Curriculum Unit:

China's Relationship with Water – A Look at the Huang He River, Grand Canal, and Three Gorges Dam

Author: Carol Kirsch

School: Westview Jr.-Sr. High School
1635 S. 600 West
Topeka, IN 46571

Class and Grade Levels:

This unit has been designed for middle school students studying Geography and History. The entire unit, which examines the Huang He, Grand Canal, and Three Gorges Dam projects, may be covered in two weeks. However, the teacher can easily shorten the unit by covering only one or two of the stand alone topics. If the teacher opts to cover more than one of the subject matters, it is recommended that afterwards a discussion be led to compare and contrast the topics and see if China's approach to water control follows any kind of theme.

The focus of this unit is to help students comprehend the importance of China's relationship with water and its great building projects in a way that is more meaningful to students.

Curriculum Standards:

Geography

Standard 1: How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective

Standard 2: How to use mental maps to organize information about people, places and environments in a spatial context

Standard 3: How to analyze the spatial organization of people, places, and environments on Earth's surface

Standard 4: The physical and human characteristics of places

Standard 7: The physical processes that shape the patterns of Earth's surface

Standard 9: The characteristics, distribution, and migration of human populations on Earth's surface

Standard 14: How human actions modify the physical environment

Standard 16: The changes that occur in the meaning, use, distribution, and importance of resources

Standard 17: How to apply geography to interpret the past

Standard 18: How to apply geography to interpret the present and plan for the future

Curriculum Standards (cont.):

World History

Era 3 - Classical Traditions, Major Religions, and Giant Empires, 1000 BCE-300 CE

Standard 3: How major religions and large-scale empires arose in the Mediterranean basin, China, and India, 500 BCE-300 CE

Era 4 - Expanding Zones of Exchange and Encounter, 300-1000 CE

Standard 3: Major developments in East Asia and Southeast Asia in the era of the Tang dynasty, 600-900 CE

Standard 7: Major global trends from 300-1000 CE

Era 5 - Intensified Hemispheric Interactions, 1000-1500 CE

Standard 3: The rise of the Mongol empire and its consequences for Eurasian peoples, 1200-1350

Time Required:

Huang He Lesson - 2 days
Grand Canal – 2 days
Three Gorges Dam – 3 days
Review and summation – 1 day

Required Materials:

Students will need access to either online resources, or to almanacs, atlases, and encyclopedias.
In addition, a copy of a state map for each student will be needed for the lesson on the Three Gorges Dam

Lesson Notes:

I wish to sincerely thank the Fulbright-Hays organization and the National Committee on United States-China Relations for giving me the opportunity to visit China and develop this curriculum project. My original lesson plan was to focus solely on the Three Gorges Dam Project. However, I had to tweak the project a bit since the museum I was hoping to gather the majority of my information, the Three Gorges Museum in Chongqing, had yet to open its Three Gorges Dam exhibit. I retained the idea of trying to help students better visualize the scope of China's relationship with water, but I needed more information to better develop the lesson's goal. I have now added the effects of the Huang He and the Grand Canal on China's development. Looking at all three - the Huang He, the Grand Canal, and the Three Gorges Dam - enables students to see the common approaches the Chinese people have taken when tackling large scale water projects.

Part 1: - The Huang He River/Yellow River

Lesson Background:

China is the oldest continuous civilization in the world. The Huang He, also known as the Yellow River, has served as the cradle of Chinese civilization. However, the Huang He has been both a blessing and a curse for its inhabitants. While bringing fertile silt to the North China Plain, it has also been the source of devastating floods that have resulted in some of the world's highest death tolls due to floods. These catastrophes are responsible for giving the Huang He its other name, the River of Sorrow.

Lesson Plan:

1. Begin by showing a video as an overview of the Huang He:

http://video.nytimes.com/video/2006/11/17/world/1194817103057/china-s-yellow-river-part-1.html -This provides a good introduction of the Huang He. (6 minutes)

2. Distribute a blank **map of China** and have students label the map as directed. (The map with directions is provided at the end of this lesson.)

