

Three Rivers

Yangtze Mekong Salween RIVERS

LESSON 2

Objectives

The students will:

- Describe how the Earth's surface moves and changes.
- Explain how landforms such as mountains, plateaus, valleys and rivers are created.
- Investigate the connections between human settlements and rivers.
- Examine three major rivers in Asia and their human and ecological impact.

Materials

- Hand or bath towels (one per student or one per group of two to three students)
- Large world map that shows elevation
- Student Handout: "Map of East and Southeast Asia" (one copy per student)
- Crayons for each student (preferably red, yellow and blue)
- Teacher Reference Sheet: "Three Rivers"
- "Winter in Songming" book

Procedure

1. Explore how landforms are created. Explain to the students that the Earth's surface is composed of approximately 12 very slowly moving sections, called "tectonic plates." The plates are irregularly shaped (not round like dinner plates!) and are constantly moving. The various movements of the plates create major landforms on the surface of the Earth. There are three ways in which plates move in relation to each other:

- Moving apart from each other (a divergent plate boundary).
- Moving toward each other (a convergent plate boundary).
- Sliding past each other in a parallel way (a transform plate boundary).

Pass out towels to each student or group of students. Have students model a convergent plate boundary with their hands. Students should use each hand to represent a different plate. The students should place their hands on the towel apart from each other. Instruct them to move their hands toward each other in order to represent two plates moving toward each other. The upheaval and folds that are formed on the towel represent the landforms that are formed on the Earth's surface when two plates converge.

National Standards Addressed



SCIENCE

- Changes in earth and sky.
- Changes in environments, types of resources; characteristics and changes in populations.



GEOGRAPHY

- The World in Spatial Terms: How to use maps and other geographic representations; tools and technologies to acquire, process and report information from a spatial perspective.
- The physical and human characteristics of places.

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Procedure (continued)

Ask students to point out a mountain that they have formed on their towel. Find an example of an area of towel that has been lifted upward but is relatively flat. Explain that this is a plateau.

Tell students that because snow forms at the high altitudes of the mountain tops, melting snow creates rivers that run downhill from the mountains. Due to gravity, the water will find the lowest path it can take to form a river and eventually empty into an ocean. Ask students to point out where on their towels they think rivers would form (in the valleys created by the folds of the towel).

Create a 3D map of the Himalayan Mountains and Tibetan Plateau region.

After students have created landforms using the towels, it would be helpful for the teacher to use a bath towel to create a rough simulation of the specific region discussed in this lesson. Have the students watch as you do this activity.

Lay the towel flat, place one hand steady on the towel to represent the Eurasian plate and use your other hand to represent India. Place the India hand below (south of) the Eurasian plate. Slowly move the India hand upward (northward) toward Eurasia. The towel should fold to create ridges running horizontally (east-west). This represents the Himalayan Mountain Range. Remove your hands from the towel and then arrange a flat yet lifted area on the east side of the Himalayans to represent the Tibetan Plateau. Lay down three strands of blue yarn to show how the Yangtze, Mekong and Salween rivers flow out of the Tibetan Plateau into China and Southeast Asia (refer to the map for general locations of the rivers). These three rivers flow so closely together in their initial stages that they are known in the region as the "Three Parallel Rivers."

- 2. Describe how tectonic plate movement created the Himalayan Mountains and the Tibetan Plateau.** Explain that India is on a separate plate from China, and that India used to be separated from China by an ocean. However, the India plate (called the Indo-Australian plate) has been moving northward for millions of years. Eventually India reached Eurasia and starting pushing into it. Since then, India has been moving into Eurasia at the rate of two centimeters per year. Have the students use their fingers (or ruler) to show each other a measurement of two centimeters. Explain that two centimeters may not seem like much, but over millions of years this constant movement has resulted in massive landforms. Ask students what types of landforms are created when two plates are pushed together (mountains, plateaus and valleys).

National Standards Addressed

- continued



GEOGRAPHY

- The physical processes that shape the patterns of Earth's surface.
- The processes, patterns and functions of human settlement.
- How human actions modify the physical environment.

