OCEANS

The sea is his, and he made it: and his hands formed the dry land. Psalm 95:5.

As you look at a map or a globe of the world, you will notice that about 70 percent of our world's surface is covered with water. Each of the bodies of water has a name, although they are connected. The Pacific Ocean is the largest expanse of water; the Atlantic Ocean, second largest. The others are the Indian, Arctic, and Antarctic oceans. The Pacific Ocean covers about 64,000,000 square miles, or about one third of the earth's surface.

Challenger Deep, in the Marianas Trench close to Guam, is the deepest spot in all the oceans. Its bottom is 37,782 feet below the surface. If we could put Mount Everest, at 29,028 feet the tallest mountain in the world, into the Challenger Deep, more than a mile of water would cover its top.

The ocean is never still; it is always moving. This movement is caused by wind and earthquakes and by the gravitational pull of the sun and the moon. The moon's pull is so strong that it causes the tides.

Many of the islands in the oceans are nothing more than the tops of mountains that project out of the deep water. Around most continents there is a plateau-like formation called the continental shelf. It gradually slopes down from the shoreline until it is under about 650 feet of water. There the shelf ends abruptly, and the bottom drops away to what is called the abyss.

I am thankful there is a God who created this earth and all that is in it. Although sin has changed many things, I know that God is in control, and that strengthens my faith. God said it, and I believe it, and that is good enough for me!

As you think about these thoughts this morning, thank God that He is in control.

ICEBERGS

Put not your trust in princes, nor in the son of man, in whom there is no help. Psalm 146:3.

Icebergs are formed in the Arctic and Antarctic, regions where it is very cold. They are formed where the glaciers meet the sea. Large chunks of ice break off and drift away. Icebergs float on the water with only about one ninth of the iceberg above the surface. There have been icebergs that were 400 feet tall, and yet only one ninth was seen. Imagine the massive amount of ice that lay hidden under the water's surface. This is what makes them very dangerous to ships, especially at night, when they cannot be seen.

Radar picks up many things on the ships' receiving units, but icebergs are only frozen water. They have no metal or minerals; so the radar cannot pick them up readily.

On the night of April 14, 1912, a ship named the Titanic was making her maiden (first) voyage. It had been advertised that the Titanic was unsinkable. It had a strong steel hull and was the safest ship afloat. On that fateful night, as everyone was drinking, dancing, and celebrating, the Titanic hit an iceberg. It ripped a long gash in the hull of the ship, which sank rapidly, taking 1,513 persons to a watery grave. An "indestructible" object met an iceberg, which unfortunately destroyed the indestructible.

We cannot put our hope, faith, trust, and confidence in men. All that man can make is destructible because only God can make something indestructible. We are not to put our trust in the things of this world. Put your trust in God this morning and ask Him to help you be indestructible today to Satan.

DESERTS

[The desert] shall blossom abundantly, and rejoice even with joy and singing. Isaiah 35:2.

Deserts are interesting places. Much can be learned from observing nature on the deserts. Ellen White, describing the results of the Flood in the book *Patriarchs and Prophets,* wrote, "Where once had been earth's richest treasures of gold, silver, and precious stones, were seen the heaviest marks of the curse." (p.108.) Could she be talking about the vast desert wastes on our Planet Earth? I believe that she is.

In the sands of the deserts are millions of little seeds that are doing nothing. Some wait in the soil for several years until they have the right conditions to grow.

Although we know that some animals burrow under the sandy soil to escape the heat, it is also true that some plants in a way do the same thing. Take, for example, the "living stone" plant, which is a native of Southwestern Africa. It grows in the sand with only a part of the leaves above the ground. These portions are called the windows, because they take in the sunlight. The plant must lose as little water as possible, and living almost totally submerged in the sand helps it do that. In fact, reducing water loss in one way or another is a trait of most of the desert vegetation.

The plants that survive in the desert have become so adapted to their situation that water loss is at a minimum. Some plants have a waxy surface that helps keep the water in; others have dense mats of silvery hairs that reflect the sun, thus reducing evaporation. As water becomes scarce, some plants shed their leaves so as not to need so much water; when the rain comes they grow their leaves again. With moisture and rain, the desert blossoms out in a magnificent way.

God is waiting for the time when He can see His world in full bloom again. He also wants to see us blossom for Him in a spiritual way. Ask God to help you blossom as a Christian today, and ask Him to come soon so that you can see the earth made new, in full bloom and living color.

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WATERSPOUTS

Deep calleth unto deep at the noise of thy waterspouts: all thy waves and thy billows are gone over me. Psalm 42:7.

I am curious to know how David knew about waterspouts. Do you suppose there were geysers back in his time? If not, how did he know about them? I'm puzzled; how about you?

There is some water under the earth's surface, just as there are oil and other substances. The water that many people drink comes from wells. On some islands, such as Bermuda, rainwater is caught on roofs or in large tanks. Most of us use well water, or purified river or lake water, or seawater that has been desalted.

In most areas where there is underground water, the rocks and sand that hold it are cool. In some areas the water table (the depth underground at which water is found) is shallow, and in other places it is deep. We used to have a six-foot well in our backyard in Colorado. Also along the Platte River in Nebraska the water table is just a few feet deep. In other places people have to drill hundreds of feet to find water.

There are areas underground where the rocks are hot and the water is under pressure. As the water runs into these reservoir areas, it heats to a super hot boiling point. Under this pressure, water and steam spout out from cracks or fissures into the air. This is how a geyser works. You may have seen those in Yellow-stone National Park. A famous one is Old Faithful, which spouts off at regular intervals. The repeat performance of the geyser is caused by more water running into the heated area; when it becomes super hot, it spouts off again.

As David recalled his love for the Lord and his desire to serve the Lord, he realized that his life needed some help. That help could come only from the Lord. Pray, as David did, that God will come in and take over in your life. Thank Him this morning for His ever-abiding presence in your life.

GLACIERS-RIVERS OF ICE

Out of the south cometh the whirlwind: and cold out of the north. Job 37:9.

I have always been fascinated by the glaciers in the mountains of North America. The Rocky Mountains in both the United States and Canada have some very large glaciers. As I walk out on them I have an uneasy feeling; I watch for cracks that are always present, somewhere. I don't want to fall into one.

A glacier is an interesting formation. It is usually in an area that has a lot of snowfall but a short melting period, such as at a high altitude. I wondered why those cracks or crevices were always present, and I found out. The ice of the glacier moves downhill. As it comes to uneven terrain, the top of the glacier continues to move and the bottom slows down, so a split is formed. Scientists have discovered that the ice of the glacier moves faster in the center and slower on the edges.

As glaciers move downhill, they will flow at different speeds.

When the glacier gets to a warmer zone, it melts completely and forms a creek or river. Since the weather is always cool where glaciers form and the summer short, the glacier doesn't usually disappear entirely. As the snow falls and builds up, the snow turns to ice, and this accumulates. Many of the North American glaciers may be between 200 and 300 feet deep. They usually form in valleys where they are protected, but they may spill down into open areas as they move and melt.

It is interesting that even in Bible times prophets wrote about the cold coming from the north. In the Northern Hemisphere, cold still comes from the north. The farther north you go, the colder it is. The farther south, the warmer it gets, until you get to the southern part of the Southern Hemisphere; then it gets cold again.

God's love for us is never cold or hot. It is always the same temperature, and He invites us to take advantage of His love. He will do much for us, because He loves us. Tell Him how much you love Him this morning; then show Him throughout the day, by the things you do, that you really do love Him.

PRAIRIE, PAMPA, SAVANNA, STEPPE, VELDT

And I will send grass in thy fields for thy cattle, that thou mayest eat and be full. Deuteronomy 11:15.

What is nicer than a prairie, pampa, savanna, steppe, or veldt? What are all of these places? They are the same, just different names in various languages for an area that is treeless grassland. *Prairie* is English, *pampa* is Spanish, *savanna* is African, *steppe* is Russian, and *veldt* is Dutch. The prairies are in the United States, the pampas in Argentina, the savannas in Africa and the veldts in South Africa, and the steppes in Russia.

People have asked the question for years: what makes a grassland? Why no trees? It is believed that the bison had much to do with there being no trees on the prairies of the United States. As the small tender shoots of trees came up, the bison ate them or trampled them into the ground, so they didn't grow. But though they ate the grass also, and trampled it, it continued to grow. Scientists think elephants are doing the same thing in Africa by pushing down trees to eat the foliage.

Grasslands are homes for many varieties of wildlife. Many birds live in the grasslands. Those that cannot nest in trees because there aren't any, use the grass or ground as nesting areas. Many rodents and other smaller animals live in the grasslands and burrow into the earth for their homes. Large animals and birds also live in some grasslands. They eat the grass as the main part of their diet. Hundreds of species of insects also claim the grasslands as their home. They live on the grass, in grass clumps, and in the ground. These creatures also provide food for the other inhabitants of the grasslands.

Jesus created the grass on the third day of Creation. It was to be for food and to beautify the earth. Can you imagine how ugly this world would be if it weren't for green grass? Thank God this morning for the beautiful grass that covers the ground.

SAHARA DESERT

The wilderness and the solitary place shall be glad for them; and the desert shall rejoice, and blossom as the rose. Isaiah 35:1.