3. Hand out worksheet titled ***Huang He's Long Course*** to students. (See at the end of this lesson)

4. For closure, show either one or all of the following videos:

   http://video.nytimes.com/video/2006/11/17/world/1194817096701/china-s-yellow-river-part-2.html - This is a continuation of the NY Times video listed earlier. It focuses more on the urbanization surrounding the river than the river itself. (4 minutes)

   http://www.youtube.com/watch?v=tl_SxeDrazc&NR=1 NPR produced this informative video on the Yellow River. (5 minutes)

   http://www.5min.com/Video/Yellow-River-Drying-Up-in-China-481387885 The video illustrates the modern and very serious problem of the Yellow River drying up due to diverting its water for other uses. It demonstrates several examples of how farmers can conserve water with different irrigation methods. (4 min.)

5. Have the students write a reflective essay using the worksheet **Huang He: What do you think?** This can result in a class discussion. (See worksheet at the end of this lesson)

Bibliography for the Huang He

http://factsanddetails.com/china.php?itemid=448&catid=15&subcatid=103

http://geography.about.com/library/blank/blxchina.htm

Nystrom World Atlas. Chicago: Div. of Herff Jones., Inc. 2002.

Salter, Christopher L. ed**.** **Eastern World.** Austin: Holt McDougal. 2010.

Other resources for the Huang He:

Video:

http://www.youtube.com/watch?v=Rd2A2nDGqA4&feature=related Images are displayed of the Yellow River with musical accompaniment. This can be appropriate shown as background during a discussion of the Yellow River (4 min.)

Part 2: - The Grand Canal

Lesson Background:

The Grand Canal is the longest canal in the world. First built over 1400 years ago, the canal was responsible for helping to bring much of China's economic and agricultural activity southward, away from the Huang He while also helping ship food supplies to the capital and growing population in the southeast.

Lesson Plan:

1. Begin by showing a video clip that allows the students to see the size and workings of China's Grand Canal. Either of the videos below would serve as a nice introduction:

http://www.youtube.com/watch?v=9-vWsiITCG4 – Students can witness all the canal traffic going on near Wuxi. (3 min.)

http://www.dailymotion.com/video/x2skoc_chinas-grand-canal-01_travel - The video shows the canal as a working canal today. Since it is rather lengthy at 9 minutes long, a short clip of the video would suffice to get the idea across

Discuss with the students their impressions of the Grand Canal.

2. Have students take out the blank **map of China** that they worked on in the Huang He lesson, or they can begin with a new blank map. Using an atlas, encyclopedia, or online resource, have students draw in the Grand Canal and other pertinent places on the map. (See the blank map and directions at the end of the lesson on the Huang He.)

3. With the help of an almanac or similar resource, have the students complete the worksheet ***The Grand Canal Goes to Great Lengths!*** (See at the end of this lesson plan.)

4. As closure, have students reflect on the question presented in the worksheet ***The Grand Canal: Still a good idea today?*** (See the worksheet at the end of this lesson plan.)

Bibliography for the Grand Canal

Nystrom World Atlas. Chicago: Div. of Herff Jones., Inc. 2002.

Salter, Christopher L. ed. **Eastern World.** Austin: Holt McDougal. 2010.

http://www.chinatown-online.com/cultureeye/highlights/grand.htm - This is a short and simple overview of the Grand Canal.

Videos:

http://www.dailymotion.com/video/x2skoc_chinas-grand-canal-01_travel - canal travel today (9 min.)

http://www.youtube.com/watch?v=9-vWsiITCG4 concentrated more on trade traffic on the canal (3 min.)

Part 3: - The Three Gorges Dam

Lesson Background:

Considered China's most ambitious building project ever, this attempt to tame the mighty Yangtze River and produce hydroelectric power to a nation that is growing by leaps and bounds is just as controversial today as when the dam was first proposed decades ago. The scope of undertaking a project that consciously affects both physical and human geography so dramatically has never been attempted before, and very likely, never will be again.

Lesson Plan

1. Show the following video that provides an introduction to the Three Gorges Dam project.

http://dsc.discovery.com/videos/discovery-atlas-china-revealed-three-gorges-dam.html (2006) (3 min.)