Procedure (continued)

- 3. Have students find India and China on the large world map.** Explain that China is on the Eurasia plate. Ask students if they can use the map to find the mountains that were created as a result of India pushing northward into Eurasia (the Himalayan Mountains). Now have students locate the Tibetan Plateau. Your map may have it labeled as either the Tibetan Plateau or Tibet.

Explain that the Himalayan Mountains are the tallest mountains in the world, and that the Tibetan Plateau is the highest plateau in the world. A plateau is a flat area of land located at high, mountainous altitudes. Tell students that the Tibetan Plateau is often called “the rooftop of the world” because it is the highest altitude at which humans have permanent settlements. The altitude of the Tibetan Plateau is approximately 5000 meters above sea level.

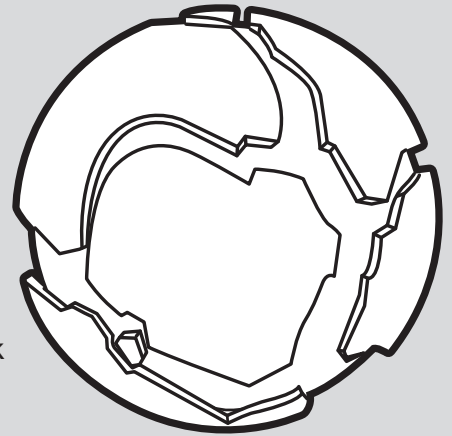
Distribute the handout, “Map of East and Southeast Asia,” to each student. Have the students color in the Himalayan Mountains red and the Tibetan Plateau yellow.

Plate Tectonics and Earthquakes:

In 2008, a 7.9 magnitude earthquake hit southwest China. The epicenter of the quake was near the city of Chengdu (pronounced “Chung-doo”). Nearly 100,000 people died in this earthquake and millions of people were left homeless. Buildings swayed thousands of miles away in cities such as Beijing, Shanghai, Hong Kong and Bangkok. Incredibly, tremors were felt as far away as India and Russia.

What caused this massive quake? It was caused by the same force that created the Himalayan Mountains, the Tibetan Plateau and the major rivers of Asia – the collision of India into Eurasia. Due to the buildup of pressure created by the continual collision of the tectonic plates, southwest China is prone to serious earthquakes. It is not a coincidence that the region is an area of serious seismic activity, is the source of major rivers of Asia and is an area of extreme ecological importance.

All of these are prime examples of the Earth’s basic geologic forces at work. It is also not a coincidence that Chengdu is the headquarters of Heifer International’s work in China. The environmental importance of the region is indisputable and is the reason Heifer International focuses so much of its work in China in this area.



Procedure (continued)

4. Identify three major rivers in this region. Three of Asia's largest rivers originate in this area and flow eastward. These are the Yangtze, the Mekong and the Salween rivers. Have a different student find each river on the large map at the front of the class, and trace it with his or her finger for the rest of the class to see. As the student traces the river, have him or her call out the different countries through which the river flows.

- **Yangtze River** – China (across almost the entire country from Tibet to the East China Sea).
- **Mekong River** – China, Myanmar, Thailand, Laos, Cambodia and Vietnam.
- **Salween River** – China, Myanmar and Thailand.

After the student at the large map traces the river and calls out the names of the countries, have the other students use a blue crayon to trace the same river on their own maps. All students should end up with each of these three rivers outlined in blue crayon on their individual maps.

5. Discuss the importance of these rivers to human life. Each of these rivers has a large river basin upon which millions of people depend for water and their livelihoods. Approximately 750 million people (about 12% of the world's population) live in the drainage basins of these three rivers. Provide the students with information in the Teacher Reference Sheet: "Three Rivers" regarding the importance of the rivers to human life.

Ask students to consider why so many people live in the vicinity of these three major rivers. Discuss how human settlements tend to be located near sources of fresh water because humans depend on rivers for water, food, irrigation, transportation and other major activities of life. Ask students, "How does living near a source of fresh water contribute to livelihoods such as fishing, farming and industry?"

6. Discuss the ecological importance of the region (biodiversity). The story, "Winter in Songming," takes place in Yunnan Province in China. The region where the Yangtze, Mekong and Salween Rivers flow in their early stages, including Northwest Yunnan Province, is considered the epicenter of biodiversity in Asia. Northwest Yunnan Province supports 25 percent of the world's animal species (50 percent of China's animal species). Many of these animals and plants are endangered.