The Sahara Desert is famous for its great heat and dryness. From 2 to 3 million people inhabit this desert, which covers more than a third of the northern part of Africa. Water is very scarce, but in this great expanse of land there are some beautiful places called *oases*. Since each oasis can support only a few people, the men go into the northern cities and find jobs. With the money they earn, they buy things and take them back to their homes in the oasis. Water comes from deep wells. The main source of power for pulling the water out of the wells is the donkey. When the water has been drawn, it is put into animal-skin bags, taken to the house and stored.

In the month of July the sun passes directly overhead, dividing the day into two equal 12-hour periods. With the intense midday heat, the farmers go to their farms early in the morning and return about ten o'clock. Then they take a long siesta and rest until the late afternoon worship time.

The desert dwellers have to continually battle to keep the wind from piling up the sand in their oasis. Each family has a house that is made of mud and cement. The houses are built around a courtyard, which helps protect the people from the blowing sand. Each room has a door that opens into this central courtyard.

Most oases have date palms growing around them. The dates are eaten, and the wood is used for pole rafters in the houses. The dates are harvested once a year, and each tree may yield more than 100 pounds of dates. All of the water used to irrigate the date palms must be carried from the wells.

What a joyful event it will be when Jesus returns and remakes this earth. These barren and desolate places will be beautiful again, as they were before sin entered. Thank God this morning for His restorative power, and ask Him to help make you a kind and friendly person today.

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THE SILVER DOME

The devil taketh him up into an exceeding high mountain) and sheweth him all the kingdoms of the world) and the glory of them. Matthew 4:8.

If the mountain the devil took Jesus to was in Palestine, it was not high as the world's mountains go. The Flood has left many high peaks and mountains.

In the country of Tanzania, on the African continent, stands Mount Kilimanjaro, a very famous mountain. It is the highest mountain in Africa. The highest peak of the mountain is called "Kibo"; it is 19,340 feet above sea level. The area around this peak is glacial. Because of the constant ice and snow, the early native Africans called the peak the Silver Dome, because as the bright African sun hit the ice caps and reflected down to where the people lived, it no doubt looked silver.

Kilimanjaro means "mountain of greatness" or "mountain of caravans," depending on which dialect you use. Kilimanjaro has three volcanoes within it. One, called the Kibo Crater, is the youngest. On a clear day Kilimanjaro can be seen for about 100 miles. It rises nearly four miles into the air and is located about 180 miles from the East African coast.

Although Kilimanjaro is so noticeable, the early explorers seemed to ignore it. Not until May of 1848 was it discovered by German missionaries named Johannes Rebmann and Ludwig Krapf. Today people come from all over the world to climb Kilimanjaro. Although it is somewhat difficult to climb and the air at the top is very thin, there are rewards for those who conquer the climb. One can see much beautiful country round about.

Satan took Jesus up on a high mountain and showed Him all around and told Him that all would be His if He would worship him--the devil. I am thankful that Jesus didn't fall for the devil's bargain, and that He is our loving Savior and Lord today. Thank Him for His love and for His decision to reject the devil's invitation.

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MOUNT EVEREST

And he carried me away in the spirit to a great and high mountain, and shewed me that great city, the holy Jerusalem, descending out of heaven from God. Revelation 21 :10.

The highest mountain in the world is Mount Everest, situated in the Himalayan Mountains on the China (Tibet)-Nepal border. This mountain was named after Sir George Everest, an early surveyor of India. Formerly it was known as Mountain XV. Its peak is 29,028 feet above sea level. The air is thin at the top, and the peak is virtually devoid of any wildlife. There are fierce winds and low temperatures, usually well below freezing.

This mountain peak has lured many climbers since the first recorded ones in 1921 when a British expedition party, under the leadership of George Mallory, tried to climb it. They made it to the 22,900-foot mark and had to turn back. The next year seven of Mallory's men were killed in an attempt to climb the mountain. In 1924 Mallory and a friend were seen at the 28,126-foot mark, but were never seen nor heard from again. They were trying to climb the most treacherous east side, which was not attempted again until 1982. That team failed also, but a team of men did succeed in reaching the top by the east side on October 8, 1983. It took them five and a half weeks to make the climb.

The first climbers to reach the summit, as far as anyone knows, were Edmund Hillary and a Sherpa, Tenzing Norgay, on May 29, 1953. Mount Everest has been a challenge to many climbers. Sixty-two of them have lost their lives trying to make the ascent. One hundred and forty-nine climbers, both men and women, have made the ascent successfully in 68 groups representing 21 nations. Truly this has been a challenge.

Climbers say the sight from the top of Mount Everest is beautiful. The revelator John saw the New Jerusalem from a high mountain and described it as beautiful, too. Tell God this morning how much you'd like to be in His New Jerusalem, and in 1987 try to live the kind of life that will please Him.

HYDROTHERMAL VENTS

I know thy works, that thou art neither cold nor hot: I would thou wert cold or hot. Revelation 3:15.

A group of scientists were working on the Pacific Ocean near the Galapagos Islands, close to the west coast of South America. They were dragging through the water a camera and thermometer about 8,600 feet down. They were looking for hydrothermal vents, a place where hot water comes out of the ocean floor. They had heard of such but had never discovered any. All of a sudden, the thermometer shot way up. The boat was stopped, and three scientists went down in a little mini-submarine called *Alvin.* They found the hydrothermal vent, and around it strangelooking creatures called tube worms. ,

Apparently what happens, according to the scientists, is that the cool ocean water is sucked through openings in the ocean's floor. It passes over hot rocks near the earth's core, and this hot water then comes streaming back up through other vents in the ocean's floor. The water takes on a black appearance, and the hot stream is called a "black smoker," resembling the lava from a volcano.

As this water goes from cold to hot and goes through a portion of the earth, it picks up some chemicals and forms a chemical "soup." As it flows upward out of the earth this soup is affected by bacteria in a process called *chemosynthesis*. In the process the bacteria convert the compounds of the "soup" from carbon dioxide into the organic molecules that make up carbohydrates and sugars. Did you understand all that? It is just a process of making food by bacteria.

Scientists believe that there is heat inside this earth. "There is fire there," they say. God wants us as Christians to be on fire for Him so that He can use us. Unfortunately, many of us are cold and say nothing to anyone about our love for Jesus. Ask Jesus to help you be "hot" for Him today.

TSUNAMI WAVES

Thou art a God ready to pardon, gracious and merciful, slow to anger, and of great kindness, and forsookest them not. Nehemiah 9:17.

The word *tsunami* comes from the Japanese word meaning "harbor wave." These large waves are sometimes called *seismic* waves or *tidal* waves. Tsunamis are the result of submarine earthquakes or volcanic eruptions, and there is no way of stopping them. When a quake is deep beneath the floor of the ocean, these tsunami waves move very rapidly--up to about 450 miles per hour. Where the water is deep, the height of the wave is not very high, but as the waves reach the beach where the water is shallow, the waves may reach up to 100 feet high, but with much slower speed.

On May 26, 1982, a Japanese fisherman was tying up his little fishing boat when he felt the water beneath him recede quickly and then begin to rise. He knew the sign and ran for high ground. As he did, he noticed a group of school children having a picnic on the beach. The wave came and washed them all out to sea. As soon as the wave receded, the fisherman ran to his boat, untied it, and went to rescue the children. He was able to rescue ten, and others clung to floating wood and offshore rocks. Thirteen of the 43 children drowned. They had no warning or idea that this 30-foot wave was soon to sweep upon them. There had been a quake about fifty miles away, and within seven minutes from the time of the quake the large wave hit the beach where the children were picnicking.

In our lives, some of us set off tsunamis. When .something doesn't go our way, we have an "earthquake" in our lives and "let go" with our temper and words. Usually someone else, often someone who is innocent, gets the brunt of our rampage. Should our lives cause tsunamis?

Right now, why not get down on your knees and ask God to help you not to "lose your cool" today, fly off the handle, or say anything unkind to anyone? If you want to be a good person today, ask Jesus to help you. He will, I know, because He gave me victory over my temper. He will help you if you ask Him.

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EARTHQUAKES

And, behold, the veil of the temple was rent in twain from the top to the bottom; and the earth did quake, and the rocks rent. Matthew 27:51.

At the time of the crucifixion of Christ, the earth quaked and opened up. Quite an event! I'm sure that the earthquake at the death of Jesus was the same type as we feel today. Some scientists estimate that some of the large quakes release energy equivalent to about 200 million tons of TNT or 10,000 times more energy than the first atomic bomb. The rocks in the outer layer of the earth are continually being squeezed and stretched by forces within the earth. When this force is more than the rocks and elements can stand, the rocks rupture and are displaced, causing an earthquake.

Have you ever experienced an earthquake? One time I was walking down a street in southern California when the asphalt began to roll under my feet like sea waves. Another time, I was in our Inca Union Conference office in Lima, Peru, when a large earthquake struck. Our building leaned and rocked. People ran to the streets and cried and yelled. At the moment the quake hit, I was meeting with fellow workers in a Welfare Services committee, known as SAWS. I immediately went to work with my staff, and we went to the north of Lima, where the center of the quake had been. More than 60,000 people were left without homes there. Many were taking their "siestas" (naps) and were either hurt or killed.

Earthquakes produce much damage. While the Bible does not tell us about all the damage that happened at Christ's death, the earth did open up and some damage was done. The shock waves must have been felt for a long distance. Think of it, even the earth quaked at the death of the Creator!

