



From The Series
Geography Basics

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LANDFORMS & LIVING PATTERNS:

Geography Basics

Running Time: 23 minutes

PROGRAM OVERVIEW

Intended Audience and Uses

Landforms & Living Patterns, the third program in the *Geography Basics* series, is designed for social studies students in grades 4-8. The concepts in this video are found in virtually all leading geography texts at the upper elementary and jr. high-middle school levels. Moreover, the material presented in *Landforms & Living Patterns* makes up part of the NCSS (National Council for the Social Studies) recommendations for the target grade levels.

Program Synopsis

The program begins with a brief review of recent technologies used to deepen our knowledge of earth crust changes. The five principal ways that land changes – weathering,

erosion, land mass motion, volcanic eruptions and earth crust movement – are then explained in detail. In the second part of the program, human activities that impact the earth’s surface are covered. Those activities include dam construction, tilling techniques, draining swamps and building dikes. The third section of the program discusses how landforms affect human activities and living patterns. Farming and ranching activities, population concentration and recreational pursuits are all affected by landforms. Natural resources found in the earth also affect living patterns. Two brief case studies are presented – iron ore in the Mesabi Range of Minnesota, and petroleum found in Saudi Arabia.

VIEWER OBJECTIVES

After viewing this video and participating in the suggested activities, viewers should be able to do the following:

1. Name and discuss the five natural ways that lands change.
2. Tell four ways humans change lands, and explain the effects of those changes.
3. Recount four ways landforms affect human living patterns.
4. Explain how natural resources found in the earth can affect human living patterns, and discuss two examples.

The producers encourage you to make adaptations and changes to the following lesson plan whenever you feel it will enhance your students’ learning experiences. Only by tailoring the material to your unique classroom situation will you be able to maximize the educational experience afforded by these materials.

SUGGESTED LESSON PLAN

Introduce the Program

Well in advance, have your students take the **PRE-TEST**, which can be used to evaluate their knowledge of the material to help you plan your lessons. After assessing your students' level of understanding, begin a discussion of your local predominant landform. Has anyone given any thought to how it affects his or her life? Have your students come up with possible effects. List them on the chalkboard. What about natural resources, including water or lack of water? What about their effects? After the discussion, tell your students they will see a video on landforms and living patterns.

Pre-Viewing Activities

Either pass out or make an overhead transparency of **LEARNING GOALS**. Discuss each item, making certain the class understands the concepts that will be presented in the video. Next, hand out the **VOCABULARY LIST** and have the class complete this exercise either as individual desk work, as a class activity or in small groups. If your students have access to computers, they can look up the words at www.onelook.com or the Encarta online dictionary, <http://dictionary.msn.com/>, which has audio files that give word pronunciations. Scientific and geographic terms can be found in the specialty dictionaries at www.yourDictionary.com. Finally, pass out the **VIEWER'S CONCEPT GUIDE**. Have your students read the questions, and tell them that they will be expected to fill in the blanks after the video has been viewed. At three places during the presentation, a stop point is designated by the “” symbol. At each stop point, teachers are encouraged to hand out a recommended worksheet that enhances an understanding of key concepts presented in the sequence just seen.

View the Video

Total viewing time is approximately 23 minutes. Teachers are encouraged to pass out the following worksheets at each stop point: **THE EARTH'S CRUST: NATURAL CHANGES** after the first stop point; **OUR EFFECT ON THE EARTH'S CRUST** after the second; and **THE LAND'S IMPACT ON LIVING PATTERNS** after the third. *Before your students fill out the information on the last worksheet, make sure that they understand that the broken lines on the vertical axis and across the bar mean that a portion of the data is not shown on the graph.* The work sheets may be done as individual desk work, or as a small group or class activity. It is also suggested that the entire presentation be replayed a second time, as a review, before giving the **POST TEST**.

Post-Viewing Activities

If you have handed out the three worksheets mentioned above, and not yet reviewed them, please do so now. Assign different regions to pre-selected committees and have them research dominant landforms and how those landforms have affected the living patterns of the people who live there. Have each committee give an oral presentation of their findings. Invite a corporate, state or local official to explain to your students the economic and environmental importance of your local area's natural resources.

DESCRIPTION OF BLACKLINE MASTERS

PRE-TEST – An assessment tool that helps you determine the level of your classroom presentation.

LEARNING GOALS – Delineates the concepts students are expected to learn. Also lists behavioral objectives.

