

# RIVERS OF CHINA: THE YANGTZE

## Teacher's Guide

Developed by  
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## RIVERS OF CHINA: THE YANGTZE

### Essential Questions

- How is studying the Yangtze River relevant to students' lives?
- What are some environmental, economic, and social issues concerning the Yangtze River?
- What are some physical characteristics and landmarks along the Yangtze River?

### Introduction and Rationale

#### *Why study rivers?*

Water is essential for all life and human survival. It is necessary for all aspects of our lives including food production and security, domestic activities and sanitation, health, energy, industry, and environmental sustainability. Of all the water on Earth, only about 2.5 percent is freshwater. Rivers are the principal systems by which freshwater is delivered to all of us around the world, yet we are imperiling this precious resource in all sorts of ways.

#### *Why China?*

China has the largest economy in the world, currently has the largest population in the world, and also emits the greatest amount of greenhouse gases into the atmosphere. Because of its unique geographical and climatic circumstances, China also has the largest potential for hydroelectric power generation of any country in the world. Therefore, China's water challenges and its relationship with its rivers are highly relevant to the world at large.

Mountains, rivers, and other geographical realities divide China roughly into eight large regions. Each of these regions is oriented toward a regional "core" more heavily populated, more prosperous, and more developed in general than the areas around it. In most regions, the cores are related to river systems. The rivers bring abundant and dependable water for irrigation and other human uses, though floods may threaten and sometimes devastate. These river systems were also major migration routes along which the Chinese people spread and in whose valleys they settled. It is thus no accident that China's largest cities have always been located in the regional cores, mostly near important rivers—as in the case in many other societies.

#### *Why study the Yangtze River?*

China's 6,418 kilometer-long Yangtze River is unlike any other great river in the world. Only the Nile and the Amazon are longer and its water volume is in the top five. Originating in the Tibetan Plateau and terminating where it spills out in the East China Sea, the Yangtze both

divides and connects the country. The Yangtze River watershed touches 19 provinces and is central to the economic life of more people than the populations of Russia and the United States combined. Studying the Yangtze serves not only as a window into China's geography, ecology, economy, culture, and history, but also its future.

*Rivers of China: The Yangtze* is divided into four activities.

**Activity 1, *Journey Down the Yangtze***, familiarizes students with significant features, cities, and landmarks along the Yangtze River. Students then participate in a poem-writing and sharing activity.

**Activity 2, *Geology and Climate***, introduces students to the fundamental properties of rivers generally and the Yangtze in particular. Students create miniature riverine landscapes out of Play-Doh, pour water down their classmates' riverbeds, and record their observations. They then complete a reading on the geology and climate of China.

**Activity 3, *Maps of China***, delves into the physical geography of China and its rivers through an extensive map-analysis activity. Working alone or in small groups, students closely examine four different maps of China that highlight the country's rivers, river basins, elevation pattern, and precipitation pattern.

**Activity 4, *Contemporary Issues***, engages small groups in exploring a variety of contemporary issues (presented in a video or webpage format) pertaining to the Yangtze River. Groups then complete an activity and present to the class. Students who are not presenting take notes.

**Objectives** Through engaging in the activities in this teacher's guide, students will

- anticipate consequences of physical processes on Earth;
- examine physical characteristics of the Yangtze River;
- explore contemporary environmental, economic, and social issues surrounding the Yangtze River; and
- compare and contrast issues pertaining to the Yangtze River with issues in the country in which the students live.

**Connections to Curriculum Standards** This unit has been designed to meet certain national history, social studies, geography, and common core standards as defined by the National Center for History in the Schools, the National Council for the Social Studies, the National Council for Geographic Education, and the Common Core State Standards Initiative.

## National History Standards (from the National Center for History in the Schools)

### World History

Era 5, Standard 1A: The student understands China's extensive urbanization and commercial expansion between the 10th and 13th centuries.

- Grades 7–12: Analyze how improved agricultural production, population growth, urbanization, and commercialization were interconnected. [Analyze multiple causation]
- Grades 5–12: Identify major technological and scientific innovations and analyze their effects on Chinese life. [Examine the influence of ideas]

Era 6, Standard 6A: The student understands major global trends from 1450 to 1770.

- Grades 5–12: Assess how the acceleration of scientific and technological innovations in this era affected social, economic, and cultural life in various parts of the world. [Analyze cause-and-effect relationships]

Era 7, Standard 6A: The student understands major global trends from 1750 to 1914.

- Grades 5–12: Describe major shifts in world population and urbanization in this era and analyze how such factors as industrialization, migration, changing diets, and scientific and medical advances affected worldwide demographic trends. [Interrogate historical data]

Era 9, Standard 2A: The student understands how population explosion and environmental change have altered conditions of life around the world.

- Grades 7–12: Analyze causes of the world's accelerating population growth rate and connections between population growth and economic and social development in many countries. [Analyze multiple causation]
- Grades 5–12: Analyze how population growth, urbanization, industrialization, warfare, and the global market economy have contributed to environmental alterations. [Analyze cause-and-effect relationships]
- Grades 5–12: Assess the effectiveness of efforts by governments and citizens' movements to protect the global natural environment. [Obtain historical data]

Era 9, Standard 3A: The student understands major global trends since World War II.

- Grades 5–12: Compare causes, consequences, and major patterns of international migrations in the late 20th century with world

population movements of the 19th century and the first half of the 20th. [Draw comparisons across eras and regions]

World History Across the Eras, Standard 1: Long-term changes and recurring patterns in world history.

- Grades 5–12: Analyze ways in which human action has contributed to long-term changes in the natural environment in particular regions or worldwide.

### **National Social Studies Standards (from the National Council for the Social Studies)**

- Culture; Thematic Strand I: Social studies programs should include experiences that provide for the study of culture and cultural diversity.
- People, Places, and Environments; Thematic Strand III: Social studies programs should include experiences that provide for the study of people, places, and environments.
- Individuals, Groups, and Institutions; Thematic Strand V: Social studies programs should include experiences that provide for the study of interactions among individuals, groups, and institutions.
- Production, Distribution, and Consumption; Thematic Strand VII: Social studies programs should include experiences that provide for the study of how people organize for the production, distribution, and consumption of goods and services.
- Science, Technology, and Society; Thematic Strand VIII: Social studies programs should include experiences that provide for the study of relationships among science, technology, and society.
- Global Connections; Thematic Strand IX: Social studies programs should include experiences that provide for the study of global connections and interdependence.

### **National Geography Standards (from the National Council for Geographic Education)**

The geographically informed person knows and understands:

- 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 5: That people create regions to interpret Earth's complexity.
- Standard 6: How culture and experience influence people's perceptions of places and regions.



