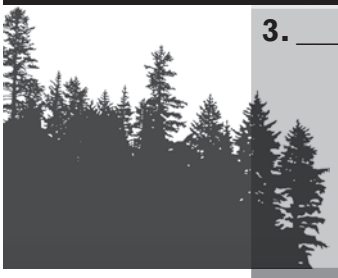
In the highest peaks this area is often covered in snow most of the year, with little or no vegetation.

2. _____ zone



This area has lots of low grasses and plants, few short trees, and a rocky, cold climate.

3. _____ zone



From lowland to the tree line, this is most often covered with either cone-bearing forests or rain forests.

4. _____ zone



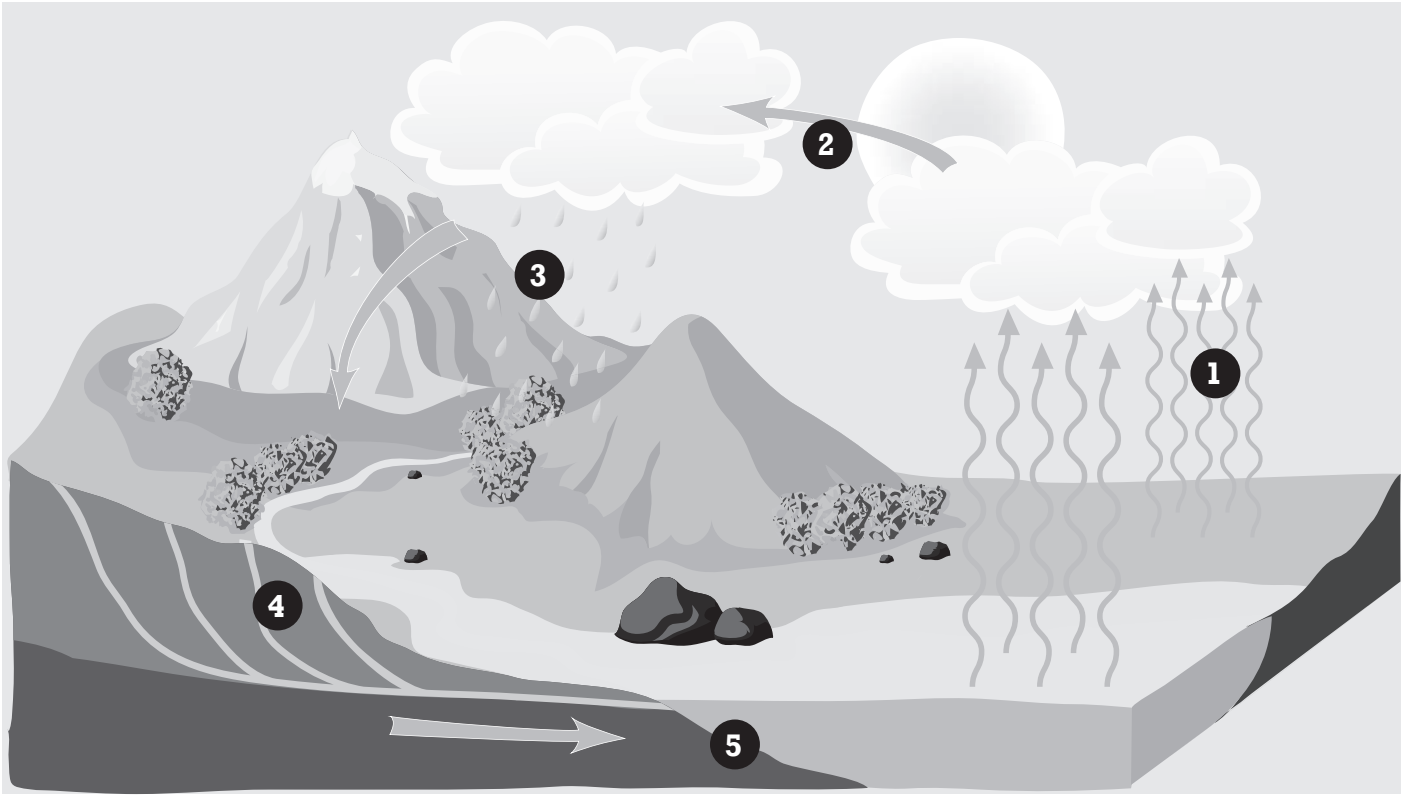
This is the base of the mountain and can be grassland, desert, or forest.