VOCABULARY LIST – Presents terms that your students will need to know to fully understand the video.

VIEWER'S CONCEPT GUIDE – Focuses on the main information in the program to help your students learn all major concepts.

THE EARTH'S CRUST: NATURAL CHANGES – Reviews volcanoes and the four other ways natural changes occur in the earth's crust.

OUR EFFECT ON THE EARTH'S CRUST – Helps students understand that each individual plays an important role in the viability of the earth's crust.

THE LAND'S IMPACT ON LIVING PATTERNS – Reviews the use of vertical bar graphs (covered in production one); helps students draw inferences from graphical data; review ways landforms affect living patterns.

POST TEST – An assessment tool that allows you to determine the level of comprehension and retention of key material.

ANSWER KEY

PRE-TEST – 1. T ♦♦♦ 2. F ♦♦♦ 3. T ♦♦♦ 4. F ♦♦♦ 5. T ♦♦♦ 6. T ♦♦♦ 7. T ♦♦♦ 8. F ♦♦♦ 9. F ♦♦♦ 10. F ♦♦♦ 11. T ♦♦♦ 12. F ♦♦♦ 13. F

VOCABULARY LIST – **Astronaut:** Space explorer ♦♦♦ **Delta:** Area where a river flows into ocean or sea ♦♦♦ **Desertification:** Creation of desert land ♦♦♦ **Drought:** Long period without rain ♦♦♦ **Earth crust:** Top layer of land on our planet ♦♦♦ **Earthquake:** Movement of earth's crust, usually along faults ♦♦♦ **Erosion:** A combination of weathering and the movement of weathered material ♦♦♦ **Fault** Area where tectonic plates meet ♦♦♦ **Glacier:** Slowly moving areas of ice ♦♦♦ **Hang glide:** recreational activity during which person hangs from large kite-like object and flies through the air ♦♦♦ **Headland** High land that juts into a body of water ♦♦♦ **Impoverished:** Poor ♦♦♦ **Land mass motion:** Movement of land, usually mud slides or landslides ♦♦♦ **Lava:** Hot, liquid rock and metals that spills or explodes from a volcano ♦♦♦ **Magma:** Hot, liquid rock and metals inside a volcano ♦♦♦ **Magma chamber:** Where magma gathers ♦♦♦ **Mantle:** Hot pool of molten rock beneath the earth's crust ♦♦♦ **Nomadic:** Moving from place to place ♦♦♦ **Pangaea:** The single continent on earth some 300 million - 180 million years ago ♦♦♦ **Polder:** Rich farmland claimed from the Zuider

Zee in the Netherlands ♦♦♦ **Reservoir:** Lake created from dammed water ♦♦♦ **Sand dune:** Large pile of sand created by winds ♦♦♦ **Subcontinent:** A large landmass smaller than a continent: a major subdivision of a continent ♦♦♦ **Tectonic plate:** The six large and many smaller sections of the earth's crust ♦♦♦ **Topsoil:** Top layer of the earth's crust, where plants and crops grow ♦♦♦ **Tremor:** Earthquake ♦♦♦ **Tsunami:** Large, often destructive wave created when earth crust movement takes place on the ocean floor ♦♦♦ **Vent:** Structure through which magma travels to the surface of the earth ♦♦♦ **Volcanic eruption:** Gases and lava expelled from a volcano ♦♦♦ **Weathering:** Breaking down of rock, etc., usually through water and/or ice ♦♦♦ **Zuider Zee:** The sea in the Netherlands from which polders have been created

VIEWER'S CONCEPT GUIDE

1. weathering, erosion, land mass motion, volcanic eruptions, earth crust movement
2. Pangaea
3. tectonic plates
4. tsunamis
5. magma
6. Ring of Fire
7. volcanic eruptions
8. Colorado River
9. building dams, using outdated farming techniques, overcutting, draining swamps/low areas
10. population concentration, farming, recreation, ranching and herding

11. petroleum

THE EARTH'S CRUST: NATURAL CHANGES

1. vent
2. magma chamber
3. mantle
4. magma

Magma and hot gases gather in the magma chamber. If they continue to build, the magma is forced upward, eventually through the vents. The exploding lava spills downward, killing everything in its path.

Earth crust movement: Tectonic plates shift on the earth's mantle; earthquakes result.

Weathering: Breaking down rocks, etc., pri-

marily with water and/or ice.