- Standard 7: The physical processes that shape the patterns of Earth's surface.
- Standard 8: The characteristics and spatial distribution of ecosystems on Earth's surface.
- Standard 9: The characteristics, distribution, and migration of human populations on Earth's surface.
- Standard 10: The characteristics, distribution, and complexity of Earth's cultural mosaics.
- Standard 11: The patterns and networks of economic interdependence on Earth's surface.
- Standard 12: The processes, patterns, and functions of human settlement.
- Standard 13: How the forces of cooperation and conflict among people influence the division and control of Earth's surface.
- Standard 14: How human actions modify the physical environment.
- Standard 15: How physical systems affect human systems.
- 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.

### **Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects**

#### **Reading Standards for Informational Text**

- Standard 1, Grade 6: Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- Standard 1, Grade 7: Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- Standard 1, Grade 8: Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
- Standard 1, Grades 9–10: Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- Standard 1, Grades 11–12: Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
- Standard 4, Grade 6: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.

- Standard 4, Grade 7: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
- Standard 4, Grade 8: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
- Standard 4, Grades 9–10: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
- Standard 4, Grades 11–12: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).
- Standard 7, Grade 6: Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
- Standard 7, Grade 7: Compare and contrast a text to an audio, video, or multimedia version of the text, analyzing each medium’s portrayal of the subject (e.g., how the delivery of a speech affects the impact of the words).
- Standard 7, Grade 8: Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
- Standard 7, Grades 9–10: Analyze various accounts of a subject told in different mediums (e.g., a person’s life story in both print and multimedia), determining which details are emphasized in each account.
- Standard 7, Grades 11–12: Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
- Standard 10, Grades 6, 7: By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.
- Standard 10, Grade 8: By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6–8 text complexity band independently and proficiently.
- Standard 10, Grades 9–10: By the end of grade 9, read and comprehend literary nonfiction in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literary

nonfiction at the high end of the grades 9–10 text complexity band independently and proficiently.

- Standard 10, Grades 11–12: By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently.

### Writing Standards

- Standard 1, Grades 6, 7, 8: Write arguments to support claims with clear reasons and relevant evidence.
- Standard 1, Grades 9–10, 11–12: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
- Standard 2, Grades 6, 7, 8: Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- Standard 2, Grades 9–10, 11–12: Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- Standard 3, Grades 6, 7, 8: Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
- Standard 3, Grades 9–10, 11–12: Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
- Standard 4, Grades 6, 7, 8, 9–10, 11–12: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
- Standard 7, Grade 6: Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
- Standard 7, Grade 7: Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.
- Standard 7, Grade 8: Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- Standard 7, Grades 9–10, 11–12: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the

inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

- Standard 10, Grades 6, 7, 8: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
- Standard 10, Grades 9–10, 11–12: Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

### **Reading Standards for Literacy in Science and Technical Subjects**

- Standard 2, Grades 6–8: Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
- Standard 2, Grades 9–10: Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- Standard 2, Grades 11–12: Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- Standard 4, Grades 6–8, 9–10, 11–12: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.
- Standard 7, Grades 6–8: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
- Standard 7, Grades 9–10: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- Standard 7, Grades 11–12: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

### **Equipment**

Computer with Internet access, a PDF reader, and a supported web browser (for teacher) (See Media Guide below.)

Computer projector (for teacher)

Access to eight to 30 computers with Internet access and a supported web browser (for in-class student work) (See Media Guide below.)

Whiteboard/chalkboard

Time,  
Suggested  
Sequence of  
Activities

*Rivers of China: The Yangtze* is divided into four activities. Taught in full, each activity comprises one to three 50-minute class periods.

Subjects,  
Suggested  
Grade Levels

This unit is recommended for use in the following types of classes:

- Social Studies
- Modern World History
- World Cultures
- Asian Studies
- Geography
- Earth Science
- Contemporary World Issues

The reading level is suitable for students in grades 5–12.

Related  
SPICE Units

If you find this teacher’s guide valuable, the following SPICE units may also be relevant to your classes. For more information on these and other units, please visit the SPICE website at <http://spice.stanford.edu>.

*10,000 Shovels: China’s Urbanization and Economic Development*

*Along the Silk Road*

*Angel Island: The Chinese-American Experience*

*China’s Cultural Revolution*

*China’s Republican Era, 1911 to 1949*

*China in Transition: Economic Development, Migration, and Education*

*Chinese Dynasties Part One: The Shang Dynasty through the Tang Dynasty, 1600 BCE to 907 CE*

*Chinese Dynasties Part Two: The Song Dynasty through the Qing Dynasty, 960 to 1911 CE*

*Geography and the Human Experience*

*Mapping Asia*

*Religions and Philosophies in China: Confucianism, Daoism, and Buddhism*

*The Road to Beijing*

*Sustainable Development and Modern China*

SPICE  
Resources  
Online

SPICE is currently expanding its online offerings, including freely viewable documentaries, interactive teaching materials, and a digest with free content pieces excerpted from various SPICE curriculum units. To find out more about these resources or to join the SPICE mailing list, please visit the “Resources” section of the SPICE website at <http://spice.stanford.edu>.

**Media Guide** This teacher's guide makes use of PDFs, the *Rivers of Asia* website, and streaming video. To open and/or play these media, ensure that your computers have the following:

- any PDF reader (e.g., Adobe Acrobat) (only necessary for teacher's computer)
- Firefox, Safari, or Internet Explorer web browser

## Activity One

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# JOURNEY DOWN THE YANGTZE

- Summary** Students learn about the significant features, cities, and landmarks along the Yangtze River. They then participate in a poem-writing and sharing activity.
- Materials** Handout 1, *Initial Questions*, p. 13, 30 copies  
Handout 2, *River Journey Activity*, p. 14, 30 copies  
Answer Key, *Initial Questions*, p. 15  
30 Envelopes
- Equipment** 10 to 30 computers with Internet access
- Teacher Preparation** Instructions and materials are based on a class size of 30 students. Adjust accordingly for different class sizes.
1. Familiarize yourself with the *Rivers of Asia* website at [http://web.stanford.edu/group/spice/rivers\\_of\\_asia/](http://web.stanford.edu/group/spice/rivers_of_asia/).
  2. Review all handouts and make the appropriate number of copies.
- Procedures**
1. Inform students they will be learning about the Yangtze River in China. Distribute one copy of Handout 1, *Initial Questions*, to each student and allow them time to record their answers on the handout.
  2. Invite students to share their answers. Discuss the answers, using the Answer Key, *Initial Questions*, as a guide.
  3. Inform students they will learn about the Yangtze through an interactive website.
  4. Depending on class size, assign each student, partner pair, or small group to a computer with Internet access. Direct students to access the website at [http://web.stanford.edu/group/spice/rivers\\_of\\_asia/](http://web.stanford.edu/group/spice/rivers_of_asia/).
  5. Allow students time to explore and familiarize themselves with the website.
  6. Direct students to the *Journey Down the Yangtze* webpage by navigating the top menu (Rivers of Asia > Rivers of China > Yangtze River > Journey Down the Yangtze).
  7. Distribute Handout 2, *River Journey Activity*, and an envelope to each student. Allow time for students to complete their poems.
  8. Facilitate classmates' sharing of poems. Collect students' poems for assessment.