I suggest that you think about the importance of the death of Jesus today. As you pray, ask God to help you understand the significance of that event when, with His death, Jesus paid the price for sin, even though He had never sinned. He died for you and me. Let's be thankful today to Jesus.

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MOUNT ST. HELENS

What manner of persons ought ye to be in all holy conversation and godliness, looking for and hasting unto the coming of the day of God, wherein the heavens being on fire shall be dissolved, and the elements shall melt with fervent heat? 2 Peter 3:11, 12.

I t was a tragic day, the fateful day that Mount St. Helens blew its top. Scientists had been watching and recording the tremors of that beautiful mountain. Gases were spewing out of the top. Then, with a mighty blow, it exploded; and hot ashes and all kinds of materials were sent flying into the sky.

As the hot lava flowed down the sides of Mount St. Helens, it covered many beautiful lakes and rivers, thousands of acres of. trees, and millions of wild creatures. The National Forest Service took a census after the first eruption and found more than 67,052 game animals dead. After the ash finished falling, they counted more than 1,483,900 game animals dead and more than 11 million salmon and other fish destroyed. It is estimated that more than one and a half million birds lost their lives as well as unnumbered nongame animals, amphibians, reptiles, and insects.

Twenty-six lakes were totally destroyed and twenty-four others partially ruined. More than a thousand miles of streams were ruined in that they were made inaccessible because of the lava flow.

In some areas around the mountain, the ash piled up from three to four feet deep. Forestry officials hoped that the rain would not make this ash like cement, which would completely eliminate any future use of the land. As one ranger said, "Nature has a way of taking care of herself."

God gave this world some marvelous methods of taking care of itself, of repairing what has been partially or totally destroyed. I thank God that He has given this earth this power, and that many ugly places, destroyed either through natural processes or by man, have somehow acquired some vegetation and eventually covered up the scars. Thank God that He will cover up those scars in your sinful life with the robe of His righteousness. He has promised, and He will do it.

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SPEWING VOLCANOES

But the day of the Lord will come as a thief in the night; in the which the heavens shall pass away with a great noise, and the elements shall melt with fervent heat, the earth also and the works that are therein shall be burned up. 2 Peter 3:10.

Although scientists are often aware, long before the "blowup," that a volcano is about to erupt, they do not know exactly when it will happen. They can only warn people that live nearby and hope for the best, because there is very little that anyone can do to stop the heavy lava flow or ash fall that usually comes out of a volcano.

In Sicily in 1983 an active volcano, Mount Etna, could not hold back the pressure any longer and blew up. The people in the surrounding towns were terrified and wanted something to be done. The hot molten lava started flowing from the volcano at the rate of 50 miles an hour, disgorging more than 2 million cubic yards a day. (A large dump truck can hold from 18 to 24 yards of dirt at a time.) The lava was engulfing buildings, houses, and many orchards and wooded areas, and turning them into an inferno. Naturally, the farther it flowed, the slower it moved.

Large bulldozers were brought in and men worked frantically to save three towns. A team of explosive specialists was brought in to see if they could use dynamite to divert the flow of the lava. They tried, but had many problems. Their explosives detonated from the heat of the lava before the workers were ready. They finally worked out a method, but it did not change very much the course of the lava flow. It seems that once lava begins to flow it takes its own course. They did save the towns, but it was a very difficult task.

We know that Jesus is coming, but we do not know the exact time. Men will not be able to stop His coming, and many will be weeping and saying all kinds of unkind things. Pray that you will be looking up to see Jesus and that you will be able to go with Him back to heaven.

FIRE IN THE SKY

His lips are full of indignation, and his tongue as a devouring fire: and his breath, as an.overflowing stream. Isaiah 30:27, 28.

Most of you have probably seen a volcano, either in a picture or the real thing. As a child, I had the opportunity of traveling with my parents, and in our travels we saw several extinct volcanoes. Also, I had seen many pictures of volcanoes, and they fascinated me.

While living in South America it was my privilege to travel over the Andes by air, and through the Andes by car, train, and horseback. We even went across Lake Titicaca by boat at night. During those seven years in Peru, I always wanted to see an active volcano but did not have such luck.

Several years ago our family went to the Hawaiian Islands. We saw results of active volcanoes. We saw how the lava had boiled out over the top of the mountain and run downhill, covering everything as it flowed. We saw where trees had once stood but were destroyed as the flowing hot lava hit them. We saw a bubbling volcano and smelled the sulfurous gas coming up out of the cracks in the ground and from the bubbling mud. One evening as we looked from our hotel balcony, we saw fire shooting up into the sky. Now I had seen an active volcano. I was happy that the eruption was not a large fireworks that would destroy property and animal and plant life, and possibly human life. However, later it did.

As the gases under the ground get hot and expand, there has to be a way of releasing pressure, and so there are volcanic eruptions.

In life, there seem to be many times when we develop emotional pressure inside. Our friends, parents, and teachers aggravate us until we cannot take it any longer; and we erupt just like the volcano -- spewing words out all over the place. God is a God of love, and He will help us not to explode if we want His help.

In your prayer this morning, tell God you want your life to be changed. If you have been an eruptive type of person, ask Him to help you change your life to do good.

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GEOTHERMAL ENERGY

Then Nebuchadnezzar flew into a rage with Shadrach, Meshach and Abednego, and his face was distorted with anger. He gave orders that the furnace should be heated up to seven times its usual heat. Daniel 3:19, *N.E.B.*

Can you imagine the anger that King Nebuchadnezzar had against these three young men, because they wouldn't follow his orders? The heat of that furnace must have really been great to kill those who threw the three youths into the fire.

In Iceland there are some important volcanoes that have been put to good use by the people there. Put a volcano to good use, you ask? Yes, that is right. Many years ago some of the people there discovered that if they poured water on the smoldering volcanoes, it produced steam. So a system was invented whereby sea water was brought in and dumped on the smoldering volcanic fires. The steam was trapped and piped into the cities, where it was used to heat houses. There are also some underground hot springs from which water is piped. There are about 28 cities in Iceland that use this hot water for heat. In the capital city of Reykjavik, one half of the island's population (237,000) use hot water from hot springs.

The government has gone to a lot of expense to pipe this water into the homes as well as greenhouses where vegetables are raised. This "geothermal energy," as they call it, is not only used for heat but it is also used to make electricity and to power industrial plants. Some companies have even started mining the residue that comes up with the steam and hot water from the volcanoes.

Down through the years men have learned to do many things with the natural resources that are found on this earth. Heat has been a very important need. Gas, coal, oil, and other resources have been used to produce heat. God will use heat and fire to cleanse this earth for the new world that He will bring into being here. Ask Him this morning to help you be a citizen in that new clean world. He'll help you.

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AUSTRALIAN SINKHOLES

They that dwell under his shadow shall return; they shall revive as the corn, and grow as the vine. Hosea 14:7.

In the southeastern part of Australia are underground caverns called sinkholes. It is not a very glamorous name for them, but in essence that is what they are. There is a large cavern, filled with water, which goes down almost 200 feet and is called Picaninnie Chasm. This chasm is located in the largest sinkhole, called Picaninnie Pond. The water is very clear and presents divers with a beautiful underground world. One diver said that swimming in that water reminded her of just floating in space. It was almost like flying.

The rock is all limestone. It is suggested that if you could cut a slice of this out as you would cut off a piece of cake, it would look like a piece of Swiss cheese. There are about 20,000 sinkholes in this region of Australia, although many of them are dry.

Many divers have lost their lives in these sinkholes; therefore it is necessary now for all divers to obtain diving permits and use special equipment. Some of the older divers, who actually discovered many of the sinkholes, cannot now dive, due to the new regulations.

In the sinkholes named Ewens Ponds, there are lovely green plants. Water comes in through springs at the bottom at the rate of about 36,000 gallons a minute, creating quite a current; however, the plants are not disturbed. Water cress and other edible plants abound in these ponds. A person could make a giant salad with all of the greens that grow there. The rapid movement of water prohibits stagnation, and the amount of plant growth on the bottom prevents silt from muddying up the water.

From "down under" comes the lesson to us that when we are prepared properly, and under the shadow of guidelines and regulations, life will be safer. The same is true under the guidelines and care of Jesus. Thank Him today for the guidelines He has given us for our safety and future life.

BLACK GOLD

And every living substance was destroyed which was upon the face of the ground. Genesis 7:23.

God caused a great flood to come upon this earth. The water came with such force that the mountains and hills were moved, and the large majestic trees, along with other living things, were buried under the dirt and rocks. These large trees, forests of them, have fossilized, forming large deposits of coal. Oil and natural gas are also products of the fossilization process.

These large deposits of coal, gas, and oil have been used to meet the needs of humanity for heat and fuel. Refined oil has many uses, such as gasoline for automobiles and airplanes; heating oil and kerosene; diesel for trains, trucks, and ships; fuel for power plants; lubricants, waxes, asphalt, plastics, synthetic rubber, paints, perfumes, dyes, vitamins, medicines, detergents, fertilizers, insecticides, film, photographic chemicals, inks, and numerous other items. As you see, much of our life depends on oil that is pumped from the earth, which is a result of the Flood.