Erosion: The combination of weathering and the movement of weathered material.

OUR EFFECT ON THE EARTH'S CRUST

1. Trash often goes to a landfill, which can create large, unsightly areas
2. Areas of the earth's crust are moved; homes for animals can be destroyed, along with native plant life.
3. Recreational land areas may be degraded through overuse, misuse and mismanagement.
4. Can enhance the beauty of the land
5. Overuse can destroy animal habitats on the land (as well as water).
6. Can help prevent soil erosion and land mass motion.
7. Help beautify the land.

THE LAND'S IMPACT ON LIVING PATTERNS

(First Part)

1. B 2. D
3. C 4. A

(Second Part)

1. Population density
2. Farming activities
3. Herding, ranching

POST TEST

Part I

1. F ♦♦♦
2. T ♦♦♦
3. T ♦♦♦
4. F ♦♦♦
5. F ♦♦♦
6. F ♦♦♦
7. T ♦♦♦
8. F ♦♦♦
9. T ♦♦♦
10. F

Part II

1. c ♦♦♦
2. b ♦♦♦
3. d ♦♦♦
4. e ♦♦♦
5. a

Part III

1. volcanic eruptions, erosion, weathering, land mass motion, earth crust movement
2. building dams, draining swamps/wetlands and building dikes (and windmills), over-cutting, using outdated farming techniques
3. the Netherlands, polders
4. flat
5. biking, hiking
6. Mesabi iron ore range
7. 1930's
8. 35, Saudi Arabian
9. 70

Part IV

- | | |
|------|------|
| 1. b | 5. d |
| 2. d | 6. a |
| 3. d | 7. d |
| 4. a | 8. d |

TRANSCRIPT OF THE VIDEO

When spacecraft first circled the earth, astronauts and others saw our planet in a new way – as a radiant blue sphere floating majestically in space.

Other views emerged within a few years, for as new space technologies advanced, modern tools gave us undreamed-of insights into our planet.

For the first time, we could see patterns in our world that previously had escaped detection – among them, patterns in land forms and water, patterns in weather and in the growth of cities.

All these new technologies brought a deeper understanding of something scientists had known for years – that the surface of our earth constantly changes.

Sometimes the changes occur quickly, within minutes, hours or days.

Other times, they happen so slowly, we do not see them.

In any event, there are five ways the lands on our earth change – through weathering, erosion, land mass motion, volcanic eruptions and earth crust movement.

Earth crust movement has been taking place for millions of years.

In fact, many scientists believe that somewhere between 300 million and 180 million years ago, the earth had only one large land mass.

Called Pangaea, it sat alone in a vast ocean. Then, very slowly, Pangaea split apart.

Over millions of years, its pieces formed today's seven continents.

Continental movement continues to this very day, although so slowly, it is seldom noticeable – except during earthquakes, which occur when huge sections of the earth's crust, the top layer of our planet, move.

Geologists - scientists who study the earth's crust - believe that this outer portion of our planet is composed of six large structures called "tectonic plates," as well as a number of smaller ones.

Five to 25 miles deep (or about 8 to 40 kilometers deep), these plates shift on the earth's mantle, a hot pool of molten rock that stretches downward from the earth's crust almost 1,300 miles (or about 2,100 kilometers).

Earthquakes most often occur at tectonic plate boundaries, or "faults," where the plates meet.

The tremors take place when the earth's crust moves in one of three directions.

Sometimes the plates pull apart. Sometimes they slide against each other and sometimes they collide.

Earthquakes can be extremely destructive and deadly. There are about 8,000 quakes each year, but only about 1,100 are strong enough to be felt.

Of that number, only about 40 result in major damage and death.

Burst natural gas lines that explode, houses and other buildings that collapse, highways and bridges that give way – all can result from shifts in the earth's crust.

As already mentioned, these shifts often occur at or near tectonic plate edges.

When those shifts take place on the ocean floor, the energy

released can push the water upward, creating huge waves known as tsunamis.

When these walls of water hit coastal areas, there can be terrible destruction.

The Himalaya mountain range of Asia is an example of how land-forms can be created, not destroyed, by earth crust movement.

At one time, there were no Himalaya Mountains. A vast, flat plain stretched northward and northeastward from the Indian subcontinent.

Two tectonic plates – the Indian and the Eurasian – met near the center of the plain.