Extension Activities

Endangered Rivers:

In 2007, the World Wildlife Fund released a list of the world's most endangered rivers. The Yangtze, Mekong and Salween rivers were all named on this list. The report stated that these were some of the world's most important rivers, and that pollution, global warming and rampant development were destroying them. Continued damage to these rivers would result in severe water shortages for the human population and extinction of thousands of species.

Have each student choose an animal that lives in this region and investigate how the animal's habitat is being affected by human activity. Many of the animals in this region are considered endangered. Have your students create a report on their findings. The report may be in the form of a poster, a slideshow or other creative format. A list of some animals from the region follows:

Extension Activities (continued)

- Asian Small-clawed Otter
- Irrawaddy Dolphin
- Wild Ox
- Giant Yangtze Sturgeon
- Siberian Crane
- Red Panda
- Fishing Cat
- Finless Porpoise
- Giant Asian Pond Terrapin
- Bigheaded Turtle
- Golden Monkey
- Siamese Crocodile
- Chinese Paddlefish
- Mekong Giant Catfish
- Chinese River Dolphin (possibly already extinct)
- Giant Panda

Links To Heifer International

The Ecological Importance of Southwest China

The story “Winter in Songming” takes place within the Yunnan Province of China, an ecologically important region. Much of Heifer International’s work in China is focused on this area because of the need to protect the Yangtze, Salween and Mekong rivers and to preserve the incredible biodiversity.

Heifer International works to help families that live in this area raise their standard of living in a way that protects the integrity of the fragile environment. Because so many people depend on the rivers that originate from this region, millions of people living downstream also benefit from Heifer International’s work of protecting the environment.



Teacher Reference Sheet:

Three Rivers

Why is the area where the Yangtze, Mekong and Salween rivers start so ecologically important? There are two main reasons – the great biodiversity found in the area, and the dependence of a large percent of the world’s human population on these waterways. Below you will find further information on these two subjects.

A Wealth of Biodiversity

Why does Northwest Yunnan Province house such biodiversity? Because the Himalayan Mountains run in an east-west direction and because they are so high, the glaciers coming from the north during the Tertiary Ice Age were unable to cross these mountains. As a result, many ancient species were able to survive the ice age in this area. Thus, the region is home to a fantastic genetic diversity of ancient species of both plants and animals.

Yangtze River: The Yangtze River Basin is home to many endangered species of plants and animals. The most famous of its residents is the Giant Panda.

Mekong River: The Mekong River Basin is home to 62 fish species that are found nowhere else in the world. It also has more species of giant fish than any other place on Earth, including the largest fresh water fish, the Mekong Giant Catfish.

Salween River: According to UNESCO, the Salween River Basin may be the most biologically diverse temperate ecosystem in the world. The river has the world’s greatest diversity of turtles and 47 species of fish that are found nowhere else in the world.

The Impact on Human Life

When rain falls on your street, where does the rainwater go? Most of it flows downstream and eventually joins creeks and streams flowing into a larger river. All the land in which the water is drained into one particular river is called a river basin.

Yangtze River Basin:

- Size The Yangtze River Basin is more than three times the size of France.
- Population Approximately 1/3 of China’s population lives in the Yangtze River Basin – this is over 400 million people (by comparison the population of the U.S. is 300 million).
- Economic Activity Most of China’s major population and industrial centers are found in the Yangtze River Basin. The Yangtze supplies 40 percent of China’s fresh water. Also, 70 percent of both China’s rice and fishery production occur in this river basin.

Mekong River Basin:

- Size The Mekong River Basin is more than twice the size of Germany. It is the largest river basin in Southeast Asia.
- Population 100 million people live in the Mekong River Basin.
- Economic Activity Freshwater fisheries are one of the main commercial activities in the region.

Salween River Basin:

- Size The Salween River Basin is more than twice the size of England. It is the second largest river basin in Southeast Asia.
- Population 6 million people live in the Salween River Basin.
- Economic Activity The people along the river basin cultivate rice and depend on freshwater fish for their survival.

Student Handout:

Map of East and Southeast Asia

Name _____