Natural gas was discovered under the property of Union Springs Academy in New York State. It is used to heat the academy buildings and houses. Another Christian church group found themselves heirs to a deposit of oil under their property. The royalties from the sale of this oil are used to help the needy and handicapped people in their church, provide education for the children in their church school, and pay for the upkeep on their buildings and property. If there are any funds left over, they are used in community services outreach. To this church the oil is considered "black gold" to help them meet their needs. They say, "God is taking care of us."

As you think about what .God has done, thank Him that He cared enough about you that He was willing to make provision for you, so that many of your present day needs would be taken care of by the oil that is in the earth. He is a loving God and takes care of His children. Thank Him for that today.

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FOSSILIZED WOOD IN INDIANA

Study to shew thyself approved unto God, a workman that needeth not to be ashamed, rightly dividing the word of truth. 2 Timothy 2:15.

Many types of plant fossils have been found by geologists, miners, and hobbyists. Such fossils range from a small microscopic size to about 15 feet in diameter. In the State of Indiana, an area has been discovered that has tree fossils from one to two feet across in size. The geologists have found only tree trunks with no traces of bark, branches, or leaves. It is interesting to note that apparently these trees never grew in Indiana. None of the trunks have been found in an upright position. They have all been lying down.

Scientists say that these trees "floated" into Indiana from New England or southern Canada where their species are found growing today. These scientists say that these trees came to Indiana during a 50-million-year period called the Devonian period.

We, of course, know from the Bible that God caused a great flood to cover this earth and that everything was destroyed. The large trees were uprooted, deposited, and covered with soil. They fossilized, and some turned into what we know today as coal. Have you ever wondered why coal burns so well in a stove? It has many of the same properties as wood.

Scientists are somewhat puzzled about how all was done in the past. We as Bible-reading Christians know what happened in the past. Someone once said, "It takes more faith to be an evolutionist than a creationist."

I am happy I have God's Book to help me understand what happened in the past and what will happen in the future. We have a God who loves us and gave us a "Guidebook" to guide us in this life here on earth.

Pray today that God will guide your mind as you open His Word to help you live a Christ-like life--one that will not lead to destruction but to eternal life.

PETRIFIED

Yea, they made their hearts as an adamant stone, lest they should hear the law, and the words which the Lord of hosts hath sent in his spirit by the former prophets. Zechariah 7:12.

What does it mean to be petrified? It means to be turned to stone. The children of Israel turned their hearts into stone because they didn't want to do what God wanted them to do. Figuratively they became petrified, although the petrifaction that we talk about this morning is a real physical change.

Trees are known to have become rock through the process of petrifaction. These can be seen in the Petrified Forest in the Arizona desert. It is interesting to see the trees now turned to rock.

Scientists say that in order for petrifaction to happen, several things must occur. It begins when water that is bearing some minerals circulates through buried fresh wood and combines with oxygen so that no microorganisms such as fungi or bacteria, capable of digesting and rotting the organic material, can get into the wood pores. The moving water carries dissolved calcium carbonate or silica that infiltrates and surrounds the woody tissues. As the water moves out, it leaves the minute particles of calcium carbonate or silica that infiltrate any cavities in the wood cells and replaces them. That is the process of petrifaction.

Some scientists talk about the billions of years that it took to do this, but we understand and believe that petrification is largely a result of the Flood. As you look at petrified wood you see different colors. Iron oxides produced the fiery reds, yellows, and browns. Researchers tell us that there are more than 40 minerals that are petrifying agents, but only four are common.

As the children of Israel hardened their hearts to God's word, so we, through sin, harden our hearts to the Savior. He wants to come in, but if we allow sin to penetrate our lives our hearts will petrify and Jesus cannot get in. Pray this morning, asking God to send Jesus into your life so your heart will not become hardened and petrified by sin.

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SALT

Ye are the salt of the earth: but if the salt have lost his savior, wherewith shall it be salted? It is thenceforth good for nothing, but to be cast out, and to be trodden under foot of men. Matthew 5:13.

Salt is a very precious commodity in the world, and our lives depend on it. Some problems do present themselves when we use too much of it, but some of it is necessary for survival.

Salt is obtained in several ways. There are large salt deposits under the ground that are mined by miners. There are salt wells, where a hole is drilled into the salt deposit and fresh water is pumped in under pressure, dissolving the salt, which is then pumped out in liquid form. A third method is to allow sea water to come into specially prepared holding tanks or evaporating beds. When the water evaporates, salt is left. Most of the salt for the United States comes from salt wells.

Someone has estimated that there are 140,000 uses for salt. Less than five pounds out of every 100 pounds of salt is used for food seasoning. Salt and its by-products are used by meat packers to preserve meat, by chemical companies to make chemicals, by tanners for the tanning of hides for leather. Fisheries use salt to preserve fresh fish; food and dairy processors use it in their processing. Millions of tons of salt are used in making soda ash, which is used in making soap, glass, and washing compounds.

When salt is broken down by passing an electric current through salt water--a process called electrolysis--caustic soda, chlorine, and chlorine products are made. Salt is fed to cattle in their feed or in blocks set out for them to lick. Salt is used to melt snow and ice on the highways to ensure safety, and because of the lower freezing point of salt water, salt is used in the ice-cream freezer to melt the ice and freeze the cream.

Jesus told us that we are the salt of the earth. This means that we are here to put seasoning into the world. We are to make it a better place, but sin has put a real damper to this. Jesus will help us to be the "salt of the earth" if we will allow Him to do such. Pray this morning, asking Jesus to help you flavor someone else's life today.

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SMOOTH STONES

The waters wear the stones: thou washest away the things which grow out of the dust of the earth. Job 14:19.

Is there a boy who hasn't gone to the water's edge of a small stream, picked up a smooth stone, and tried to skip it across the water? For years as I have approached a body of water I have wanted to pick up smooth stones and skip them across the water. It is still fun to see how many times I can skip the stone on top of the water.

Have you ever wondered what made stones smooth? A rock hound, that is, a person who collects and polishes rocks, will pick up the ugliest rocks, put them in a tumbler, and after some time take them out all smooth. What has happened? As the rocks roll in the tumbler, all of the sharp edges are worn off and the rock becomes smooth. A stream of water, or small river, or even the waves at the edge of the ocean, keep rolling the rocks; and over a period of time they become smooth. All of the sharp edges are worn off, and the rocks become nice smooth stones. They are not made smooth in a day but over a long period of time. Nature's forces are often slow, but because they are steady they have been able to move mountains, carve new riverbeds, and create underground caverns.

We as sinners have rough edges caused by sin in our lives. The Lord wants to have all our roughness removed, so He allows us to go through trials that will help wear down the rough edges and make us smooth and valuable "stones.".

As we meet obstacles in our lives and conquer them, roughness is worn off; as we steadily meet trials and conquer them, our character is polished. God does not promise us a smooth life altogether, but He does promise to be with us and help us through the trials.

Ask God today to be with you as you go through the day. As the trials come, with His help you will be able to meet and overcome them.

PRECIOUS STONES

And the merchants of the earth shall weep and mourn over her [Babylon].... The merchants ... shall stand afar off for the fear of her torment, weeping and wailing, and saying, Alas, alas that great city that was clothed in fine linen, and purple, and scarlet, and decked with gold, and precious stones, and pearls! Revelation 18:11-16.

Precious stones or gems come in all colors, some more valuable than others. We have already talked about pearls, which come from mollusks, and coral from sea creatures. Amber comes from the resin of fossil trees, and jet from fossil coal. This morning we want to talk about real gems. They are minerals that look like pretty stones, which are lodged generally in other rocky substances.

Color determines not only the beauty of the gem but it helps in the value of it too. There are two types of color: (1) essential, and (2) nonessential. The true color of the gem is "essential"; the "nonessential" is that which is the result of some impurity.

The degree of hardness determines whether it is classified as a gem or not. Minerals are classified by hardness on a scale of one to ten, with ten being the hardest. Diamonds are classed at ten; that is why they are used in cutting tools. In order to be classified as a gem, the rock must be a hardness of seven to ten. This hardness means that it cannot be cut with a knife or scratched by glass.

Opal and turquoise are found in areas where there is very little moisture. The prominent sources for turquoise are in the Southwestern United States and Tibet. Emeralds, topaz, and tourmaline are found in areas where erosion has exposed the old, once-molten rocks at the surface. Topaz comes from Germany and Russia, but the best are found in Brazil. The best rubies come from Burma, the best sapphires from Kashmir, the best diamonds from Africa, and the best opals from Australia. Value of the gems is determined by color, rareness, demand, hardness, and brilliance.

Since precious stones were used to build that beautiful city of Babylon, which was destroyed, God has said He will build a more beautiful city with even more beautiful and precious stones. Thank Him for the beauty in the rocks and minerals today.

SCULPTURES OF TIME

Great peace have they which love thy law: and nothing shall offend them. Psalm 119:165.

Many stand in awe as they look at the beautiful rock formations in caves and caverns. Time does not stand still in a cave; there are usually on-going changes.

Many formations grow through interaction between water and rock surfaces. How the specific forms come about may depend on the amount of water in the cave and the type of minerals in the water. In standing water within a cave, minerals in the water precipitate out to form clusters of crystals. These clusters of crystals take on various shapes and forms and are called cave coral.