Discuss with the students the following:

- Why was the dam built?
- What are the benefits gained from the dam?
- What are the concerns caused by the dam?

If desired, the following longer video can be shown that expresses some of the concerns of the dam.

http://www.youtube.com/watch?v=3z9K82ZVdMA (19 min.) Discusses how the making of the dam has created a hazard of landslides along the river.

2. Have students complete the worksheet **Three Gorges Dam: Just the Facts, Ma'am.** Students will need a copy of their state's map as well as access to online resources, or materials such as an almanac, atlas, and encyclopedias. (Worksheet is at the end of the lesson plan.)

3. After the completion of the worksheet **Three Gorges Dam: Just the Facts, Ma'am**, have students share their answers to the last question. This should lead to a class discussion on the merits of the Three Gorges Dam. Is it a bold move that will benefit China or a dangerous act that will take a hefty toll on the people and its environment?

Bibliography

http://www.cnn.com/SPECIALS/1999/china.50/asian.superpower/three.gorges

http://debatepedia.idebate.org/en/index.php/Debate:_Three_Gorges_Dam

http://www.internationalrivers.org/files/3Gorges_FINAL.pdf

http://news.nationalgeographic.com/news/2006/06/060609-gorges-dam.html

Part 4: - Final review and summary

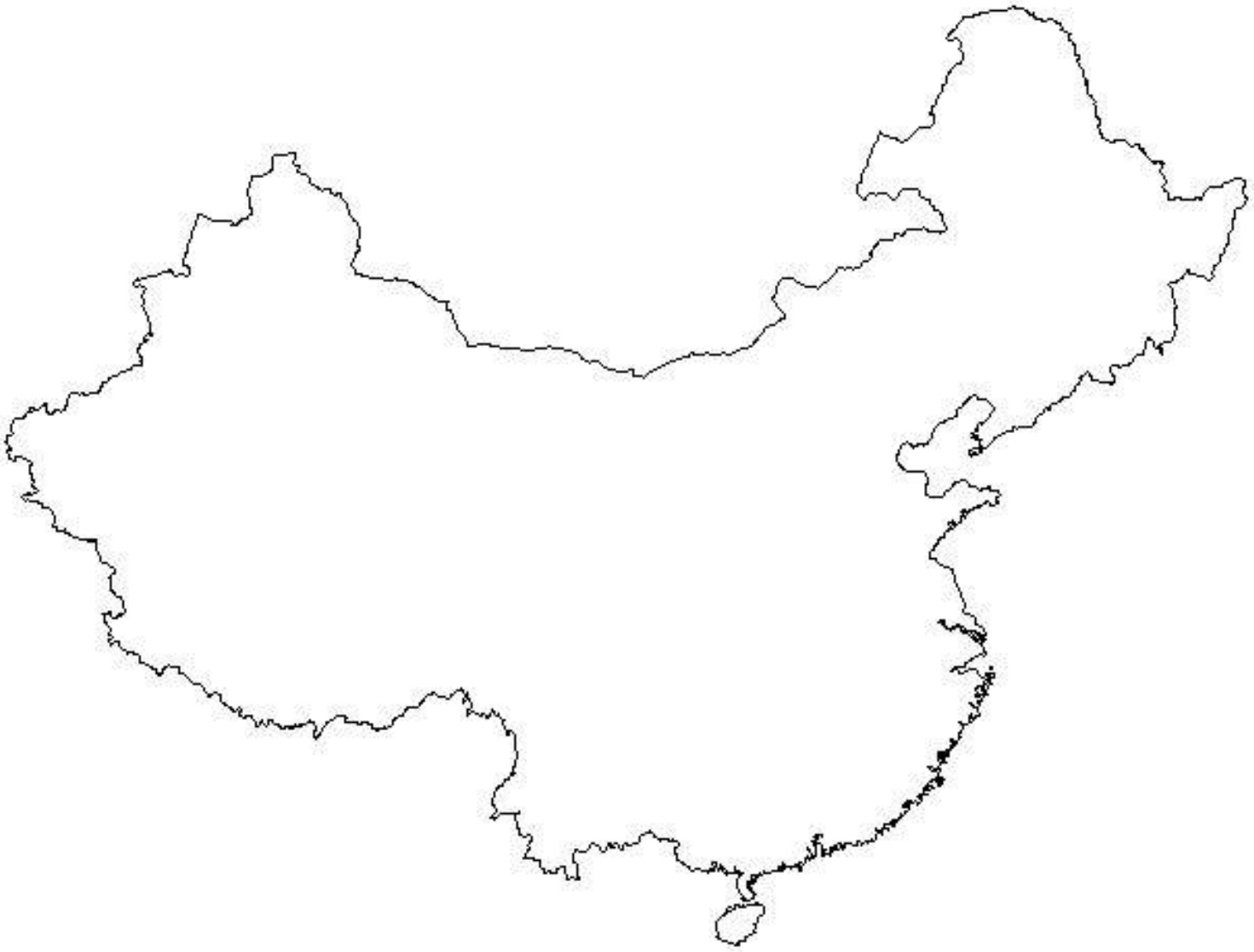
The following can either be done in the format of