**Assessment** The following are suggestions for assessing student work in this activity:

1. Handout 2, *River Journey Activity*, using the criteria outlined on the handout as a guide
2. Student participation in group and class discussions, evaluating students' ability to
  - clearly state their opinions, questions, and answers;
  - exhibit sensitivity toward different cultures and ideas;
  - respect and acknowledge other students' comments;
  - ask relevant and insightful questions; and
  - provide correct and thoughtful answers





## RIVER JOURNEY ACTIVITY

1. Using the interactive map on the webpage, *Journey Down the Yangtze*, embark on a virtual journey on the Yangtze.
2. When you have finished, choose 10 points you would like to focus on.
3. For each point write two lines of poetry, from the Yangtze's source to the East China Sea.

The following are suggestions when creating your poem:

- Explore and try several words or phrases before deciding which to use.
  - Analyze the name or nickname of the city or setting. Think of why it has this name or nickname.
  - Think of four words that best describe the city or setting.
4. Compile your 20-line poem.
  5. Create two copies of your 20-line poem. Keep one for yourself, cut the other poem into 10 strips (two lines each). Put these strips in an envelope.
  6. Trade envelopes with a classmate. Try to arrange his/her poem in the order you believe to be correct. Also guess which section of the river each two lines of poetry depict.
  7. Compare notes with your classmate.
  8. Hand in your complete poem to your teacher for assessment.

## INITIAL QUESTIONS

1. True or False: Water is an abundant resource available for human use and consumption. Explain your answer.

*Fresh water is essential to human life and human society as we know it, but is only a very small percentage of the total amount of global water. In fact, the total usable freshwater supply available for humans and ecosystems is less than 1 percent of all freshwater resources on the planet.*

2. In terms of water, why is the study of rivers important?

*Rivers are the principal delivery system by which fresh water is delivered to all of us around the world. Rivers are also an important source of hydropower, thereby contributing to countries' industrialization and economies. Yet, rivers are also being imperiled in all sorts of ways.*

3. Why, in particular, is studying the Yangtze River relevant to us?

*The Yangtze River watershed touches 19 provinces and is central to the economic life of more people than the populations of Russia and the United States combined. Studying the Yangtze serves not only as a window into China's geography, ecology, economy, culture, and history, but also its future. China now has the largest economy and the largest population in the world. Because of its unique geographical and climatic circumstances, China also has the largest potential for hydroelectric power generation of any country in the world. Therefore, China's water challenges and its relationship with its rivers are highly relevant to the world at large.*

## Activity Two

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### GEOLOGY AND CLIMATE

- Summary** Students are introduced to the fundamental properties of rivers generally and the Yangtze in particular. Students create miniature riverine landscapes out of Play-Doh, pour water down their classmates' riverbeds, and record their observations. They then complete a reading on the geology and climate of China.
- Materials** Handout 1, *River Observations*, p. 19, 10 copies  
Handout 2, *Monsoon Quiz*, p. 20, 30 copies (optional)  
Handout 3, *Geology and Climate Test*, p. 21, 30 copies  
Answer Key 1, *Monsoon Quiz*, p. 22  
Answer Key 2, *Geology and Climate Test*, p. 23  
River Cards, pp. 24–25, one copy  
20 five-ounce packs of Play-Doh\*  
10 sheets of plastic wrap (e.g., Saran Wrap)  
10 cups for water  
Water
- Equipment** 10 to 30 computers with Internet access
- Teacher Preparation** Instructions and materials are based on a class size of 30 students. Adjust accordingly for different class sizes.
1. Make appropriate number of copies of handouts and River Cards. Cut the River Cards sheet into separate cards.
  2. Procure enough Play-Doh for the class, or ask students to bring their own salt dough to school.  
Note: If possible, try to have some extra dough on hand, in case some groups need more than 10 ounces to create their landscapes.
  3. Prepare your classroom space for the activity, or arrange for an alternative space to run the activity. (This activity involves molding dough and pouring water, so an outdoor area is ideal.)

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\* If Play-Doh is difficult to obtain, use an equivalent amount of homemade salt dough instead. Salt dough can either be provided by the teacher or made at home by students and brought to class. Directions for making salt dough can be found at <http://www.learning4kids.net/wp-content/uploads/2012/11/Printable-Salt-Dough-Recipe.pdf> and elsewhere online.

- Procedures
1. Inform students that they will work in small teams to build miniature model rivers.
  2. Divide students into groups of three, and distribute one River Card to each group. Explain that each group will build a river with a unique set of characteristics.
  3. Distribute 10 ounces of Play-Doh to each group, and instruct students to use the material to build a miniature landscape according to the instructions on their assigned River Card.
  4. Allow students 10–15 minutes to form their rivers. As they are creating their landscapes, walk among the groups to check that each team is building its river according to its assigned River Card.
  5. Distribute a sheet of plastic wrap to each group. Instruct groups to cover their models with the wrap, trying to shape the wrap to the river bed as closely as possible.
  6. Supply each group with a cup, water, and one copy of Handout 1, *River Observations*. Tell students they will now pour water onto their landscape to see how their river behaves. Direct them to experiment with different amounts of water ( $\frac{1}{2}$  cup, 1 cup) and different pouring speeds (slowly, quickly) and to record their findings on the handout. Allow students to rotate through their classmates' landscapes and observe how the poured water behaves differently depending on the landscape's characteristics.
  7. Lead a classroom discussion using the questions below.
    - Under what land conditions does water flow from Point A to Point B? *Water flows downhill and sometimes across flat land, but never uphill. Therefore, Point B must always be at an equal or lower altitude than Point A.*
    - What determines the speed of the water flow? *The water speed depends on the slope of the river: the steeper the slope, the faster the river. It can also depend on the speed that the water is poured at the source.*
    - What happened when you poured only half a cup of water? A full cup? *Student responses will vary. Depending on the speed of pouring, students may report that the river's water level was higher when pouring a full cup.*
    - What happened when you poured the water slowly versus quickly? *The water level of the river rises when water is poured quickly. If water is poured very quickly or all at once, water may escape the riverbed and flood the surrounding areas.*
    - How do you think these properties translate to real rivers? *Student responses will vary.*
  8. Tell students that these properties apply to real rivers, too. For example:
    - Rivers flow from higher to lower ground.
    - Rivers flow more quickly when they are steep and full of water. They flow more slowly when they are flat and have little water.