Some 50 million years ago, they began to push against each other. As they did, the area at the tip of the Indian plate was forced upward, creating the Himalayas.

Besides earth crust movement, volcanic eruptions are another way that the earth's surface can change.

Volcanoes begin when "magma" or hot, liquefied rock and metals push upward to a "magma chamber." Hot gases also gather in the chamber.

If the magma and gases continue to build, they are propelled upward through one or more vents.

In time, the molten material reaches the surface, where it can explode with enormous force, sometimes blowing away whole portions of a mountain.

At the same time, lava – which is magma that reaches the surface – may spill from the vent.

This substance can be enormously destructive because it burns, and instantly kills, everything in its pathway.

Huge areas of desolate landscape made of cooled, solidified lava are found in locations where volcanoes have erupted.

The world's most active earthquake and volcano region, the so-

called "Ring of Fire," forms an arc around the Pacific Ocean.

Each year, about 80 percent of the world's most destructive earthquakes and the vast majority of its volcanoes take place along the "Ring of Fire."

While volcanoes can destroy landforms, they also can create them. The Hawaiian Islands were created by a series of volcanic eruptions that began millions of years ago on the ocean floor.

Today, the result is one of the most beautiful places on earth – a tropical paradise.

So far, we've discussed two ways land can change – earth crust movement and volcanic eruptions. Now, let's look at weathering.

Weathering can occur when rainwater enters a crack in a rock. If the weather turns cold enough, the water will freeze and expand.

The ice will then push against the walls of the crack with such force, small pieces may break away.

Something similar happens when plant roots grow in the crack of a rock or boulder.

Another type of weathering takes place when water dissolves the minerals in rocks.

The sand on beaches is the result of this type of weathering.

Erosion is the fourth type of land change that occurs in the earth's crust. Erosion is a combination of weathering and the movement of weathered material from one place to another.

The Grand Canyon, in Arizona, is perhaps the most dramatic example of erosion.

The Colorado River has been the principal agent of erosion in the Grand Canyon. For millions of years, its waters have broken away bits of rock, and carried them downstream.

The river has cut a one-mile (or 1.6 kilometer) deep chasm into the earth.

Deltas – areas where rivers flow into an ocean or sea – show another way erosion can change the earth's crust.

The soil picked up by the river and then carried downstream ends up in delta regions creating headlands and beaches.

Sometimes sand bars and even cliffs are formed.

Erosion can take place underground, also. Water can create deep caverns and mineral deposits left behind can build up, into beautiful, icicle-like rock formations.

The movement of glaciers – often so slow, it cannot be detected by the human eye – is still another way that erosion can take place.

Glaciers often smooth out the land as they slowly move along, grinding and pushing rocks, boulders and plants that get in their way.

The northern plains of the United States were formed hundreds of thousands of years ago when huge glaciers slid over the land and smoothed it out.

Erosion also can occur when winds blow. Wind carries dust and sand from one place to another, and sand particles blown by the wind can scrape and wear away rocks.

In some places – most notably, North Africa – piles of sand, or "sand dunes," have moved outward from the desert and have covered farm land.

As you might imagine, the destruction of crop land through this so-called "desertification," or creation of desert lands, is a serious problem because it destroys much-needed farm acreage.

Land mass motion is the final category of changes in the earth's crust.

Land mass movements – mud slides and landslides – usually take place on steep slopes, often during very heavy rainfalls that wash away soil.

Up to this point, we've discussed natural causes for changes in the earth's crust – tectonic plate shifts that result in earthquakes, volcanoes, weathering, erosion and land mass movement.

Now we're going to turn our attention to human activities that have an impact on the earth's surface.

Building dams is the first.

Dams, as you probably know, are a barrier used to control the flow of water, usually river water.

Reservoirs or lakes cover a portion of the land upstream from a dam. They're created by the water that's been held back.

Often, reservoirs are used for boating, fishing and other recreational activities.

Dams have other uses, too. When dammed-up water is released, it helps turn giant generators that produce electricity.

The generators are located inside the dam.

Dams also prevent destructive flooding by holding back water after heavy rains, or during sudden snow melts in early spring.

Without dams, sandbag brigades are often needed to hold off rising flood waters that otherwise could destroy life and property.

And by regulating the flow of water to downstream areas, dams can keep rivers and streams from drying up during droughts – good news for farmers who use the water for irrigation and for wildlife that needs water to survive.