- a class discussion
- a small group discussion
- a writing assignment
- a debate forum for question #4

1. What problems were the Chinese trying to solve using water by controlling their water resources?
2. Is there anything these approaches to water have in common?
3. Was their handling of the water issues successful?
4. Would similar projects like the ones in this unit ever be done today in the US? Why or why not?

Name _____

China



With the help of an atlas, on the map above

- ✓ Draw in The Huang He (be as accurate as possible)
- ✓ Lightly shade in the North China Plain
- ✓ Label the
  - Yellow Sea
  - East China Sea
  - South China Sea
- ✓ Locate the following cities
  - Beijing
  - Lanzhou

Name _____

Huang He's Long Course

The Huang He is sometimes referred to as China's Cradle of Civilization because it is the birthplace of China's ancient civilization from as early as 5000 BC. Running through the fertile North China plain, its water carries a tremendous amount of silt which has been left on the plain following the river's mainly floods. The silt in the water gives the river its other name, the Yellow River. Unfortunately, it has also earned the name the River of Sorrow.

Photo from Google images:
http://www.google.com/imgres?q=yellow+river+mouth+china&um=1&hl=en&client=firefox-a&sa=N&rls=org.mozilla:en-US:official&biw=1260&bih=861&tbm=isch&tbnid=qkLXDokfNd_AjM:&imgrefurl=http://factsanddetails.com/china.php%3Fitemid%3D448%26catid%3D15%26subcatid%3D103&docid=_0_WTcPHXym07M&w=361&h=242&ei=QPFWTqbsJIKHsgKtpbizDA&zoom=1&iact=hc&vpx=379&vpy=527&dur=4554&hovh=184&hovw=274&tx=165&ty=112&page=2&tbnh=153&tbnw=189&start=31&ndsp=20&ved=1t:429,r:1,s:31

Go the website below and read the information from the beginning through the three paragraphs describing Lanzhou.
http://factsanddetails.com/china.php?itemid=448&catid=15&subcatid=103

1. How many miles long is the Yellow River? _____
2. Look at a map of the United States. If the Yellow River were to begin in New York City, what European city could it reach? _____ (Lisbon)
3. According to the article, the river supplies water for 155 million people. Look up the population for the United States and see what percentage of the US population would be 155 million. _____ (approx. 50%)

4. Most of the land surrounding the Huang He is flat. When the river floods, the water covers a huge area. Not only do people die because of the floods, but also from diseases caused by water borne pathogens. Approximately how many floods have occurred since record keeping began in 602 BC?

   _____ (1,500)

5. In 1887 one of the deadliest natural disasters ever recorded occurred in the world when the Yellow River flooded resulting in the death of 900,000 – 2,000,000 people. Why do you think so many people live in an area where dangerous flooding occurs?

   _____

6. When the water spills over its banks, the silt covers a wide area over the flat plain. Why do you think silt is valuable?