- When a lot of water enters the riverbed quickly, the water level rises. If too much water enters the riverbed too quickly, the river overflows.
  - Shallow and narrow riverbeds overflow easily; deep and wide riverbeds do not.
9. Depending on class size and computer availability, assign each student, partner pair, or small group to a computer with Internet access. Inform students they will now learn more about the properties of rivers—in particular, how rivers like the Yangtze are “born.”
  10. Direct students to the *Rivers of Asia* website at [http://web.stanford.edu/group/spice/rivers\\_of\\_asia/](http://web.stanford.edu/group/spice/rivers_of_asia/), then have them use the top menu to navigate to the *Geology and Climate* section (Rivers of Asia > Rivers of China > Yangtze River > Geology & Climate). Instruct students to read the entire section and complete the online Monsoon Quiz.  
Note: The online Monsoon Quiz is optional. (Alternatively, you can distribute Handout 2, *Monsoon Quiz*, and administer a paper quiz.) Note that the online version is self-scoring, and students are allowed to retake the quiz until achieving 100% correct. If you decide to administer an in-class paper quiz, be aware that some students may have already tried the online version.
  11. To conclude the lesson, distribute copies of Handout 3, *Geology and Climate Test*, and instruct students to complete the test.  
Note: Handout 3 tests students on a much broader range of content than Handout 2 or the online quiz (i.e., not just the monsoon).

**Assessment** The following are suggestions for assessing student work in this activity:

1. Handout 1, *River Observations*, and subsequent class discussion, evaluating students’ ability to
  - record descriptive and accurate observations;
  - observe how the different variables (e.g., steepness of landscape, depth and width of riverbed, volume and speed of water added) influence how a river behaves; and
  - translate their observations into hypotheses about how real rivers behave
2. Handout 2, *Monsoon Quiz*, using Answer Key 1 as a guide (or students’ successful completion of the online monsoon quiz)
3. Handout 3, *Geology and Climate Test*, using Answer Key 2 as a guide
4. Student participation in group and class discussions, evaluating students’ ability to
  - clearly state their opinions, questions, and answers;
  - exhibit sensitivity toward different cultures and ideas;
  - respect and acknowledge other students’ comments;
  - ask relevant and insightful questions; and
  - provide correct and thoughtful answers

## RIVER OBSERVATIONS

Record your river's characteristics below:

- The river's slope is relatively flat / moderate / steep. (Circle one.)
- The riverbed is shallow / deep / narrow / wide. (Circle two.)

Different landscapes allow rivers to behave in different ways. Pour water into your riverbed and observe how the water behaves. Try varying the amount of water you pour (e.g., ½ cup vs. 1 cup) and the speed at which you pour it (e.g., slowly vs. quickly). These factors may also influence how your river behaves.

Record your observations in the space below, paying special attention to the three questions below.

1. How quickly does the river water flow?
2. How high does the river water reach in the riverbed?
3. Does any water overflow the river channel?

**MONSOON QUIZ**

Now that you've read why the monsoon switches directions, let's test your understanding. Choose the best answer for each question.

**The three principles**

1. Which temperatures fluctuate more?  
a. land                      b. sea
2. In summer, which temperature is higher?  
a. land                      b. sea
3. In winter, which temperature is lower?  
a. land                      b. sea
4. Wind always blows from \_\_\_\_\_.  
a. high-pressure systems to high-pressure systems  
b. low-pressure systems to low-pressure systems  
c. high-pressure systems to low-pressure systems  
d. low-pressure systems to high-pressure systems
5. When air expands, it creates \_\_\_\_\_.  
a. a low-pressure system              b. a high-pressure system              c. wind

**Applying the three principles to summer**

6. In summer, land becomes \_\_\_\_\_ than the sea.  
a. warmer                      b. cooler
7. Therefore, continental air \_\_\_\_\_.  
a. expands                      b. becomes dense
8. Therefore, a \_\_\_\_\_-pressure system is created over land.  
a. high                      b. low
9. Therefore, the monsoon blows from \_\_\_\_\_.  
a. land to land              b. sea to sea                      c. land to sea                      d. sea to land

**Applying the three principles to winter**

10. In winter, land becomes \_\_\_\_\_ than the sea.  
a. warmer                      b. cooler
11. Therefore, continental air \_\_\_\_\_.  
a. expands                      b. becomes dense
12. Therefore, a \_\_\_\_\_-pressure system is created over land.  
a. high                      b. low
13. Therefore, the monsoon blows from \_\_\_\_\_.  
a. land to land              b. sea to sea                      c. land to sea                      d. sea to land



## GEOLOGY AND CLIMATE TEST

**Directions:** Answer the questions below. Turn your test in to your teacher when you are done.

1. What two things do all rivers need?
  
2. What geological event created the Himalayas and Tibetan Plateau? What is the name of the geological phenomenon that caused this event?
  
3. When were the Himalayas and Tibetan Plateau created? (Choose the closest answer.)
  - a. thousands of years ago
  - b. millions of years ago
  - c. billions of years ago
  - d. trillions of years ago
  
4. Match the terms below with their correct definitions.
 

river system	the path of a river
drainage basin	a stream/river that merges into a larger stream/river
course	a network of connected rivers
tributary	an area of land drained by a river or river system
  
5. In what season does the Yangtze's water level rise? In what season does it fall?
  
6. What causes the Yangtze's water level to fluctuate seasonally? Name two factors.
  
7. What is a monsoon?
  
8. In summer, does the monsoon blow onshore or offshore? Is the air humid or dry?

## MONSOON QUIZ

**Note to teacher:** Use this Answer Key to correct Handout 2, *Monsoon Quiz*. Correct answers appear in bold text.

### The three principles

- Which temperatures fluctuate more?  
**a. land**                      b. sea
- In summer, which temperature is higher?  
**a. land**                      b. sea
- In winter, which temperature is lower?  
**a. land**                      b. sea
- Wind always blows from \_\_\_\_\_.  
a. high-pressure systems to high-pressure systems  
b. low-pressure systems to low-pressure systems  
**c. high-pressure systems to low-pressure systems**  
d. low-pressure systems to high-pressure systems
- When air expands, it creates \_\_\_\_\_.  
**a. a low-pressure system**              b. a high-pressure system              c. wind

### Applying the three principles to summer

- In summer, land becomes \_\_\_\_\_ than the sea.  
**a. warmer**                      b. cooler
- Therefore, continental air \_\_\_\_\_.  
**a. expands**                      b. becomes dense
- Therefore, a \_\_\_\_\_-pressure system is created over land.  
a. high                      **b. low**
- Therefore, the monsoon blows from \_\_\_\_\_.  
a. land to land              b. sea to sea                      c. land to sea                      **d. sea to land**

### Applying the three principles to winter

- In winter, land becomes \_\_\_\_\_ than the sea.  
a. warmer                      **b. cooler**
- Therefore, continental air \_\_\_\_\_.  
a. expands                      **b. becomes dense**
- Therefore, a \_\_\_\_\_-pressure system is created over land.  
**a. high**                      b. low
- Therefore, the monsoon blows from \_\_\_\_\_.  
a. land to land              b. sea to sea                      **c. land to sea**                      d. sea to land

GEOLOGY AND CLIMATE TEST

**Note to teacher:** Use this Answer Key to correct Handout 3, *Geology and Climate Test*. Correct answers appear in italicized text.