We have all heard of stalagmites and stalactites. Stalactites grow from the ceiling down and stalagmites grow from the floor of the cave upward. Both of these types of formations are formed by constant dripping of water. The water evaporates, and the calcium carbonate, or calcite, forms deposits. What is fascinating is that in each cave or cavern there are many types of formations. One of the prettiest types of stalactites is the "soda straw." As the stalactite is formed, the carbon dioxide released from the water "fizzes" away and leaves beautiful crystals on the stalactite.

Gypsum crystals finer than human hair have been photographed. These crystals grow parallel to each other; they look like the lovely "angel hair" decorations some people use on their Christmas trees.

There are formations called mothballs, twisted currents, aragonite crystals, calcite chunks, gypsum flowers, cave pearls, gypsum needles, and crystal bunches. Almost all of these formations are made from calcium carbonate, gypsum, and calcite.

There are many people who live what is called a "hard life." They have left God out of their lives, and their hearts have turned to stone. Ask Jesus to help you live a happy, peaceful, and satisfied life.

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NEW JERUSALEM FOUNDATIONS

And the foundations of the wall of the city were garnished with all manner of precious stones. The first foundation was jasper; the second, sapphire; the third, a chalcedony; the fourth, an emerald; the fifth, sardonyx; the sixth, sardius. Revelation 21 :19, *20.*

Today and tomorrow we will talk about the twelve foundation stones that God will use in the walls of the New Jerusalem. Some of these precious stones are more common than others.

Jasper is a mixture of quartz and iron oxide. It comes in many colors, such as green, yellow, brown, black, and red. Sapphires come from corundum and are usually blue in color. The deeper the blue, the more expensive the sapphires are. There are other sapphires that are called the pink sapphire, the "oriental emerald," the "oriental topaz," and the "oriental amethyst."

Named after the town of Chalcedon in Turkey, where these gems were found, chalcedony has been referred to as "thunder eggs." There are many varieties of this gem, which has also been called the "white agate" because it is semitransparent to translucent with spots and circles. Petrified wood has deposits of chalcedony in it.

In larger sizes, emeralds are almost as expensive as diamonds, because they are very rare. They are usually from a pale to a rich green in color and have a six-sided form. They are a type of beryl, which is usually found in a rocky substance with many layers of pegmatite. A variety of agate, which is a form of quartz or chalcedony, is sardonyx, usually cut flat from layers of banded masses of agate. This is the cheapest of the gems and is used widely in jewelry.

Sardius, orange-red in color, comes from the iron compounds of chalcedony that permeate the colloidal silica, today known as carnelian. It is used extensively in jewelry. Mohammad is said to have used it in a ring to seal his important papers.

Why will God use these precious stones in foundations, you ask? Why not? He made them, and He wants the best for His children. The streets will be pure gold, so why not foundations of precious stones? God is a lover of beauty, and these gems are beautiful. Seek Him this morning, asking Him to help you enjoy that beauty forever.

MORE FOUNDATION STONES

The foundations of the city walls were decorated with every kind of precious stone.... The seventh chrysolite, the eighth beryl, the ninth topaz, the tenth chrysoprase, the eleventh jacinth, and the twelfth amethyst. Revelation 21:19,20, NI. v:

This morning we take a look at the other six foundation stones. Chrysolite is a type of peridot or olivine, which is a magnesium-iron silicate. The colors are yellow, brown, and green, the best colors being yellowish-green to green. The chrysolite that is yellowish-green is the most expensive of all of the peridots.

Beryl are popular crystals because they are among the largest, some of them weighing up to several tons. Within their gem materials are smaller and more valuable crystals, which are slightly harder than quartz. They vary in color from bright grass green to a dull bluish green, yellow, pink, or white.

In early days the name *topaz* was used to designate the colors from yellow to orange. Some of the topaz colors vary from brown to pinkish-red. Topaz is a mixture of aluminum silicate and fluorine, and is one of the hardest of the gems. Some of the crystals are colorless; the largest of the colorless crystals weighed nearly 600 pounds.

Chrysoprase, also a chalcedony, is a combination of nickel and colloidal silica. It is easy to get a high luster from polishing this transparent apple-green gem, thereby making it one of the most beautiful of gems. Jacinth is an orange colored gem that is probably a sapphire, which is also a corundum. It is a very hard mineral and almost transparent.

The last of the foundation gems mentioned by John is amethyst. It is a quartz and gives a show of "zones" in its purple color. The large crystals are beautiful as they radiate the zoned look. Interestingly, the best of most of these precious foundation gems come from Brazil. It is a country rich in natural resources.

What a privilege it will be to see all of these precious gems in the new earth and have them all around us! We cannot imagine how bright and brilliant they will be as they reflect the light shining from God. Ask God to help you be faithful so that you can live where precious stones are the foundations.

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BALANCED ROCKS

And Jesus said unto them, See ye not all these things? Verily I say unto you, there shall not be left here one stone upon another, that shall not be thrown down. Matthew 24:2.

Naturally balanced rocks have been found in many places in the world. It has been a marvel to millions of people how these rocks got the way they are, and what keeps them from falling. Geologists explain that in most cases, the under rock has been worn away by glaciers, wind, or running water, leaving a harder rock in place above.

In the country of Zimbabwe on the African Continent, just south of the capital city of Salisbury is a very famous pair of balancing rocks called the Rocks of Epworth. According to history, these two rocks have been balancing there for centuries and are among the oldest of the balancing rocks. These rocks appear to be an easy "pushover"; many tourists and others have visited these rocks and have tried to push them over, but in vain. The rocks teeter back and forth, but that is all. They seem to have a perfect balance, and no one has been able to move them off of their perch.

In England there are the famous balancing rocks the Dartmoor; in Australia, the Yellowdine; in Argentina, the Tandil; in the United States there are many, including those in the Red Rocks of Colorado, the Garden of the Gods in Colorado, and Monument Valley in Arizona and Utah.

As people admire these rocks, they stand in awe. "How did it happen?" they ask.

As Jesus was talking about the beautiful Temple in Jerusalem, He told the people of trouble coming when not one stone would be left standing upon another one. He linked that time with the end of the world and His second coming. I hope you are looking forward to Jesus' return, and that you will ask Him just now to help you be in His heavenly family.

NATURAL ARCHES

Hearken to me, ye that follow after righteousness, ye that seek the Lord: look unto the rock whence ye are hewn, and to the hole of the pit whence ye are digged. Isaiah 51:1.

Among the many interesting natural phenomena around the world are the natural arches. Some of them disappear after many years, due to erosion, but others still withstand the weathering of time.

There is one national park in Utah that is set aside just for the purpose of preserving natural arches; it is called the Arches National Park. In this park is the famous Landscape Arch, the world's longest natural arch. It measures 291 feet. In Panama City there is another natural arch, the flattest natural arch in the world. Israel has a number of natural arches, too. In the State of Virginia there is the famous limestone Natural Bridge. Natural arches are found where there is a lot of sandstone, for this type of rock lends itself to the making of natural arches.

Natural arches and bridges seem to abound where there is pink-tinted sandstone. This rock takes its color from minute particles of quartz and makes a very beautiful sight. In the Arches National Park a famous arch is the Delicate Arch. It looks so fragile people wonder why it doesn't fall, but it is quite solid. There is also one section in the park called the window section. People can look through at the arches and give them their own names. The tall Courthouse Towers and Fiery Furnace are named such because of their soil color and formation.

While in Hawaii some years ago, we saw along the ocean a beautiful natural arch, and I took pictures of it. Two years later when we returned, the arch was gone. The ocean water had washed away all the sandstone, and it had collapsed. We could see only where it had been.

Paul says Jesus' is our Rock of salvation; we are made in His image. Thank Him today that He made you and that He is the solid Rock of your salvation.

NATURAL HOUSES

The holy portion of the land shall be for the priests the ministers of the sanctuary, which shall come near to minister unto the Lord: and it shall be a place for their houses, and an holy place for the sanctuary. Ezekiel 45:4.

Sandstone has been a favorite building material for many because it can be easily worked. There are many beautiful buildings made of sandstone blocks of varying colors. Around the world, people have made houses of sandstone, but we'll talk about only two of these this morning.

In the central part of Turkey, the city of Urgup, which is about 150 miles southeast of the capital city of Ankara, has some unique houses. Many years ago the people noticed the sandstone columns of the area and decided that they would make good houses, so they began to carve into them. These houses are still in use today. In the larger columns churches were carved, and the people worshiped in them. More than 300 churches have been found.

In the State of Colorado is another interesting sight. The Pueblo Indians built themselves villages and communities under large overhanging rocks, actually part of a large open cave. These rocks were so large and flat they were named *Mesa Verde,* Spanish for "green table."

The Indians cut out the sandstone, formed blocks, and built their dwellings in the cliffs, under the overhanging rocks. This is the largest assemblage of Indian ruins anyplace in the United States. This mesa is about 20 miles long and 15 miles wide.

Instructions were given as to how the people in Israel should build and locate their houses and the sanctuary. N Q doubt some of their technology has come down through their descendants to our day. Provisions were made in every community for some type of religious services.

God is preparing a home for us in heaven, and we will worship our God throughout all eternity. I want to be there to do that, how about you? If that is what you want, tell God this morning in your prayer.

GYPSUM

And spared not the old world, but saved Noah the eighth person, a preacher of righteousness, bringing in the flood upon the world of the ungodly. 2 Peter 2:5.