   _____ (fertilizes the soil)

7. However, all of the silt can cause problems. The buildup of silt has caused the river to change its course. How many times has the river changed its course since record keeping began in 602 BC?

   _____ (26 times)

8. Why do the Chinese have to continually build their levees higher and higher? _____

   _____

   (Silt left on the river bottom is raising the levels of the river)

9. Why is the river running dry? _____
   (diverted for other uses)

10. How much of the water is used for agricultural purposes? _____ (65 %)

11. Pollution has become a major issue. What percent of the river's volume consists of waste water? _____ (10%)

    What percent of the river has been labeled biologically dead? _____ (50%)

    What disease has had a dramatic rise in the river communities? _____ (cancer)

12. Read the section on the web about the city of Lanzhou. Pretend you have been selected as the city's new mayor. What would you do to tackle the city's water problems? Be specific and on a separate piece of paper, write a 100 word speech that you might give to the citizens of Lanzhou.

Name _____

Huang He: What do you think?

The Huang He has been given a number of names: The Yellow River, The Mother River, and River of Sorrow, to name a few. Which name do you think best describes China's second longest river? Explain your reasons.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

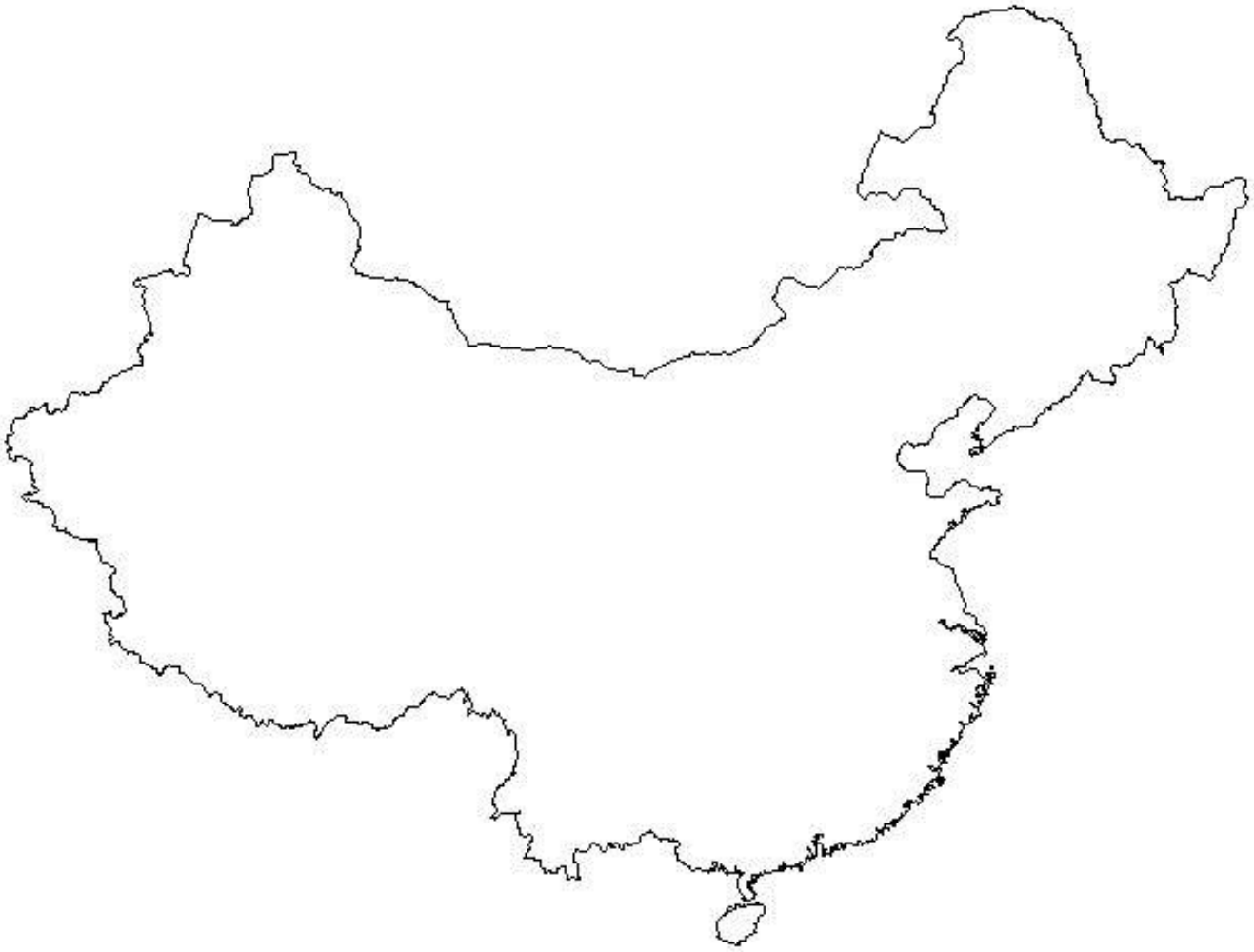
_____

_____

_____

Name _____

The Grand Canal



With the help of an atlas, encyclopedia or online resource, add the following to the map above:

- ✓ Carefully draw in and label the Grand Canal
- ✓ Include the cities of Beijing and Hangzhou
- ✓ Add the Yangtze River and Huang He (Yellow River)
- ✓ Label the
    - Yellow Sea
    - East China Sea
    - South China Sea

Finally write the word **China** neatly across the country

Name _____

The Grand Canal Goes to great lengths!

The Grand Canal is considered the world's oldest and longest manmade canal. It measures 1,115 miles long.

Using an almanac, encyclopedia, or online resource find the length for four other famous canals in the world:

The Suez Canal by the Nile River is _____ miles long.

The Grand Canal in Venice, Italy is _____ miles long.