1. What two things do all rivers need?

*A water supply and an "uneven" (i.e., sloped) area of land*

2. What geological event created the Himalayas and Tibetan Plateau? What is the name of the geological phenomenon that caused this event?

*The Himalayas and Tibetan Plateau were created by the collision of India and Asia. The collision was due to a geological phenomenon known as "plate tectonics."*

3. When were the Himalayas and Tibetan Plateau created? (Choose the closest answer.)

- a. thousands of years ago
- b. millions of years ago
- c. billions of years ago
- d. trillions of years ago

*Answer: B. millions of years ago*

4. Match the terms below with their correct definitions.

river system		the path of a river
drainage basin		a stream/ river that merges into a larger stream/ river
course		a network of connected rivers
tributary		an area of land drained by a river or river system

5. In what season does the Yangtze’s water level rise? In what season does it fall?

*The Yangtze’s water level rises in the summer and falls in the winter.*

6. What causes the Yangtze’s water level to fluctuate seasonally? Name two factors.

*(1) The summer’s higher temperatures cause ice and glaciers near the river’s source to melt more quickly. (2) Summer is China’s rainy season (due to China’s “monsoon climate”).*

7. What is a monsoon?

*A monsoon is a special kind of wind that blows in different directions at different times of the year.*

8. In summer, does the monsoon blow onshore or offshore? Is the air humid or dry?

*The summer monsoon blows onshore (i.e., from sea to land) and is very humid.*

RIVER CARDS

**Note to teacher:** Make one copy of these cards and cut along the solid lines. Two extra cards (River Cards #11 and #12) are included in case you run this activity with more than 10 groups.

<p style="text-align: center;"><b>River Card #1</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river landscape is <u>relatively flat</u> (not steep).</li> <li>• The riverbed (the groove for your river) is <u>shallow</u> and <u>narrow</u>.</li> </ul>	<p style="text-align: center;"><b>River Card #2</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river landscape is <u>relatively flat</u> (not steep).</li> <li>• The riverbed (the groove for your river) is <u>shallow</u> and <u>wide</u>.</li> </ul>
<p style="text-align: center;"><b>River Card #3</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river landscape is <u>relatively flat</u> (not steep).</li> <li>• The riverbed (the groove for your river) is <u>deep</u> and <u>narrow</u>.</li> </ul>	<p style="text-align: center;"><b>River Card #4</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river landscape is <u>relatively flat</u> (not steep).</li> <li>• The riverbed (the groove for your river) is <u>deep</u> and <u>wide</u>.</li> </ul>
<p style="text-align: center;"><b>River Card #5</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river has a <u>moderate</u> slope (neither flat nor steep).</li> <li>• The riverbed (the groove for your river) is <u>shallow</u> and <u>narrow</u>.</li> </ul>	<p style="text-align: center;"><b>River Card #6</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river has a <u>moderate</u> slope (neither flat nor steep).</li> <li>• The riverbed (the groove for your river) is <u>shallow</u> and <u>wide</u>.</li> </ul>

<p style="text-align: center;"><b>River Card #7</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river has a <u>moderate</u> slope (neither flat nor steep).</li> <li>• The riverbed (the groove for your river) is <u>deep</u> and <u>narrow</u>.</li> </ul>	<p style="text-align: center;"><b>River Card #8</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river has a <u>moderate</u> slope (neither flat nor steep).</li> <li>• The riverbed (the groove for your river) is <u>deep</u> and <u>wide</u>.</li> </ul>
<p style="text-align: center;"><b>River Card #9</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river is relatively <u>steep</u> (not flat).</li> <li>• The riverbed (the groove for your river) is <u>shallow</u> and <u>narrow</u>.</li> </ul>	<p style="text-align: center;"><b>River Card #10</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river is relatively <u>steep</u> (not flat).</li> <li>• The riverbed (the groove for your river) is <u>shallow</u> and <u>wide</u>.</li> </ul>
<p style="text-align: center;"><b>River Card #11</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river is relatively <u>steep</u> (not flat).</li> <li>• The riverbed (the groove for your river) is <u>deep</u> and <u>narrow</u>.</li> </ul>	<p style="text-align: center;"><b>River Card #12</b></p> <p>Your team must create a river landscape that has the following characteristics:</p> <ul style="list-style-type: none"> <li>• The river is relatively <u>steep</u> (not flat).</li> <li>• The riverbed (the groove for your river) is <u>deep</u> and <u>wide</u>.</li> </ul>

## Activity Three

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### MAPS OF CHINA

Summary	Students learn more about the physical geography of China and its rivers through an extensive map-analysis activity. Working alone or in small groups, students closely examine four different maps of China that highlight the country's rivers, river basins, elevation pattern, and precipitation pattern.
Materials	Handout, <i>Map Exercises</i> , pp. 28–30, one copy per student computer Teacher Information, <i>Answer Key and Discussion Guide for "Map Exercises,"</i> pp. 31–36
Equipment	10 to 30 computers with Internet access (for student groups) Computer with Internet access (for teacher) Computer projector (for teacher)
Teacher Preparation	Instructions and materials are based on a class size of 30 students. Adjust accordingly for different class sizes. <ol style="list-style-type: none"><li>1. Make the appropriate number of copies of the handout.</li><li>2. Go to the <i>Rivers of Asia</i> website at <a href="http://web.stanford.edu/group/spice/rivers_of_asia/">http://web.stanford.edu/group/spice/rivers_of_asia/</a> and review the seven maps on the <i>Maps of China</i> webpage. (To navigate to the <i>Maps of China</i> webpage, use the top menu to select Rivers of Asia &gt; Rivers of China &gt; Yangtze River &gt; Maps of China.)</li><li>3. Read the Teacher Information sheet.</li><li>4. Set up and test computer and projector before starting the activity. Confirm that you are able to access the URL above.</li></ol>
Procedures	<ol style="list-style-type: none"><li>1. Inform students that they will now examine some maps of China, learning more about China's rivers and about China itself. In the process, they will practice their map-reading and reasoning skills.</li><li>2. Depending on class size and computer availability, assign each student, partner pair, or small group to a computer with Internet access. Direct students to the <i>Rivers of Asia</i> website at <a href="http://web.stanford.edu/group/spice/rivers_of_asia/">http://web.stanford.edu/group/spice/rivers_of_asia/</a>, then have them use the top menu to navigate to the <i>Maps of China</i> webpage (Rivers of Asia &gt; Rivers of China &gt; Yangtze River &gt; Maps of China).</li><li>3. Distribute one copy of Handout, <i>Map Exercises</i>, to each group, and instruct students to complete the exercises on the handout. Note that students will only examine four of the seven maps on the webpage.</li></ol>