Another way that humans can change the land is by using outdated farming techniques that increase the chances of soil erosion.

When it rains, improperly plowed soil can be washed away. As the topsoil disappears, the land loses its ability to produce crops.

Over-cutting plant growth, including trees, also can result in soil erosion, since plant roots hold soil in place.

Over-cutting also destroys homes for animals – insects, birds and many others.

While improper uses can destroy precious land, other human activities can create it.

Some swamps and other low-lying areas have been drained to create rich farm land.

And in Europe, in the Netherlands, where 40 percent of the land is below sea level, windmills built on dikes help pump out water that has leaked into the land from the Zuider Zee, at one time a large North Sea inlet.

The land areas protected by the windmills and dikes, known as "Polders," are among the richest farmlands in Europe, famous for their colorful tulip crop each spring.

Now that we've discussed the earth's land area, and the ways it can be changed, let's turn our attention to how landforms affect human activities and living patterns.

For one thing, people tend to cluster in areas that are flat, not mountain areas, shown in orange.

Not one of the world's 50 largest cities is built on mountains, although many are located in valley areas near mountains.

It's easy to see why cities are generally built on flat land. Construction materials can be easily transported to building sites.

And few special considerations need to be made when putting up homes and office buildings there – considerations such as how to prevent buildings from slipping downhill in mud slides.

It's also fairly easy to move people in flat areas – on commuter and elevated trains, as well as other forms of transportation.

Of course, not all cities are built on flat land. Much of San Francisco, California, is built on hilly terrain.

But cities built on hills are far fewer than urban areas built on plains and other types of flat land.

Large-scale, mechanized farming activity almost always takes place in flat or relatively flat areas, too.

Using huge agricultural machinery is practical only where hills are gentle or non-existent.

That's one reason why some of the most productive farmland is located in the mid-western portion of the United States and on similar plains areas elsewhere in the world.

Of course, mechanical equipment can be used in mountain regions and hilly areas. But it's on a much smaller scale than in flat regions.

On the other hand, herding and ranching activities are common on hilly, flatland and mountainous regions because most herd and ranch animals can feed and walk on almost any terrain.

Recreational activities are something else affected by landforms.

Downhill skiing takes place only on mountain slopes and steep hills, of course.

Cross-country skiing, on the other hand, glide along on flat lands or gently rolling hills.

Hang gliding is a recreational activity found in mountain areas, where there are high cliffs to jump off or at lowland beach areas, where there are ocean breezes to lift the gliders skyward.

Of course, some recreational activities, such as biking can take place on different kinds of terrain – flat, hilly or mountainous.

Hiking is another activity found on all kinds of terrain – from hilly and mountainous to lowland and muddy.

So far, we've discussed how land can be created and changed, and the roles landforms can play in human activities.

Now we'll turn our attention to some major natural resources found in the earth, and how they affect living patterns.

Different kinds of metal resources such as iron ore, copper and

gold are found throughout the world. And, in varying degrees, they can improve the economies of the regions in which they are found.

Let's take iron ore as an example.

One of the largest iron ore deposits in the world is located in the United States, near Lake Superior, in the Mesabi iron ore range of northern Minnesota.

The mines there provide thousands of jobs for the people of that north-central state, not only in the quarries, but also in the business offices of the mining companies.

Moreover, there are jobs for workers who help load and transport the iron ore and for those who sell food and other items to the people who work at the mines and mining offices.

Of course, others outside the region may benefit, too.

Those who work in the mills hundreds of miles or kilometers away that turn the iron ore into steel also benefit – as do the assembly workers who help build cars and trucks, the construction workers who build bridges and buildings with steel beams and factory workers who make an untold number of products with steel components.

Energy-producing substances found worldwide are another important resource. Petroleum, natural gas and coal are the chief energy resources found in the earth's crust.

Large petroleum deposits found on the Arabian Peninsula show how dramatically these natural resources can affect life patterns in an energy-hungry world.

Before the oil industry began in Saudi Arabia, the Saudis were largely an impoverished, nomadic people.

Their education and health care was among the lowest in the world.

But the discovery of oil in the 1930s completely changed the life of the Saudi people.

With some 35 percent of the world's known oil deposits located on the Saudi Arabian Peninsula, Saudi Arabia, as well as the smaller oil-producing countries on its borders, is today among the most modern nations of the world.

In less than a hundred years, its literacy rate has jumped from single digits to almost 70 percent.