The Erie Canal in New York State is _____ miles long.

The Panama Canal in Panama is _____ miles long.

Make a bar graph below that shows the length of the 5 canals.

1300					
1200					
1100					
1000					
900					
800					
700					
600					
500					
400					
300					
200					
100					
0					
Miles Long	Grand Canal (China)	Suez Canal (Egypt)	Grand Canal (Venice, Italy)	Erie Canal (USA)	Panama Canal (Panama, South America)

Looking at the table above, what does it tell us about the China's Grand Canal?_____

_____

Why do you think the Grand Canal was built? _____

_____

_____

Name _____

The Grand Canal:
Still a good idea today?

The building of China's Grand Canal was a huge work project involving millions of peasant laborers over one thousand years ago. About half of the workers (3,000,000) died from hard labor and hunger before the canal was finished. Along with the emperor's other demands, like building a road along either side of the canal for his private use, the project was thought to have been wasteful use of manpower and money, and resulted in the downfall of the Sui Dynasty.

Today, some of the canal has been filled in, but parts of it are still used for trade and travel. Below is the canal south of Shanghai as it travels through the city of Suzhou today.

Photo by Carol Kirsch

The Grand Canal was instrumental in bringing food and goods from the north to the people in the southeastern part of the country. Thanks to the waterway, a new part of the country could develop. Today, many of the factories, and the people to run them, live in the southeastern part of the country.

<u>Your thoughts……</u>

Do you think it is still a good idea to build canals ***today***? Why or why not? _____

_____

_____

_____

_____

_____

_____

_____

Name _____

Three Gorges Dam: Just the Facts, Ma'am

The building of the Three Gorges Dam is the largest and most controversial hydropower project ever undertaken. However, facts and figures, even if incredibly large, can be meaningless to us unless we can connect them to things we already know. This exercise will help you better understand the work that was and is involved with China's most ambitious project. You will need to check into an almanac, atlas, encyclopedia, or online resources to find the answers as well as a map of your state.