4. Allow students time to complete the handout on their own. While students work, field questions, check for understanding, offer help, and observe group discussions.
5. When students are done, instruct them to trade handouts with another group for correction. Display the *Maps of China* webpage in front of the classroom and walk students through each question using Teacher Information, *Answer Key and Discussion Guide for "Map Exercises,"* as a guide. Instruct students to correct each other's handouts in pen.
6. Collect completed handouts for assessment.
7. Optional: Continue the classroom discussion by examining the last three maps together with students (i.e., "Summer Winds," "Winter Winds," "Provinces"). Discussion points for these maps are included at the end of Teacher Information, *Answer Key and Discussion Guide for "Map Exercises."*

**Assessment** The following are suggestions for assessing student work in this lesson:

1. Students' written responses to Handout, *Map Exercises*, using Teacher Information, *Answer Key and Discussion Guide for "Map Exercises,"* as a guide
2. Student participation in group and class discussions, evaluating students' ability to
  - clearly state their opinions, questions, and/or answers;
  - provide thoughtful answers;
  - exhibit sensitivity toward different cultures and ideas;
  - respect and acknowledge other students' comments; and
  - ask relevant and insightful questions

## MAP EXERCISES

Name(s): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Directions:** Navigate to the *Maps of China* webpage of the *Rivers of Asia* website. You will closely examine four different maps of China. Follow the instructions below, and answer the questions in the space provided.

**Map 1: Rivers**

First, view the map called “Rivers,” which shows many of China’s major rivers. Study the map for a while, and then answer the questions below.

1. Observe the geographic distribution of China’s major rivers. What regions of China contain many major rivers?
2. What region of China contains the fewest major rivers? Why do you think there are so few rivers here? Make an educated guess.
3. Some rivers flow only through China, while other rivers also flow through other countries. Name at least three rivers that flow through countries other than China.
4. Compare the length of China’s major rivers. Which four or five rivers appear to be the longest?
5. Where do all (or almost all) of the longest rivers originate? Why? Make an educated guess. (Hint: When trying to determine which end of a river is its origin, remember that rivers usually start inland and flow toward the sea.)



**Map 2: River Basins**

Now view the “River Basins” map. This map divides China into 10 main river areas. Each area represents either a single river system (a single river or network of connected rivers) or multiple river systems combined into one (separate rivers that never connect). Study the map, and then answer the questions below.

6. What is the largest basin labeled on this map? What is the smallest?
  
7. According to this map, what basins do the following rivers belong to?
  - Wei River: \_\_\_\_\_
  - Brahmaputra River: \_\_\_\_\_
  - Tarim River: \_\_\_\_\_
  - Xiang River: \_\_\_\_\_
  
8. Are the Wei and Yellow rivers part of the same river system?
  
9. Are the Yulong and Gan rivers part of the same river system?
  
10. Are the Mekong and Salween rivers part of the same river system?

**Map 3: Elevation**

Now view the “Elevation” map. This map illustrates China’s tremendous range of elevations, from lowlands near sea level (dark green) to the highest peaks on Earth (purple and white). Some of China’s notable geographical features—like the Gobi Desert in the north and the Himalayas in the southwest—are also labeled. Study the map, and then answer the questions below.

11. What map color represents elevations between 3,000 and 4,500 feet?
  
12. What elevation range is indicated by the color purple?
  
13. By looking at the colors on this elevation map, we can tell if an area of land is relatively flat or steep. For example, if a large area consists of just a single color, we know it is relatively flat. Name (or describe) three areas of China that are relatively flat.

14. By the same rule, if a small area of the map consists of many distinct colors, we know the land is very steep. In fact, the faster the map colors change over a short distance (for example, from purple to orange to yellow), the steeper the land is. Describe two areas of China that are very steep.
  
15. Locate the Pearl River in southern China. In which direction does it flow: east or west? How do you know for sure?
  
16. Locate the Tarim River in northwestern China. In which direction does it flow: east or west? How do you know for sure?
  
17. In which direction do most of China's major river systems primarily flow: north, south, east, or west? (Hint: If some rivers are hard to see in this map, try switching back and forth between this map and the simpler "Rivers" map.)

***Map 4: Annual Precipitation***

Finally, view the "Annual Precipitation" map. Study the map, and then answer the questions below.

18. Which country on this map looks the "wettest"? Which looks the "driest"?
  
19. Describe the general precipitation pattern within China. Which region receives the most precipitation? Which receives the least?
  
20. One way to measure a river's size is by its "water flow," or the amount of water it carries past a stationary point every second. Which river do you think has the highest water flow: the Pearl, Yangtze, or Yellow? Which do you think has the lowest? Make your best guesses.

## ANSWER KEY AND DISCUSSION GUIDE FOR “MAP EXERCISES”

**Note to teacher:** Use the answer key below and the maps on the *Maps of China* webpage to lead an in-class review of students’ answers to Handout, *Map Exercises*. For some answers below, additional information is included to help you explain the correct answers to students and/or debrief the topics in greater depth.

**Map 1: Rivers**

1. Observe the geographic distribution of China’s major rivers. What regions of China contain many major rivers?

*China’s major rivers are concentrated in China’s south and east.*

2. What region of China contains the fewest major rivers? Why do you think there are so few rivers here? Make an educated guess.

*China’s northwest region has the fewest major rivers. This region is largely desert land where the dry climate prevents major rivers from forming. (Student hypotheses will vary.)*

3. Some rivers flow only through China, while other rivers also flow through other countries. Name at least three rivers that flow through countries other than China.

*Of the rivers that are labeled, the Indus, Brahmaputra, Salween, and Mekong flow through South Asia and Southeast Asia. The Amur flows into Russia after absorbing the Songhua.*

*In northeastern China, some rivers flow along international borders: the Yalu serves as China’s border with North Korea, and the Amur serves as China’s border with Russia.*

4. Compare the length of China’s major rivers. Which four or five rivers appear to be the longest?

*Student answers may vary slightly due to differences in estimation, but will likely include the Yangtze, Yellow, Mekong, Salween, and/or Brahmaputra. The Amur and/or Songhua are also valid answers. (Students may not notice the Amur/Songhua due to the rivers’ partial overlap with the Russia-China border.)*

5. Where do all (or almost all) of the longest rivers originate? Why? Make an educated guess. (Hint: When trying to determine which end of a river is its origin, remember that rivers usually start inland and flow toward the sea.)

*Most of China’s (and Asia’s) longest rivers begin in China’s southwest—home of the Tibetan Plateau, the largest and tallest plateau in the world. The Tibetan Plateau is an ideal place for these rivers to originate, because it provides rivers with two important things: a water source (e.g., snowmelt and glacier melt) and a staggering altitude from which to fall.*

**Map 2: River Basins**

**Note to teacher:** This map divides China into 10 major river areas for the sake of simplicity, but in reality China could be divided into hundreds or even thousands of separate river areas, depending on the rules employed. Some areas of this map, like the Yangtze River Basin, accurately mark the basin of a single river system. Other areas represent the basins of multiple river systems that have been combined for simplicity. For example, the map's "Liao River Basin" includes the basins of both the Liao and Yalu, the "Songhua River Basin" includes the basins of both the Songhua and Amur, and the "River Basin of Southwest" includes the basins of the Mekong, Salween, Brahmaputra, and Indus—each of which, in its own right, is a major river of Asia.