God told Noah what to do and what He would do if Noah was faithful. Noah was faithful, and God fulfilled His promise. The Flood came and Noah and his family were saved. Under the waters of that Flood great upheavals of earth occurred. Many natural resources were buried. Today many of those natural resources are being discovered. One of these resources is gypsum.

We depend a lot on gypsum, though we may not even realize it. There is gypsum in tooth paste. Gypsum is also used in matches; in molds to make sterling-silver handles for knives, forks, and spoons; in plaster of Paris for splints and other uses; in the making of plates, saucers, cups, and other dishes to eat on; and in casts used by dentists in making dentures. Many of the houses that we live in have gypsum wallboard in one form or another. Gypsum wallboard is the biggest and most lucrative part of the gypsum business, which consumes mare than 12 million tons a year, worth about $100 million.

Early inhabitants on this earth such as the Assyrians, Egyptians, and Greeks used gypsum in one form or another. The Assyrians used it in their cuneiform scripts and the Egyptians used it in making vessels, boxes, and sculptures. It was also used in constructing the Egyptian family pyramids. The Greek word for this substance is *gypsos,* meaning chalk. Gypsum in its natural state is white and chalky. It is soft and can be scratched easily.

Gypsum is the only product that can be softened with water and that then, when it is dry, takes back its original hard form. This is why plaster of Paris is so good for casts-it dries quickly and gets hard.

God has a plan for everything that He does, and He gives us the wisdom to know how to use the natural resources He has provided. Thank God today for His foresight in your behalf. He is a God of love, so thank Him for that, too.

GEODES

Therefore thus saith the Lord God, Behold, I lay in Zion for a foundation a stone, a tried stone, a precious corner stone, a sure foundation: he that believeth shall not make haste. Isaiah 28:16.

Just by looking at a geode from the outside, it is difficult to imagine what a beautiful inside it has. But upon splitting the rock open, you can see some of the most beautiful sights in crystal formation.

There are certain places in the world where these geodes are found. A person going into the area of geodes needs to know what to look for. Rock hounds tell me that one cannot judge the beauty of a geode by the exterior appearance. To some they look like petrified cauliflower heads. However, one rock hound told me that when he sees an ugly rock he knows that there is going to be a beautiful crystal formation inside.

Geodes come in all sizes. One scientist said that his fellow scientists do not know definitely how geodes originated; their development and origin remain controversial. Some scientists believe that the geodes are still growing, through the process of evolution.

Geodes are formed by many types of crystals. In the State of Indiana, where a lot of geodes are found, 20 different minerals have been identified in geodes. Geodes are found in sedimentary rocks such as limestone; rarely are they found in shale, siltstone, and sandstone.

Geodes are composed of a thin layer of a kind of quartz called chalcedony, which is very beautiful and is named as one of the 12 foundation stones for the wall of the New Jerusalem.

While some people are trying to determine how the geodes are made, there are others who are trying to do away with the importance of the Cornerstone, Jesus. Christians know that Jesus is the true cornerstone upon whom we should build our life. Ask Jesus to help you build your life on Him today; He is the only sure foundation that will not crumble when everything else gives way. He is always there to hold you up.

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Bible Projects and Activities

- Make a list of gems and minerals mentioned in the Bible and how they were used.
- Do a Bible study on the topic of Christians and jewelry.
- Make a list of Bible stories which include earthquakes. Choose a story or two to illustrate or to portray in a skit.
- In the *Great Controversy*, chapter 40, "God's People Delivered," create a timeline sequencing the events which occur just before Christ's second coming.
- Create a book of promises which will comfort God's people during the last days when there will be earthquakes and other natural disasters.
- Study the list of gems which form the foundation of the New Jerusalem (see Revelation 21:18-20). Learn the color of each gem and draw and color your impression of how the city will look from the outside.
- Research the significance of the ephod worn by the priests who ministered in the sanctuary. Choose a method to showcase your findings.
- Research Scripture to find what people understood about the Earth in Bible times. Consider the following passages: Gen. 1:2-10; Gen. 10:25; Deut. 8:9; 1 Sam. 2:8; Job 9:4-6; Job. 26:7; Job 28: 5,6; Ps. 18:15; Ps. 24:1,2; Ps. 97:5; Ps. 104:5-13; Is. 40:22; Jonah 2:6. Choose a method to showcase your findings.
- Choose some special rocks, perhaps ones worn smooth by erosion. Decorate them with Bible promises using paint or permanent markers and give to a person who is homebound or in the hospital.
- Prepare a Bible study designed to share with a new believer what the Bible teaches about how the world came into existence and the forces which have changed it.
- Create a poster, bulletin board or set of cards which show Jesus as a rock which can be relied upon.
- As a community outreach, cooperate with your local Community Services Department or the Red Cross to prepare emergency/survival kits.
- Plan and carry out a fundraiser for disaster relief.

Writing a Report Cooperatively One Step at a Time

Group Name _____

First Group Meeting

1. Gather research materials. Consider books, encyclopedias, magazines and newspaper articles, internet sources and experts.

2. Have everyone in your group read a general article about your topic (earthquakes, volcanoes, sinkholes, etc.) from an encyclopedia.

3. Decide on the important parts to cover in the report. On the line below, list them and the person who will be responsible for each.

Topic _____ Person _____

Topic _____ Person _____

Topic _____ Person _____

Topic _____ Person _____

Topic _____ Person _____

4. Agree on a due date for each person's part of the report.

5. Continue your research and start writing.

Second Group Meeting

6. Put all of the pieces together to form one complete research report.
7. Decide who will complete the following tasks:

Write an introduction _____

Write a conclusion _____

Revise the writing _____

Edit the report _____

Proofread the report _____

Design a cover/create illustrations or create a PowerPoint presentation _____

Present to class/other audience _____

Third Group Meeting

8. Put together your finished product and rehearse the presentation.

9. Present the report to the class or other audience.

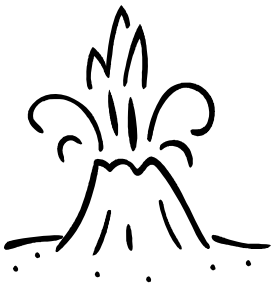
10. Evaluate the product and the presentation.

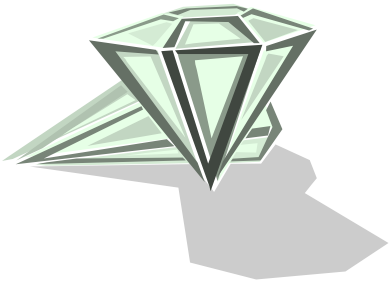
Things We Did Well	Ways We Could Have Improved

Geology-Related Language Arts Projects

- Write a poem about the New Jerusalem including references to the precious stones and minerals which are part of its construction.
- Write a book of puns or riddles about rocks and minerals.
- Write and illustrate a book of safety techniques for surviving earthquakes.
- Create an alphabet book about rocks and minerals.
- Using PowerPoint or a similar program, design a slide show containing a dictionary of terms you have learned in this unit.
- Prepare and tell a children's story at your church. The story should use rocks or minerals as an object lesson.
- Interview someone who has experienced an earthquake, mudslide, sinkhole or volcano eruption. Write a news article based on the interview. Publish it in your classroom or school newsletter.
- Research a flood legend. Write the legend and illustrate it.
- Create a word search with geology terms. Instead of listing the words to be found, list the definitions, with places to record the corresponding terms.
  Create a board game which reinforces terms or concepts from this geology unit.

My Geology Book





By _____

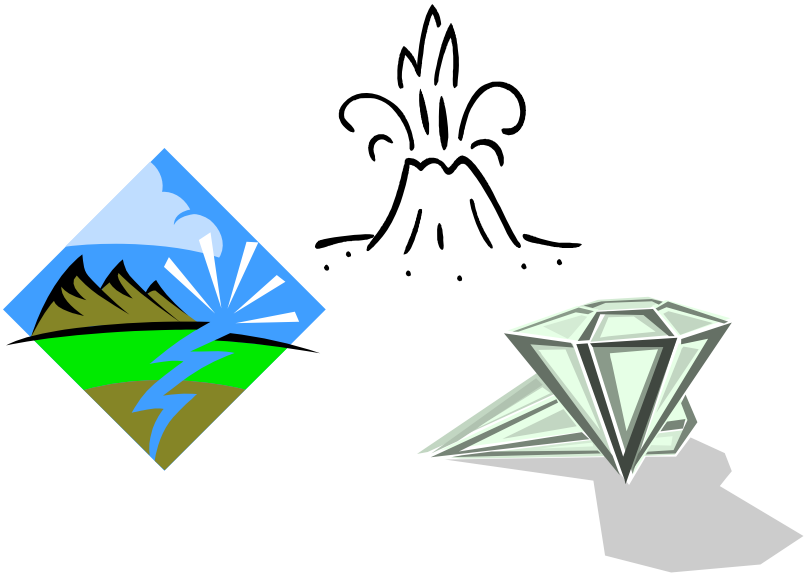
continent	desert
equator	erosion
glacier	ice cap

igneous rock	island
metamorphic rock	mineral
mountain	oasis

ocean	plain
plateau	prairie
river	sedimentary rock

tsunami	valley
volcano	weathering

My Dictionary Of Geology Terms



By _____

Table of Contents

General Terms

continent: _____ _____ _____ _____
equator: _____ _____ _____ _____
geology: _____ _____ _____ _____
geography _____ _____ _____ _____