1. The Three Gorges Dam is built across the Yangtze River which is China's longest river and the third longest in the world. Name the rivers that are longer:

   Longest river in the world _____

   Second longest river in the world _____

2. Because of the building of the dam, the area upstream where the Three Gorges are located was flooded. Included in this flooded area were 4,000 villages, 140 towns and 13 cities that are now submerged below the waters of the Yangtze. Using a state map or map of the US, list the 13 cities closest to you:

   Using a copy of a map of your state, draw a line through 50 of the closest towns from where you live. (In a show of mercy, you will not be asked to cross out 140 towns. ☺)

3. The reservoir that was created by the dam is 410 miles long. Using your state map, draw a bold line that reaches 410 miles from your hometown to show the length of the Three Gorge's Dam reservoir. The reservoir averages 3/4 mile wide, forming a lake that covers 395 square miles.

4. At least 1.3 million people had to be relocated from their homes in order to escape the rising waters of the Yangtze. What percentage of your state's population would 1.3 million people be?

   _____ %

5. The dam itself is 1.4 miles long and 607 feet high (five times bigger than the U.S.'s Hoover Dam). If it takes 20 minutes to walk a mile, how long does it take to walk across the Three Gorges Dam?

   _____

6. 21 million cubic yards of concrete was used to build this dam. This is twice as much as the world's second largest dam which is located in Brazil. One cubic yard of concrete weighs 3,300 pounds, or in other words, 1.6 tons.
   a. How many tons of concrete were used? _____

   b. Convert the answer above to pounds (Be careful to count your zeros!)

   _____

China had three main purposes for building the Three Gorges Dam.

- One was to stop the massive flooding that took place on the Yangtze. In the last one hundred years, over *300,000* people have died in floods along the Yangtze;
- To help produce cleaner energy by replacing the coal fired energy plants that cause air pollution;
- To help make the Yangtze River more navigable for larger ships to bring in goods by raising the level of the water that is behind the dam.

Let's see if the efforts are worth it:

7. Chinese officials say the dam will protect 15 million people from deadly floods. Find the populations of the largest US cities, and list them until their total reaches 15 million people.

_____

_____

8. When they first started construction of the dam in 1994, China estimated that the hydroelectricity produced by the dam would meet 10% of China's energy needs. However, since the dam was first planned, China has grown tremendously and requires much more energy than ever imagined. Today, experts are saying the Three Gorges Dam will provide 3% of the country's energy needs. Which of the following statements below is true based on this information:

   _____ The dam is producing less energy than first thought.

   _____ China is using much more energy than it did in 1994.

   _____ China does not use as much energy now as it did in 1994.

9. 44 million tons of cargo have been transported over the Yangtze River via the Three Gorges Dam which is up from 14.75 million tons in 2003. The average American car weighs two tons. How many cars would equal 44 million tons?

   _____

   FYI: The latest data for the State of Indiana says there are six million licensed vehicles in the state.

*** Looking at the information presented on these two pages, was building the Three Gorges Dam a good idea? Why or why not?

_____

_____

_____

_____

_____

_____

_____

Unfortunately, a number of the concerns people have about the Three Gorges Dam are fears about the future. Some of the issues include:

- How will the tremendous buildup of silt upriver from the dam affect the river?
- How will the river flush itself of pollutants now that the dam has slowed the river's flow?
- The reservoir holds back 10.3 trillion gallons of water; will the weight of all that water cause an earthquake? Hundreds of small tremors have already been felt since the reservoir began forming five years ago.
- The dam has already shown signs of small cracks. Chinese experts said this is to be expected, but can it lead to worse things?
- The rise and fall of the river due to the release of the dam's water has weakened the shorelines and already caused a number of landslides. Will the condition become even more serious?
- A number of fish have become extinct due to the increased water pollution. What will happen to the fishing industry?
- Since the Yangtze River no longer rushes out to the sea, the rich delta that once existed along China's coastline is now eroding away. In addition, because there is no strong flow of water out to the sea, the salt water is starting to make its way inland, destroying cropland that is along the river bank.

This is only a sampling of the concerns people have about the future of the Three Gorges Dam.

Your assignment is to select one of the above issues, research it, and write a paragraph describing the problem. On a separate sheet of paper:

- Identify which problem you are researching.
- How serious is it?
- Is anything being done to address the problem?
- Can it be solved?

Photo from
http://topics.nytimes.com/topics/news/international/countriesandterritories/china/three_gorges_dam/index.html