1. _____ **3.** _____

2. _____ **4.** _____

Water Cycle

Fill in the blank with the correct name of the water cycle.



1. _____

2. _____

3. _____

4. _____

5. _____

How Precipitation Happens

Fill in the blank with the correct form of precipitation.

Precipitation is the name given to any falling moisture, whether it's rain, sleet, snow, hail, or freezing rain. Most precipitation begins as ice or snow crystals in freezing temperatures of higher elevation clouds.

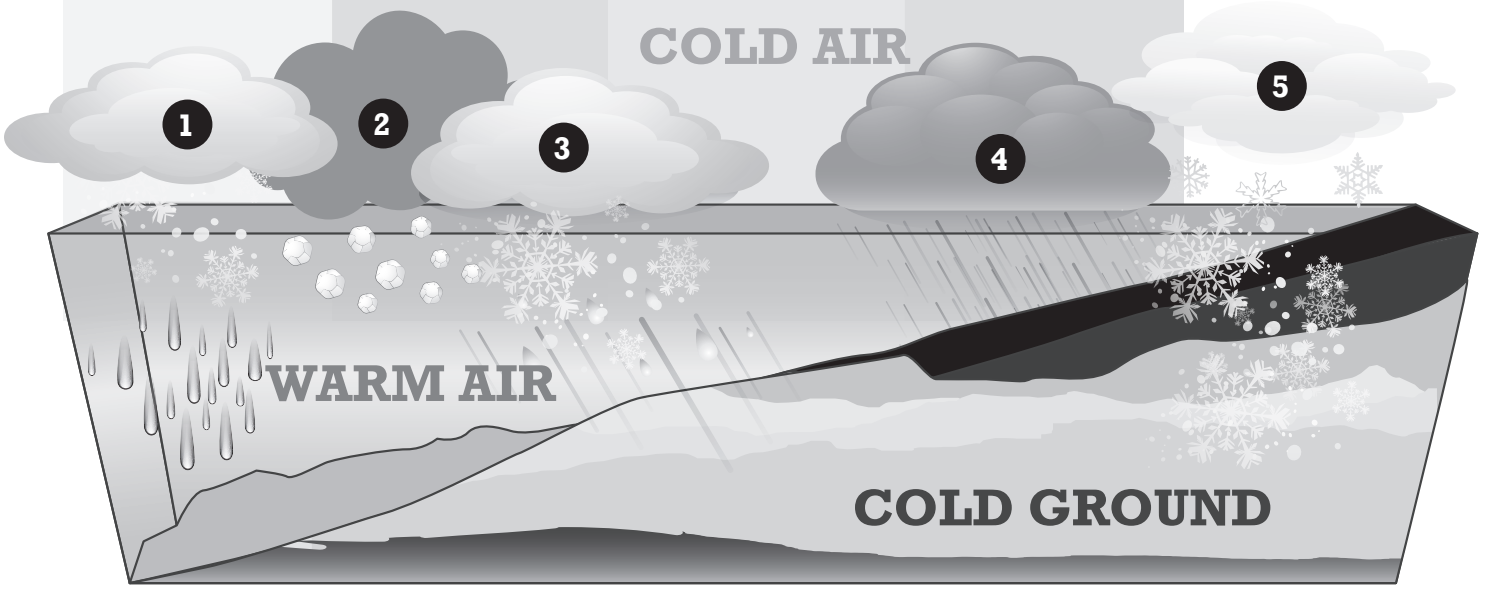
1. _____ forms when water vapor in the clouds condenses in cooler conditions.

2. _____ forms from moisture in the clouds that freezes layer on layer in cold temperatures.

3. _____ forms as normal rain but freezes on contact with cold objects on Earth.

4. _____ when raindrops are frozen by cold masses of air near the ground.