At modern hospitals and health clinics, most Saudis enjoy first-rate health care backed up by the latest medical technologies.

And a once largely ignored part of the world is now counted among the most important of all regions.

In short, then, the earth's land area constantly changes through shifts in tectonic plates, which may result in earthquakes; through volcanic activity; weathering; erosion and land mass motion.

Humans can change the face of the earth through the construction of dams, by using outdated farming techniques, by over-cutting and by constructing dikes with windmills.

The shape of the land influences population concentration and transportation.

It can also affect how people play, farm and raise animals.

Finally, the resources found in the land affect people in many important ways.

In sum, knowing the earth's land, how it's used and how it affects the living patterns of people helps us better understand the world in which we live.

WEB RESOURCES

Desertification

<http://pubs.usgs.gov/gip/deserts/desertification/>

The U.S. Geological Survey's excellent web site gives background information on this worldwide problem.

Volcano World

<http://volcano.und.nodak.edu/>

This outstanding, award-winning site has everything you ever wanted to know about volcanoes. A special section for educators offers lesson plans and a lot more.

Tectonic Plate Maps

<http://inspire.ospi.wednet.edu:8001/curric/land/tectplts.html>

Shows current plate movement worldwide.

Tsunamis

<http://www.geophys.washington.edu/tsunami/welcome.html>

Hosted by the University of Washington, this site gives complete information on the big waves.



LANDFORMS & LIVING PATTERNS

- **NAME FIVE NATURAL WAYS LANDS CHANGE**
- **DESCRIBE HOW EACH CHANGE TAKES PLACE**
- **NAME FOUR WAYS HUMANS CHANGE THE LAND**
- **EXPLAIN HOW NATURAL RESOURCES AFFECT HUMANS**
- **DESCRIBE HOW LANDFORMS AFFECT LIVING PATTERNS**

Name _____

Pre-Test

Directions: Place a "T" in the space next to the statement if it is true, and an "F" if it is false.

- 1. Earth crust movement has been taking place for millions of years.
- 2. The "Pangaea Effect" is an example of erosion.
- 3. Tectonic plates float on the earth's mantle.
- 4. Tsunamis occur mostly in desert areas.
- 5. When magma reaches the surface of the earth, it is called lava.
- 6. Hawaii was created by volcanic eruptions.
- 7. The Grand Canyon was created by erosion.
- 8. The movement of glaciers is an example of land mass movement.
- 9. As topsoil washes away, the land becomes more fertile.
- 10. Polders are among the richest farmlands in Asia.
- 11. Iron ore has been mined in northern Minnesota for many years.
- 12. Petroleum has been an important part of the Saudi Arabian economy for more than 150 years.
- 13. More than 50 percent of the world's known oil deposits are found on the Saudi Arabian Peninsula.

Name _____

Vocabulary List

Directions: Define the words and terms on the blank spaces.