6. What is the largest basin labeled on this map? What is the smallest?

*Largest: River Basin of Northwest*

*Smallest: River Basin of Southeast*

7. According to this map, what basins do the following rivers belong to?

- Wei River: *Yellow River Basin*
- Brahmaputra River: *River Basin of Southwest*
- Tarim River: *River Basin of Northwest*
- Xiang River: *Yangtze River Basin*

8. Are the Wei and Yellow rivers part of the same river system?

*Yes; the Wei is a tributary of the Yellow.*

9. Are the Yulong and Gan rivers part of the same river system?

*Yes; the Yulong and Gan are both tributaries of the Yangtze.*

10. Are the Mekong and Salween rivers part of the same river system?

*No; the Mekong and Salween never connect to each other.*

**Map 3: Elevation**

11. What map color represents elevations between 3,000 and 4,500 feet?

*Yellow*

12. What elevation range is indicated by the color purple?

*12,000 to 18,000 feet (3,658 to 5,486 meters)*

13. By looking at the colors on this elevation map, we can tell if an area of land is relatively flat or steep. For example, if a large area consists of just a single color, we know it is relatively flat. Name (or describe) three areas of China that are relatively flat.

*Student answers may vary but will likely include the Taklamakan Desert, the Manchurian Plain, and/or the North China Plain. Other answers can be valid as long as the areas described consist mainly of a single color. (Note: Students may include the Tibetan Plateau. This is an acceptable answer, given the plateau's nearly uniform purple color. However, it is worthwhile to note that purple encompasses an extremely wide range of elevations (see key), and that some areas of the plateau are actually very steep in reality.)*

14. By the same rule, if a small area of the map consists of many distinct colors, we know the land is very steep. In fact, the faster the map colors change over a short distance (for example, from purple to orange to yellow), the steeper the land is. Describe two areas of China that are very steep.

*Student responses will vary. Examples of valid answers include "the western edge of the Sichuan Basin" or "the southern edge of the Taklamakan Desert," but any answer is valid as long as the area described consists of at least three unique colors over a short distance. In general, any edge of the Tibetan Plateau is a valid answer.*

15. Locate the Pearl River in southern China. In which direction does it flow: east or west? How do you know for sure?

*It flows east. We can tell by looking at the elevation at each end of the river. In this case, the river's western end is at a higher elevation (orange) than its eastern end (dark green). Since rivers always flow downhill, we know the Pearl River flows east.*

16. Locate the Tarim River in northwestern China. In which direction does it flow: east or west? How do you know for sure?

*It flows east. Again, we can determine the river's direction by comparing the elevation at each end of the river.*

17. In which direction do most of China's major river systems primarily flow: north, south, east, or west? (Hint: If some rivers are hard to see in this map, try switching back and forth between this map and the simpler "Rivers" map.)

*Nearly all of China's major river systems flow primarily east (e.g., the Pearl, Tarim, Yellow, Yangtze, Hai, Huai, and Liao systems). A few flow primarily south (e.g., the Mekong and Salween systems).*

*Some rivers (like the Yellow) have sections that flow north/west, but the overall direction of these river systems is still east/south. (Compare the Yellow River's starting point and ending point.)*

**Map 4: Annual Precipitation**

18. Which country on this map looks the “wettest”? Which looks the “driest”?

*Wettest: Bhutan*

*Driest: Mongolia*

19. Describe the general precipitation pattern within China. Which region receives the most precipitation? Which receives the least?

*The south/southeast receives the most precipitation.*

*The north/northwest receives the least.*

20. One way to measure a river’s size is by its “water flow,” or the amount of water it carries past a stationary point every second. Which river do you think has the highest water flow: the Pearl, Yangtze, or Yellow? Which do you think has the lowest? Make your best guesses.

*The Yangtze has the highest water flow.*

*The Yellow has the lowest water flow.*

*Note: Many students may guess that the Pearl has the highest water flow since its basin looks “the wettest.” This is a good guess, but ultimately wrong. Although the Pearl River Basin does receive the most precipitation per square kilometer, the Yangtze River Basin receives more precipitation in total because it covers a much larger area of land. (Refer to “River Basins” map to compare basin sizes.) Meanwhile, even though the Yellow’s basin is larger than the Pearl’s, its size does not compensate for its lower average precipitation, and the Yellow River has the lowest water flow. See the chart below for a summary.*

	Average Precipitation Per Unit Area	Area of Drainage Basin	Average Water Flow
Yellow River	<i>lightest</i>	945,065 km <sup>2</sup> <i>(medium)</i>	2,571 m <sup>3</sup> /s <i>(lowest)</i>
Yangtze River	<i>medium</i>	1,722,155 km <sup>2</sup> <i>(largest)</i>	30,166 m <sup>3</sup> /s <i>(highest)</i>
Pearl River	<i>heaviest</i>	409,458 km <sup>2</sup> <i>(smallest)</i>	9,500 m <sup>3</sup> /s <i>(medium)</i>

**Optional Extension**

**Note to teacher:** The Answer Key for Handout, *Map Exercises*, ends with question 20 above. However, you can optionally extend the classroom discussion by exploring three additional maps with your students—“Summer Winds,” “Winter Winds,” and “China’s Provinces” (also on the *Maps of China* webpage). If you choose to do so, the following discussion points can be used as a guide.

### Maps 5 and 6: Summer Winds and Winter Winds

- Recall what you learned about China's monsoon winds. In what direction does the monsoon generally blow in the summer? In what direction does it generally blow in the winter?

*In summer it blows onshore (i.e., from sea to land).*

*In winter it blows offshore (i.e., from land to sea).*
- Why does the monsoon switch directions?

*In summer, the continental air becomes hot and expands, creating a low-pressure system. This low-pressure system sucks air in from the oceans, creating an onshore wind.*

*In winter, the continental air becomes cool and dense, creating a high-pressure system. This high-pressure system pushes air out into the oceans, creating an offshore wind.*
- Which season is the rainy season: summer or winter? Which season is the dry season? Why?

*Summer is the rainy season. Winter is the dry season.*

*In the summer, winds blow from sea to land, bringing the humid ocean air over China. This humid air carries moisture, which eventually turns into precipitation over China.*

*In the winter, winds blow from land to sea. As the air over China blows out to sea, it is replaced with dry continental air from Siberia and Inner Asia. Because this air contains little moisture, winter rains are relatively rare in China.*
- China receives most of its annual precipitation during the rainy season. Some parts of China receive about two-thirds of their annual rainfall during the rainy season; other regions receive as much as 94 percent!
- Look closely at the "Summer Winds" and "Winter Winds" maps. Do the wind arrows point in the directions you were expecting? Where do the arrows point in unexpected directions?