5. _____ when moisture stays frozen in cold air as it falls to the ground.



1. _____

2. _____

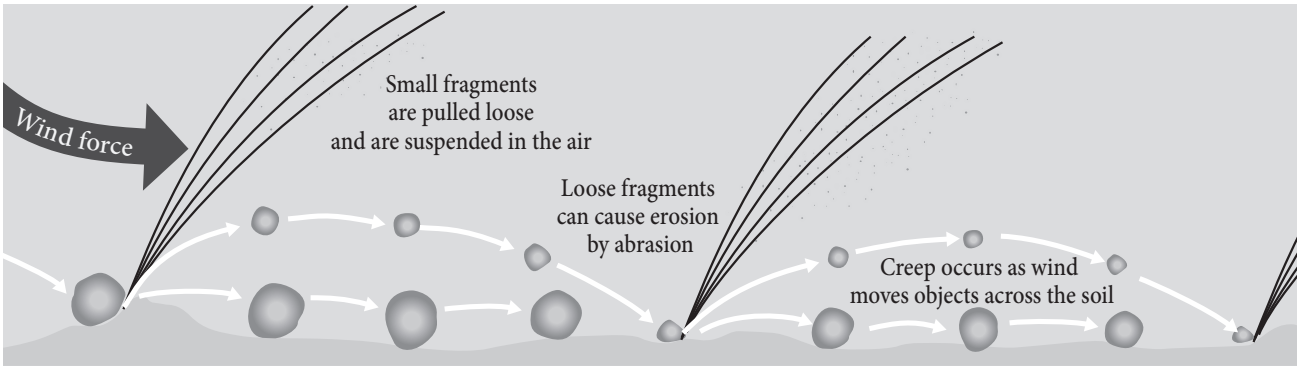
3. _____

4. _____

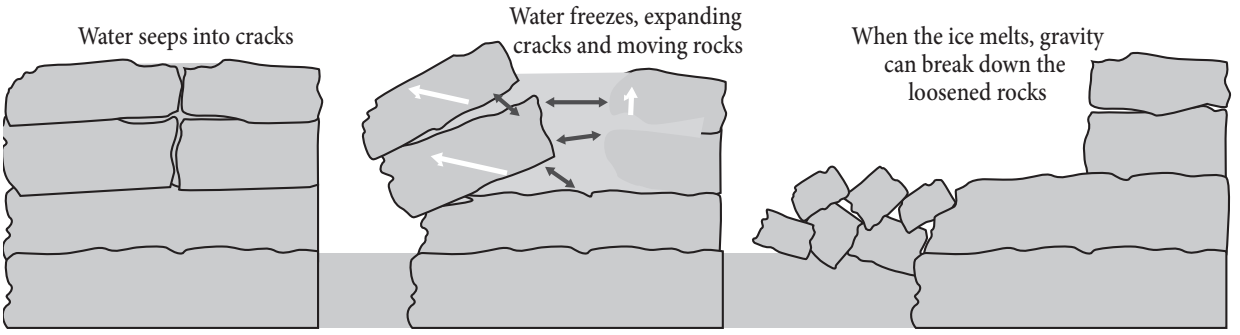
5. _____

Erosion

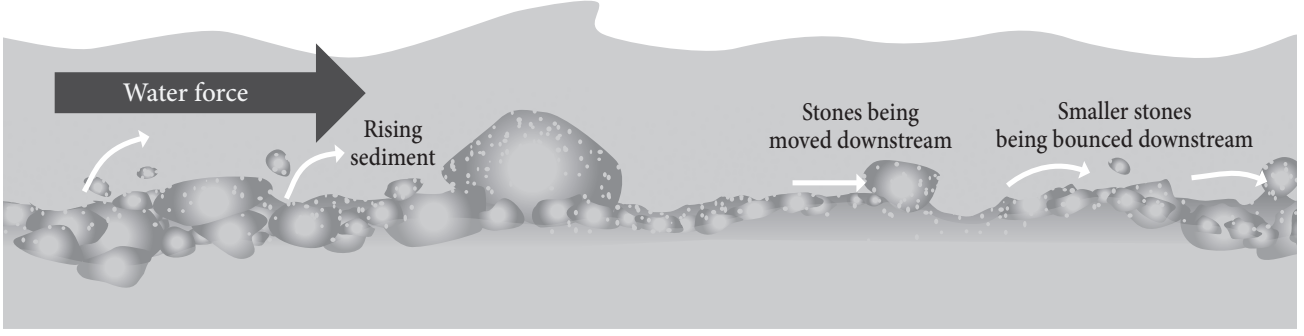
Fill in the blank with the correct type of erosion.