Astronaut _____

Delta _____

Desertification _____

Drought _____

Earth crust _____

Earthquake _____

Erosion _____

Fault _____

Glacier _____

Hang glide _____

Headland _____

Impoverished _____

Land mass motion _____

Lava _____

Magma _____

Magma chamber _____

Mantle _____

Nomadic _____

Pangaea _____

Polder _____

Reservoir _____

Sand dune _____

Subcontinent _____

Tectonic plate _____

Topsoil _____

Tremor _____

Name _____

Vocabulary List, Page 2

Tsunami _____

Vent _____

Volcanic eruption _____

Weathering _____

Zuider Zee _____

Name _____

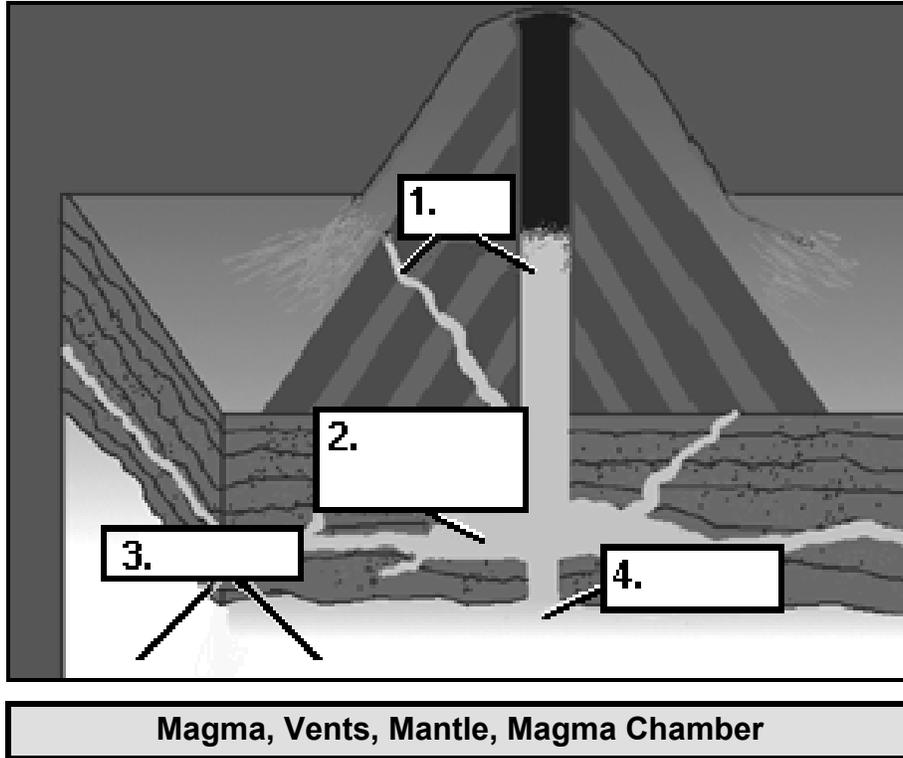
Viewer's Concept Guide

Directions: Fill in the blank spaces.

1. Five natural ways the earth's crust changes are through _____
_____, _____,
_____ and _____.
2. Once, the earth had only one large continent called _____.
3. The earth's surface is composed of six large structures, and a number of smaller ones, called _____, that float on the earth's mantle.
4. Large waves that result from earth crust shifts on the ocean floor are called _____.
5. Volcanoes begin when _____ pushes into a magma chamber.
6. The world's most active earthquake and volcano region is known as _____.
7. The Hawaiian Islands were created by a series of _____.
8. The principal agent of erosion in the Grand Canyon has been the _____.
9. Four human activities that have an impact on the earth's surface are _____,
_____, _____ and _____.
10. Four human activities affected by landforms are _____,
_____, _____.
11. The natural resource that has transformed Saudi Arabia is _____.

Name _____

THE EARTH'S CRUST: NATURAL CHANGES



Directions: Using the terms in the box, label the illustration of the volcano. Then, below, write a description of the natural events that lead up to a volcanic eruption. When you have completed your description, list and briefly explain the four other natural ways lands change. You may use the back of this paper if you need more space.

Name _____

Our Effect on the Earth's Crust

Directions: It's easy to see that the farmer below has an impact on the earth's crust because he raises crops on it. If he uses sound tilling practices, the topsoil will be saved. If he doesn't, the topsoil will be washed or blown away. It's not so obvious that the rest of us have an impact on the earth's crust – but we do. Look at the list of activities below the picture. Then write how each action could affect the land on which we live.

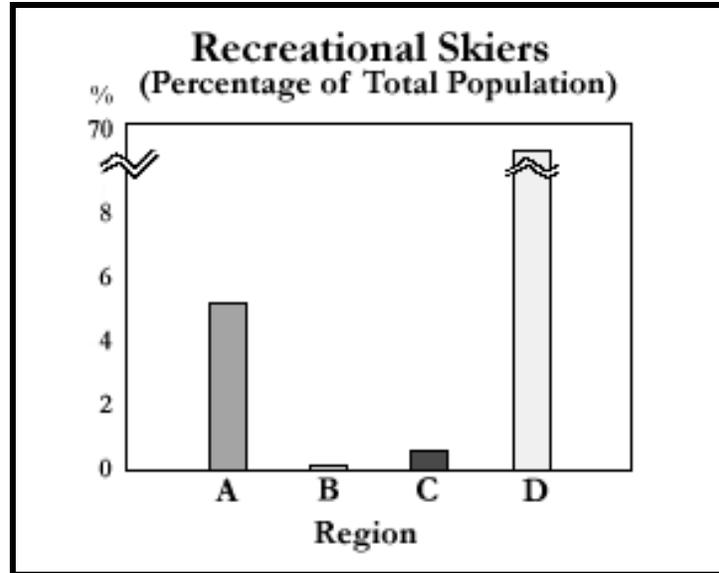


1. Throw out the trash every night.
2. Move to a new housing development.
3. Take a vacation in a state or national park.
4. Fertilize your lawn with natural fertilizer.
5. Fertilize your lawn with chemical fertilizer.
6. Help your parents plant trees and grass on a hill behind your house.
7. Volunteer for a "Spring Cleanup" weekend in your community.