General Terms (continued)

latitude _____ _____ _____ _____
longitude _____ _____ _____ _____
prime meridian _____ _____ _____ _____
revolution _____ _____ _____ _____

General Terms (continued)

rotation _____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

Land Features

desert _____ _____ _____ _____
glacier _____ _____ _____ _____
hill _____ _____ _____ _____
ice cap _____ _____ _____ _____

Land Features (continued)

island _____ _____ _____ _____
mountain _____ _____ _____ _____
oasis _____ _____ _____ _____
ocean _____ _____ _____ _____

Land Features (continued)

plain _____ _____ _____ _____
plateau _____ _____ _____ _____
prairie _____ _____ _____ _____
river _____ _____ _____ _____

Land Features (continued)

valley _____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

Geology Terms

compound _____ _____ _____ _____
continental drift _____ _____ _____ _____
core _____ _____ _____ _____
crust _____ _____ _____ _____

Geology Terms (continued)

earthquake _____ _____ _____ _____
element _____ _____ _____ _____
element _____ _____ _____ _____
erosion _____ _____ _____ _____

Geology Terms (continued)

igneous rock _____ _____ _____ _____
Ice Age _____ _____ _____ _____
lava _____ _____ _____ _____
magma _____ _____ _____ _____

Geology Terms (continued)

mantle _____ _____ _____ _____
metamorphic rock _____ _____ _____ _____
mantle _____ _____ _____ _____
metamorphic rock _____ _____ _____ _____

Geology Terms (continued)

Geology Terms (continued)

mineral _____ _____ _____ _____
Richter scale _____ _____ _____ _____
sedimentary rock _____ _____ _____ _____
seismograph _____ _____ _____ _____

Geology Terms (continued)

tsunami _____ _____ _____ _____
volcano _____ _____ _____ _____
weathering _____ _____ _____ _____
_____ _____ _____ _____

Geology Terms (continued)

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

Banner in the Sky

Teacher Notes

** The full unit plans are located in the Pathways section of the Teacher Bulletin

Just a few notes about teaching *Banner in the Sky:*

- Accelerated Reader classes this as a mid-fifth-grade level book. I plan to have my 7/8 graders read it, but use it as a read-aloud with grades 4-6. Most of the lesson plans can be adapted to use either way.
- There are several vocabulary activities included which continue throughout the unit. Don't feel that you have to use all of them. Some assume students have access to the book; others would work well with a read-aloud. Just choose one activity that works for your situation.
- The book uses the word "damn" or a form of the word at least a couple of times. Prepare students for this by informing them of it in advance and discussing why, as Christians, we do not use this word in this way. If you know that the constituents of your school will be offended by their children encountering this word in school, do not use the book or consider blotting it out (sometimes this only increases curiosity!). Use good judgment--either use it to teach a moral value or eliminate it.
- One issue that comes up repeatedly in the story is the main character Rudi's lying to his mother about his mountain climbing activities. There are several activities and/or discussion questions dealing with this issue at various points. When you get to the end of the book, however, there will still be kids who will say, "It was all right because everything came out OK." Here are some possible discussion questions to include after finishing the book to deal with that:

- In the beginning of the story, Rudi is self-centered. What were some things he did that show this? (lying to get what he wanted, disobeying his mother, showing off on the Wunderhorn)
- In the end, was Rudi still self-centered? (no)
- How did he show he had changed? (giving up his dream to save his arch-rival's life, leaving celebrations in his honor to help Teo with the dishes)
- Why do you think he changed? (Possibly the realization that his father considered helping others more important than his own dreams or safety.)
- Do you think that he will lie and disobey his mother in the future? Why or why not?

Geology-Related Social Studies Projects

- Research and plot on a map the locations of earthquakes which have occurred in the past week/month.
- On a map, plot the locations of Earth's active volcanoes.
- Choose a community which has been affected by a volcanic eruption. Research the community to find out positive and negative effects and how they are coping with living with the threat of repeated eruptions.
- In the *Projects and Experiments* section of this unit, see the activity on topographic maps entitled Mapping Mountains.
- Use the following website to discover legends from the past which were used to explain earthquake activity. Choose one or more to write and illustrate. Locate on a map the country from which the legend originates. http://www.fema.gov/kids/eqlegnd.htm
- Research which U.S. government agencies are responsible for responding to disasters, how they are funded and how their leaders are chosen.
- Learn which countries are currently receiving disaster recovery assistance from the United States. What disasters are they recovering from? Choose one to learn more about.
- Learn how the Seventh-day Adventist church assists communities or countries which are suffering from the effects of earthquakes, tsunamis, landslides or volcanic eruptions.
- Develop a plan to raise money to assist in disaster relief.
- Make a list of precious gems. Research and label a map showing the countries in which they are most commonly found.
-
-

- Create a timeline showing the development of seismology. Use pictures and creativity.

- Write a short paper (3 paragraphs) describing how the world would be different if we didn't have plate tectonics.

Geology-related Math Projects

- Gather data on the number of national and/or international volcanic eruptions or earthquakes recorded in the past 30 years. Graph this information and note any trends. Report your findings to your class.

- Gather data on the number of lives lost or money spent as a result of earthquake disasters in the past 30 years. Graph this data and note any trends. Report your findings to your class.

- Research the value of some of the world's most prized jewels. Choose an ADRA project and determine how many people could be helped if the same amount of money were given to the project.

- Using the data below, find out how much thicker/thinner various parts of the earth's structure are when compared with each other.

Data on the Earth's Interior

	Thickness (km)	Density (g/cm³) Top	Density (g/cm³) Bottom	Types of rock found
Crust	30	2.2	—	Silicic rocks.
		—	2.9	Andesite, basalt at base.
Upper mantle	720	3.4	—	Peridotite, eclogite, olivine, spinel, garnet, pyroxene.
		—	4.4	Perovskite, oxides.
Lower mantle	2,171	4.4	—	Magnesium and silicon oxides.
		—	5.6	
Outer core	2,259	9.9	—	Iron+oxygen, sulfur, nickel alloy.
		—	12.2	
Inner core	1,221	12.8	—	Iron+oxygen, sulfur, nickel alloy.
		—	13.1	
Total thickness	6,401			

Geology-related Art Projects

- In magazines, have students look for pictures of objects made from rocks or minerals and create a collage entitled "The Role of Rocks" or "Ways in Which Rocks and Minerals Are Used".
- Create pet rocks using permanent markers or paint, pieces of felt, wiggle eyes, etc.
- Create paper mache' landforms.
- Paint landscapes.
- Create a puppet show based on the book *The Magic School Bus Inside the Earth* or *The Magic School Bus Blows Its Top*. Students can create the characters on cardstock and apply a craft stick to the back. Create a stage from large boxes.
- Have students create door decorations to accompany the geology unit.
- Research the art of pottery making. If possible, find a potter who will demonstrate his/her skills.

Mosaic in Plaster

Materials needed: bottom of a small gift box, sheet of foil, cord, coffee or similar can, plaster of Paris, long stirring stick, food coloring, plastic spoon, small smooth stones, scissors

Procedure:

1. Line the bottom of the box with foil, pressing it into the corners.
2. Punch two holes on the underside of the box and insert the cord. This will be used to hang the completed project.
3. Fill the can half full of plaster of Paris. While stirring, add water until the mixture looks like heavy cream.
4. Add food coloring, if desired.
5. Pour plaster into foil-lined box and quickly spread and smooth it.
6. Push pebbles halfway into the plaster in a pleasing arrangement.
7. Plaster will dry in about ½ hour.
8. Display in the box or remove from box and trim away foil with scissors.

Mosaic Sand Cast

Materials needed: plaster of Paris, water, clean wet sand, container and spoon to mix plaster, possibly buckets, basins or pans for sand and water, beach pebbles, paper clip.

Procedure:

1. Place wet sand in a pan or sturdy box.
2. Make a clean impression in the sand. Consider using a shell, piece of driftwood, hand or foot print.
3. Inlay the impression with smooth pebbles or stones
4. Mix the plaster according to box directions. (Prepare small batches as it hardens quickly.)
5. Pour the plaster into the impression.
6. Place a paper clip in the plaster if it will be hung.
7. Allow plaster to harden.
8. Remove plaster form from the impression and brush loose sand from surface (some sand will cling and is part of the art)

Salt and Watercolor Picture

Materials needed: newspaper, pencil, drawing paper, watercolor paints, paintbrush, salt

Procedure:

1. Cover your work area with newspaper.
2. Sketch a picture on a piece of drawing paper.
3. Paint the drawing using watercolor paint.
4. While the paint is still wet sprinkle it with salt and let it dry._The painting will take on a textured look, and the paper may even crinkle and pucker.

(adapted from *365 Art and Craft Activities*, by Hoppert)

Foil Printmaking

Materials needed: newspaper, heavy-duty aluminum foil, ballpoint pen, ruler, poster paints, paintbrush, drawing paper, paper towels.

Procedure:

1. Cover your work area with newspaper.
2. Draw a square on a sheet of foil, making the square slightly smaller than the paper sheet you will print on.
3. Draw a picture on the foil square.
4. Select one color of paint and paint the parts of the picture requiring that color.
5. Place a sheet of paper over the foil print and press. Carefully peel off the paper, and let the paint dry.
6. Use a damp paper towel to wipe off the old color from the foil.
7. Now select a different color and paint in another area of the picture. Reprint it on the paper as before.
8. Continue reprinting the paper until you use all the needed colors and the picture is complete.