1. _____ **Erosion:** Wind can lift small fragments of rock or can cause these fragments to strike others, thus removing more particles.



2. _____ **Erosion:** When water freezes and then melts, it loosens stones, thus allowing gravity to eventually tear down the rock structures.



3. _____ **Erosion:** The force of a river can lift sediment, pushing along stones and causing erosion by abrasion.

1. _____

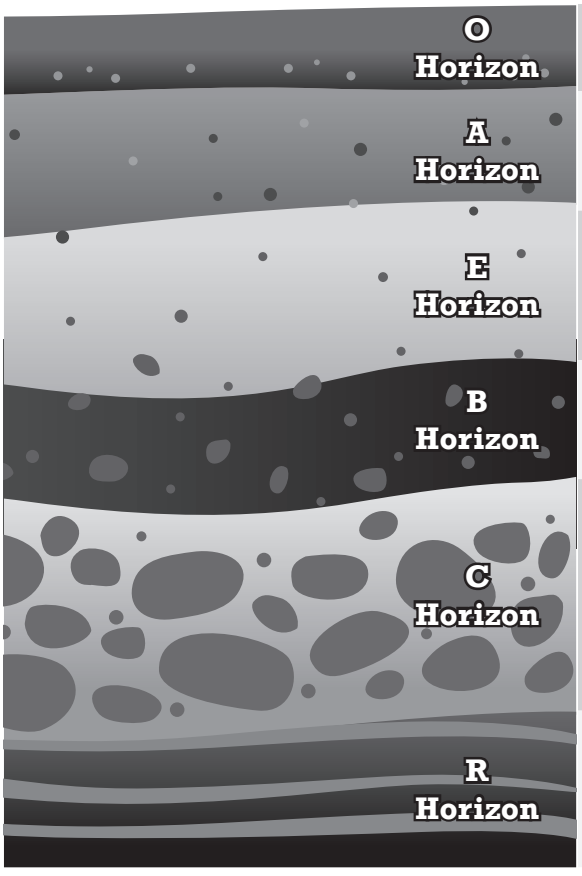
2. _____

3. _____

Dirt Layers

Fill in the blank with the correct layer of dirt.

Not all kinds of dirt, or soil, are the same; there are several types based on the kinds of material that forms it! These include: clay, sandy, peat, silty, and chalky. There are even different layers, known as horizons, within the soil itself! Usually these layers include but are not limited to:



1. This is the _____ layer of soil that is made of organic matter that has decomposed.
2. This is the layer known as _____; normally darker-colored with minerals, this is soil that is excellent for growing things.
3. This is the _____ layer that is usually lighter in color, made up of sand and/or silt; through which water can easily filter, taking minerals and clay with it.
4. Known as _____, the clay and minerals leached from the E Horizon and above is deposited here.
5. This layer is called _____. It sits just above the bedrock layer or R Horizon. The regolith is made up of partially broken bedrock. There are no nutrients that plants need to survive, so roots don't usually come down this far into the soil.
6. The bottom layer or the _____; without any kind of organic matter or loose minerals. It is basically rock that has not been broken, weathered, or eroded.