Name _____

The Land's Impact on Living Patterns

Directions: The vertical bar graph below shows how landforms can affect one recreational activity. Study the graph, then read the descriptions of the regions below it. Then write in the blank space the letter of the region that best matches the graph's data. After you have finished, tell three other ways landforms can affect human activity.



Regional Information

1. A hot desert region with no nearby mountains or hills. _____
2. A mountainous region with snowy winters. _____
3. A dry flatland region with hills about a day's drive away _____
4. A temperate hilly region _____

Three Other Ways Landforms Can Affect Living Patterns

- 1.
- 2.
- 3.

Name _____

Post Test

Part I

Directions: Place a "T" in the space next to the statement if it is true, and an "F" if it is false.

- ___ 1. Earth crust movement has been taking place only during the past 1,000 years.
- ___ 2. Earthquakes are an example of earth crust movement.
- ___ 3. There are six large tectonic plates and a number of smaller ones.
- ___ 4. Tectonic plate shifts occur on the earth's inner core.
- ___ 5. Every year there are about 18,000 earthquakes, but only 3 or 4 result in death.
- ___ 6. The Himalaya Mountains were created by a series of volcanic eruptions .
- ___ 7. The "Ring of Fire" forms an arc around the Pacific Ocean.
- ___ 8. Hawaii was formed by tectonic plate movement.
- ___ 9. Weathering may take place when rainwater enters a crack in a rock.
- ___ 10. The Grand Canyon is an example of headland creation.

Part II

Directions: Place the letter of the best definition next to the word.

- | <u>Word</u> | <u>Definition</u> |
|------------------|----------------------------------------------------|
| 1. ___ Pangaea | a. Body of water created by a dam |
| 2. ___ Fault | b. Border between tectonic plates |
| 3. ___ Delta | c. Where all continents began |
| 4. ___ Erosion | d. An area where a river flows into a sea or ocean |
| 5. ___ Reservoir | e. Weathering and movement of weathered material |

Part III

Directions: Fill in the blank with the correct information.

1. Five natural ways lands can change are _____, _____, _____, _____ and _____.
2. Four human activities that can change the earth's surface are _____, _____, _____ and _____.
3. In the European country of _____ people have created rich farmland known as _____ by pumping water from the Zuider Zee.
4. People tend to cluster in land that is _____, not mountainous.
5. Two recreational activities that can take place on all landforms are _____ and _____.
6. One of the world's largest iron ore deposits, in Minnesota, is the _____.
7. Oil was discovered in Saudi Arabia in the decade of the _____.
8. About _____ percent of the world's known oil deposits are located in the _____ Peninsula.
9. Today, thanks to oil money, the Saudi Arabian literacy rate is almost _____ percent.

Part IV

Directions: Circle the letter next to the word or phrase that most accurately completes the sentence.

1. Pangaea
 - a. is an area of intense volcanic activity.
 - b. is the name of an ancient continent.
 - c. is a fault line in Peru.
 - d. none of the above.

2. Tectonic plates
 - a. are five to 25 miles deep.
 - b. float on the earth's mantle.
 - c. are modern dishes.
 - d. a. and b.
3. Tsunamis
 - a. take place on oceans.
 - b. can be very destructive.
 - c. result from tectonic plate shifts.
 - d. all of the above.
4. Lava
 - a. spills from vents.
 - b. is found only outside the "Ring of Fire."
 - c. is another name for a fault line in California.
 - d. none of the above.
5. The sand on beaches is a result of
 - a. earth crust movement.
 - b. land mass motion.
 - c. erosion.
 - d. weathering.
6. When glaciers move across rocks, boulders and plants
 - a. erosion takes place.
 - b. weathering takes place.
 - c. earth crust movement takes place.
 - d. none of the above.
7. Desertification
 - a. is not a problem in Africa.
 - b. has reduced farmland in South America.
 - c. is the result of land mass motion.
 - d. none of the above.
8. Dams can prevent
 - a. rain.
 - b. floods.
 - c. drought.
 - d. b. and c.