Sand Art

Materials needed: newspaper, sand, small dishes, powdered poster paints, clean glass jar with lid, acrylic paints, paintbrush.

Procedure:

1. Cover your work area with newspaper.
2. Mix small amounts of sand with different colors of powdered paints in small dishes.
3. Carefully pour one color at a time into a glass jar. Tilt the jar and add about ½ inch of one color of sand.
4. Tilt the jar the other way and add another ½ inch of sand using a different color.
5. Keep tilting the jar and alternating colors until the jar is full.
6. Decorate the lid of the jar with acrylic paints.
7. When the paint is dry, place the lid on the jar. Be careful not to shake your sand picture.

Geology Related Music

Songs

All Nations of the Earth
Deep, Deep, Deep as the Sea (Advent Youth Sing)
A Great Big God
He Owns the Cattle on a Thousand Hills
No Mountain High Enough
Rock of Ages (Adventist Hymnal)
Shall We Gather at the River
Sing Praises to the Lord
Springs of Living Water (Advent Youth Sing)
This is My Father's World (Adventist Hymnal)
Wide, Wide as the Ocean

Name _____

Model the Formation of Sedimentary Rock

Materials needed: ajar with a lid, soil, sand, fine gravel and water

Procedure: Put a handful of soil, sand and gravel into the jar. Fill it with water and screw the lid on tightly. Shake the jar so that all the materials are well mixed. Allow the contents to settle overnight. Check the jar.

What do you notice?

_____

_____

_____

How is this like sedimentary rock?

_____

_____

_____

How is this different from sedimentary rock?

_____

_____

_____

Name _____

Mountain Run-Off

Materials needed: a large pile of rocks, dirt, sand, mud and gravel at least three feet high, outside; a place where water can run off and plenty of water either through a hose, a sprinkler or large watering can; camera.

Procedure:

1. Make sure that both sides of the "mountain" have obstacles similar to a real mountain. You may want to plant some small plants or place rocks or sticks on it. As much as possible make both sides of the "mountain" alike in terms of the obstacles on them.
2. Predict where the rivers will form.
3. Take a picture of both sides of the "mountain" before watering it.
4. To simulate steady rain use a sprinkler on top of the "mountain" aimed at one side. To simulate occasional rain use a watering can on the other side of the "mountain".
5. Take pictures of the mountain at intervals so you can document the changes taking place.

Did rivers form in the place where you predicted?

What did you observe? _____

_____

_____

In what ways is this like rain on a mountain? _____

_____

_____

In what ways is it different? _____

_____

_____

Why do you think rivers are not straight? _____

_____

_____

How does slowly moving water affect the land differently from fast moving water? _____

_____

_____

_____

Why do you think that the mouths of rivers, especially where they empty into the ocean, tend to be really wide open and flat with water that moves slowly into the ocean?

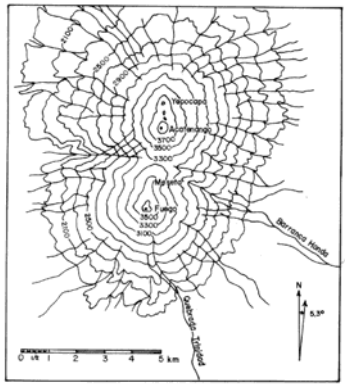
_____

_____

_____

Display your pictures and findings in an interesting way so that others may learn from your experiment.

Name _____



Mapping Mountains

Materials needed: for each "mountain" model, a chunk of clay equivalent to about 1 cup, thread (approx. 50 cm for each "mountain"), paper and pencil.

Procedure:

1. Make several "mountains" with different shapes and degrees of steepness.
2. Beginning with one "mountain", wrap the thread around it about 1 cm down from the top and pull the thread tight so that it slices off the top.
3. Lay the sliced piece on paper and trace around it.
4. Repeat steps two and three until the "mountain" is done.
5. Reassemble the "mountain" and follow the same procedure for the other "mountains".
6. Show your topographic maps to a peer, asking him or her to match them to the correct "mountains".

What did you learn about topographic maps from this activity? _____

_____

_____

_____

In what situations might one choose to use a topographic map? _____

_____

_____

_____

Using the internet or other resources, find a topographic map for a mountain near you. If found on the internet, print it and include it with a display of this project.

Name _____

Sand Hunt

Materials needed: bags of sand, magnifying glasses, toothpicks, small magnets, egg cartons, samples of rocks listed on accompanying master, glue, vinegar (optional).

Procedure:

Using small samples of the sand, sort the sand into groups based on color. Using additional samples of the same sands, sort into groups based on luster. Repeat sorting based on shape. Challenge students to identify the sands by comparing them to the sample rocks provided as well as the descriptions provided on the accompanying worksheet. Once they have identified the groups, provide glue to adhere the samples to the Sand Hunt worksheet. Have them glue a "pile" of sand in the middle of the page as well.

Erosion Bottles

Materials needed: several identical recycled bottles with caps (smaller soda bottles would work well); water, marble chips.

Procedure:

1. Place the marble chips and water in the bottles filling them no more than half way. Put the cap on tightly.
2. Designate one bottle as the control and set it aside.
3. Allow students to shake the bottles frequently.
4. After a few weeks of shaking the students should compare the shaken bottle to the control. They may notice that the marble chips have become smaller with smoother edges.

Candy Rocks?

Materials needed: metal container, bowl of ice, water, measuring cup and spoon saucepan, stove or hot plate, sugar, spoon, vanilla extract, salt

Caution: This project requires adult supervision!!!

Procedure:

1. Put a metal container into a large bowl filled with ice.
2. Bring ½ cup of water to a boil in a pan on the stove. Slowly add 2 ½ cups of sugar, mixing it gently with a spoon. Add 2 tsp. of vanilla extract and ¼ teaspoon of salt. Keep stirring the candy mixture as you heat it.
3. Heat the mixture to a slow boil until the sugar dissolves. Be careful that it doesn't foam up and over the pan. When all the sugar is dissolved, turn off the stove.
4. Carefully pour half the mixture into the container cooled with ice. This should make the candy solution cool quickly.
5. Leave the remaining mixture in the pan and place it where it will be undisturbed.
6. The two mixtures should form crystals.

How are the crystals in the two mixtures different?

_____

_____

_____

_____

How does this relate to the formation of rocks?

_____

_____

_____

_____

Would you expect the rate of cooling to affect rocks in a similar way? Why or why not?

_____

_____

_____

Granite is an igneous rock with large grains and basalt is an igneous rock with small grains. Which do you think cooled faster?

_____

(Adapted from *365 Science Projects and Activities* by Perry and Rillero)

Tite and Mite

Materials needed: two jars, water, Epsom salts, thick string, paper clips, jar lid

Procedure:

1. Fill two jars halfway with very warm water. Add as much Epsom salts as will dissolve in the water.
2. Attach each end of a 3 foot piece of heavy string to a paper clip.
3. Wet the entire string with the salt solution. Put one end of the string in one jar and the other end in the other jar, making sure the ends are covered by the liquid.
4. Let the string hang between the two jars to form a loop. Place a jar lid under the loop.
5. Observe daily for one week.

What did you observe? _____

_____

_____

How would you explain it? _____

_____

_____

How does this relate to the formation of stalactites and stalagmites?

_____

_____

_____

_____

(Adapted from *365 Science Projects and Activities* by Perry and Rillero)

Hit the Beach

Materials needed: books, 2 cake pans, sand, pebbles, water, sponge, soil

Procedure:

1. Put several books under one side of a rectangular cake pan so that one side is raised a couple of inches.
2. Put sand and pebbles on the raised end to form a beach.
3. Put enough water in the pan so that it reaches the beach.
4. Put a sponge in the other end of the pan. Push down on the sponge repeatedly to create small waves. Observe the effect.
5. Repeat the experiment using the second pan and replacing the sand a pebbles with soil. Observe the effect.

Compare the effect of the waves on the sand and pebbles with the effect on the soil.

_____

_____

_____

What do you learn about beach erosion from this activity?

_____

_____

_____

Why are most waterfront areas made of sand and gravel rather than soil?

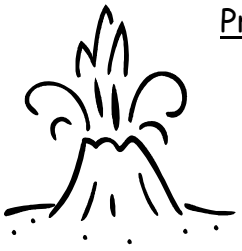
_____

_____

Adapted from *365 Science Projects and Activities* by Perry and Rillero)

Volcano Model

Materials needed: small plastic bottle, baking soda, wide tray or baking pan, sand or dirt, ½ cup vinegar, measuring cup with pouring lip, red food coloring



Procedure:

1. Fill the bottle ¼ to ½ full of baking soda and place it in the middle of the tray.
2. Pile the sand around the bottle so that you can just see the opening. This should look like a small volcano.
3. Pour the vinegar into the measuring cup.
4. Place several drops of food coloring into your vinegar and quickly pour it into the bottle top.
5. Observe what happens.

What did you observe? _____

_____

_____

_____

In what ways is this model like a volcano? _____

_____

_____

_____

In what ways is it different from a real volcano? _____

_____

_____

_____