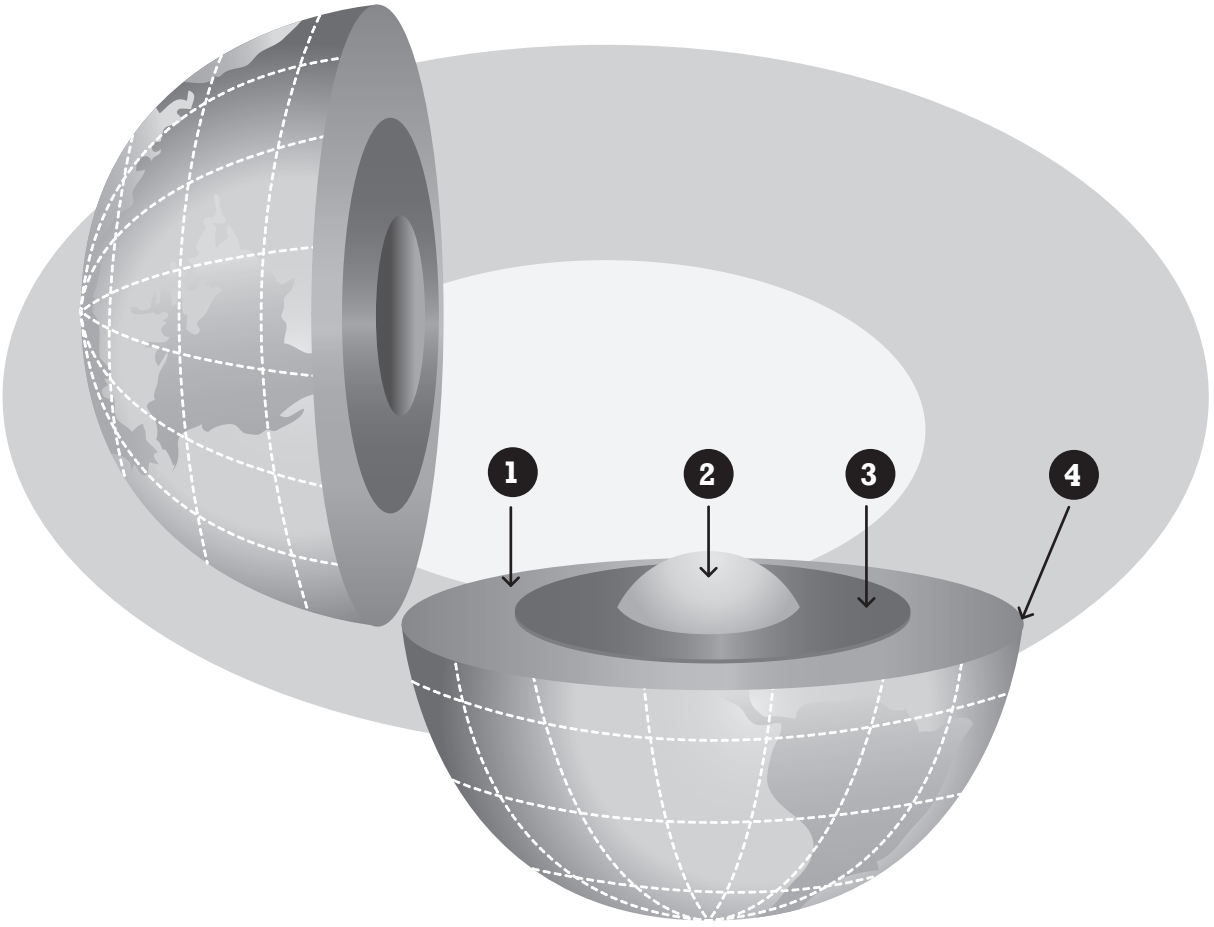
1. _____ **4.** _____

2. _____ **5.** _____

3. _____ **6.** _____

Layers of Interior Earth

Fill in the blank with the correct section of interior earth..



1. _____	The largest at 1,900 miles (3,000 km) thick.
2. _____	Under so much pressure that it is solid
3. _____	So hot that it is a molten liquid
4. _____	Includes both dry land and ocean floor

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BIG BOOK ANSWER KEY

Cave Quiz!

1. anthropods
2. relict caves
3. karst
4. dripping speleothems
5. echolocation
6. troglobites
7. troglophiles
8. trogloxenes
9. vadose
10. cave paintings
11. karstlands
12. active caves
13. cenote
14. engravings
15. cave
16. sinkholes
17. speleothems
18. cul-de-sac

Search and Find Quiz!

1. magma comes from the mantle of the earth and turns to lava once it breaks the crust (panel 13)
2. the stratosphere (panel 21)
3. Luke Howard (panel 13)
4. the peregrine falcon (panel 18)
5. the outer core (panel 1)
6. Jacques Piccard and Don Walsh (panel 4)
7. Felix Baumgartner (panel 19)
8. the Challenger Deep (panel 3)
9. Tau Tona gold mine in South Africa (panel 5)
10. yellow, red, brown, and green (panel 8)
11. the mesosphere (panel 21)
12. about 3 percent (panel 10)
13. casual surface diving is 30 feet; recreational diving limit about 100 feet (panel 11)
14. somewhat pear shaped (panel 20)
15. the fossil of the Sharovipteryx mirabilis was used to design planes that could have slower, safer landings (panel 18)

Helpful Handouts

Layers of Atmosphere

1. Exosphere
2. Thermosphere
3. Mesosphere
4. Stratosphere
5. Troposphere

Mountain Zones

1. Snow
2. Alpine
3. Mountain
4. Lowland or Foothill

Water Cycle

1. Evaporation
2. Condensation
3. Precipitation
4. Run off
5. Ground water

How Precipitation Happens

1. Rain
2. Hail
3. Freezing Rain
4. Sleet
5. Snow

Erosion

1. Wind
2. Ice and Gravity
3. Water

Dirt layers

1. top
2. topsoil
3. leaching
4. subsoil
5. regolith
6. bedrock

Layers of Interior Earth

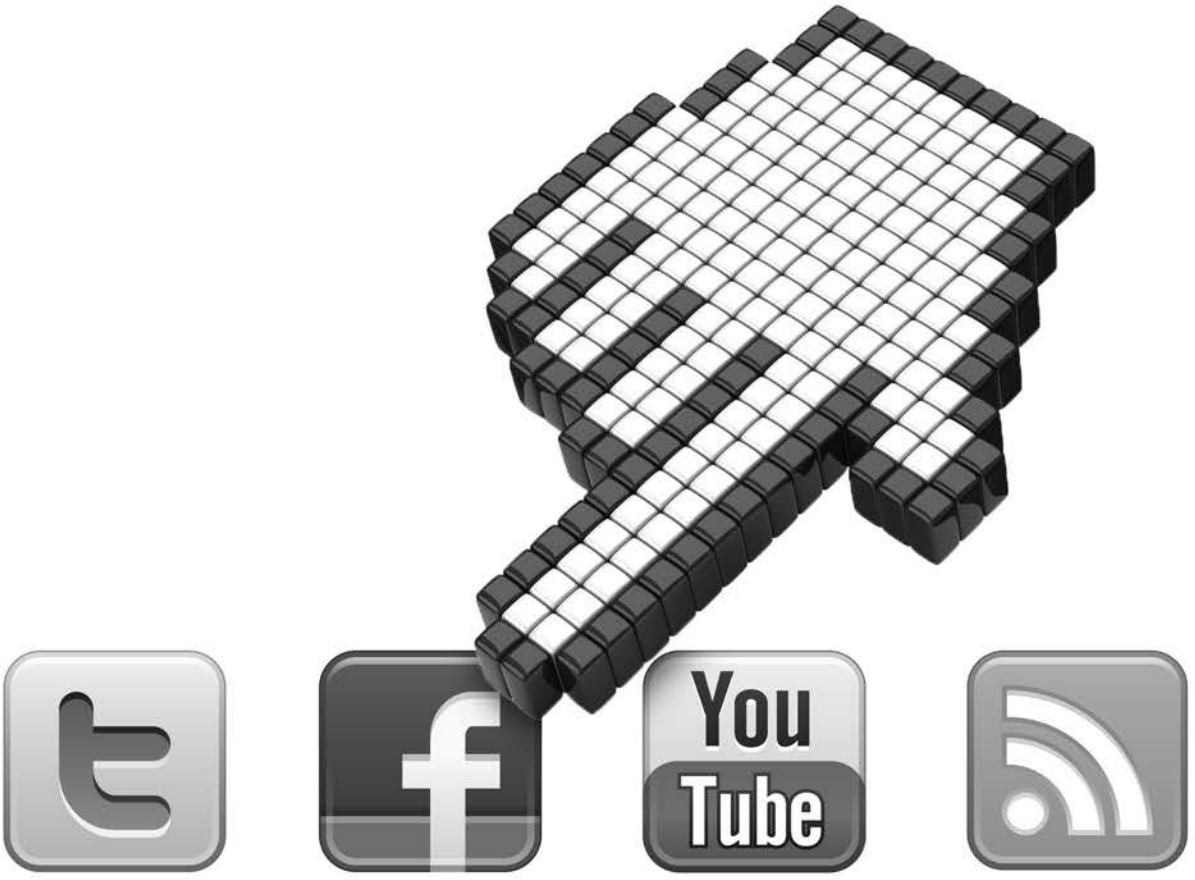
1. mantle
2. inner core
3. outer core
4. crust



Earth and Sky-related Resources for Further Reading

* *Answers Book for Kids Series*
* *Awesome Science DVD Series*
* *Children's Atlas of God's World*
* *The Complete Aquarium Adventure*
* *The Complete Zoo Adventure*
* *The Summit*
* *What's So Hot About the Sun?*
* *What's So Striking About Lightning?*
* *The Wonders of Creation Series*
* *The World of Animals*
* *World of Science*

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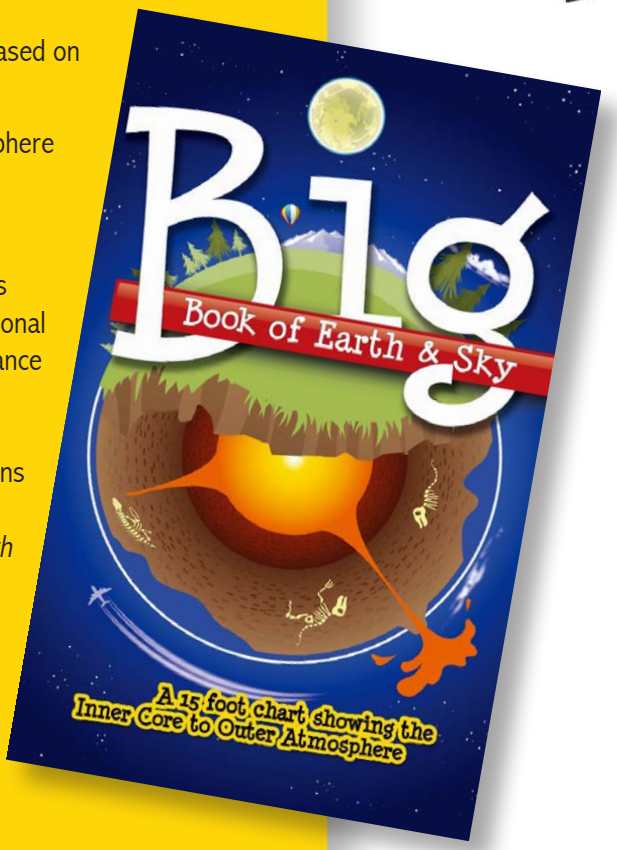
CreationConversations.com

Connecting Christians who believe in Biblical Creation

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* Examine detailed charts and graphs about the earth's crust, caves, and clouds
* Scan facts on weather, mountains, and more based on the best-selling *Wonders of Creation* Series!
* Quickly put oceans, mountains, and the atmosphere in context



The Big Book of Earth & Sky: Teacher's Guide helps bring out additional insights with questions, educational activities, and additional readings, all of which enhance this excellent reference tool and help a parent or teacher utilize it within their science curriculum. Sample questions, activities, reading, and discussions are included to serve as a starting point or source of ideas for ways you can use the *Big Book of Earth & Sky* in your education program.

Also available: *Big Book of History* is the award-winning, multi-stream timeline teaching 6,000 years of world history to children ages seven through twelve.

[just] where
do you find the ozone layer?



[just] where
is the deepest part of the world's oceans?

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