*Student answers may vary, but students will likely point out the three arrows on the "Summer Winds" map that point southwest. (These arrows appear in Mongolia and western China.)*
- Although most of China's winds do follow the broader monsoon pattern, there are some exceptions, like the winds in western China that tend to blow toward the southwest year-round. The exact reasons for these variations are beyond the scope of this lesson. However, in summary, you should understand that wind patterns are determined by several geographic and climate-related factors, not only the monsoon-related forces you have studied.

**Note to teacher:** For older students or advanced classes, it may be enriching for students to explore the relationships among the "Elevation," "Annual Precipitation," and "Summer Winds" maps. For example, ask students to explain (1) why precipitation is so heavy south of the China-Nepal and China-Bhutan border, but so light north of it, (2) why central Myanmar is drier than its surroundings, or (3) why there is a small relatively wet area near the convergence of the Min and Yangtze Rivers. These exercises challenge students to synthesize information from different maps and formulate hypotheses using their geographic reasoning skills.

**Map 7: Provinces**

- Whereas previous maps highlight the natural features of China, this map shows China's main administrative divisions. The country is split into 33 "province-level administrative divisions," sometimes called "provinces" for short.
- Chinese provinces are roughly the same size as U.S. states. As you can see from this map, they vary dramatically in size, from very small (like Macau and Hong Kong in the south) to very large (like Xinjiang and Inner Mongolia in the north).
- Which of these provinces have you heard of previously?  
*Students will likely have heard of Shanghai, Beijing, and Hong Kong, but perhaps little else. (Tibet may also be familiar to students.)*
- Compare this map with the "Annual Precipitation" map. Which province receives the least precipitation (per unit area)? Which receives the most?  
*Xinjiang receives the least precipitation (per unit area).  
Hainan receives the most.*
- Compare this map with the "Elevation" map. Which two provinces overlap most with the Tibetan Plateau? Which province overlaps most with the Gobi Desert?  
*The Tibetan Plateau primarily encompasses Qinghai and Tibet.  
The Gobi Desert primarily covers Inner Mongolia.*



## Activity Four

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### CONTEMPORARY ISSUES

- Summary** In small groups, students explore a variety of contemporary issues (presented in a video or webpage format) pertaining to the Yangtze River. Groups then complete an activity and present to the class. Students who are not presenting take notes.
- Materials** Handout 1A, *Don't Cry Three Gorges*, p. 39, 3–4 copies  
Handout 1B, *Four Great Rivers*, p. 40, 3–4 copies  
Handout 1C, *Lessons of the Loess Plateau*, p. 41, 3–4 copies  
Handout 1D, *Origins of Rivers*, p. 42, 3–4 copies  
Handout 1E, *Poyang: Tale of a Lake*, p. 43, 3–4 copies  
Handout 1F, *The Melt and Baby Cribs on Yangtze Glaciers*, p. 44, 3–4 copies  
Handout 1G, *Floods and Dams*, p. 45, 3–4 copies  
Handout 1H, *South-to-North Water Transfer Project*, p. 46, 3–4 copies  
Handout 2, *Note-taking Sheet*, p. 47, 30 copies
- Equipment** Eight to 30 computers with Internet access and Firefox, Safari, or Internet Explorer browser
- Teacher Preparation** Instructions and materials are based on a class size of 30 students. Adjust accordingly for different class sizes.
1. Review all handouts and make the appropriate number of copies.
  2. Set up and test computers before starting the activity. Go to the *Rivers of Asia* website at [http://web.stanford.edu/group/spice/rivers\\_of\\_asia/](http://web.stanford.edu/group/spice/rivers_of_asia/) and confirm that computers are able to play the streaming videos on the *Contemporary Issues* webpage. (To navigate to the *Contemporary Issues* webpage, use the top menu to select Rivers of Asia > Rivers of China > Yangtze River > Contemporary Issues.) The Firefox, Safari, and Internet Explorer web browsers are recommended.
- Procedures**
1. Direct students to the *Contemporary Issues* webpage.
  2. Divide the class into small groups and assign each group one of the eight topics below.
    - Don't Cry Three Gorges (video)
    - Four Great Rivers (video)
    - Lessons of the Loess Plateau (video)
    - Origins of Rivers (video)
    - Poyang: Tale of a Lake (video)

## activity four

- The Melt and Baby Cribs on Yangtze Glaciers (two videos)
  - Floods and Dams (webpage)
  - South-to-North Water Transfer Project (webpage)
3. Distribute copies of Handouts 1A–H, to the appropriate groups. Allow groups time to view their assigned videos or read their assigned webpages, and complete the tasks outlined on their handouts.
  4. Assign group projects for homework if students are not able to complete them in the class time allotted.
  5. Facilitate group presentations. Distribute copies of Handout 2, *Note-taking Sheet*, and direct students who are not presenting to take notes on their classmates' presentations.
  6. Debrief students' exploration of the Yangtze using the following questions and prompts to guide the discussion.
    - Why have rivers remained an important part of civilizations throughout time? How has the Yangtze been a central component in Chinese civilization?
    - How has the Yangtze contributed to China's economic development and industrialization?
    - In terms of rivers, discuss the dilemma between economic development and industrialization on one hand, and environmental preservation on the other.
    - How are issues facing the Yangtze River similar to issues facing other rivers throughout the world?
    - What issues pertaining to the Yangtze or other rivers are in the news today, and how are governments, institutions, and individuals addressing these issues?
    - What steps can our own society take to ensure the health of our rivers?

**Assessment** The following are suggestions for assessing student work in this lesson:

1. Group projects and presentations for Handouts 1A–H, using the criteria outlined on the handouts as a guide
2. Handout 2, *Note-taking Sheet*, based on students' level of attention to the groups' presentations and the quality of the notes taken
3. Student participation in group and class discussions, evaluating students' ability to
  - clearly state their opinions, questions, and answers;
  - exhibit sensitivity toward different cultures and ideas;
  - respect and acknowledge other students' comments;
  - ask relevant and insightful questions; and
  - provide correct and thoughtful answers

## DON'T CRY THREE GORGES

**Directions:** Take notes on the short film in the space provided below. Use complete sentences.

1. What is the main issue / topic covered in the film?
2. Think of images depicted in the film. Choose two and explain what in particular left an impression on you.
3. During what times does the level of garbage in the Yangtze increase?
4. What does the boat operator believe is the fundamental solution to the problem?

**Activity**

- Research a river or a body of water near where you live. Are there issues with pollution? If so, how is your community addressing the problem? Prepare to present your findings with the class.
- Present the information from the film and your research to the class.
- Divide speaking responsibilities equally among your group members and rehearse.
- Your presentation should be 3–5 minutes long.



## LESSONS OF THE LOESS PLATEAU

**Directions:** Take notes on the short film in the space provided below. Use complete sentences.

1. What is the main issue / topic covered in the film?
2. Think of images depicted in the film. Choose two and explain what in particular left an impression on you.
3. Locate the Loess Plateau on a map and include the map in your presentation to the class.
4. What were some of the consequences of the disappearance / removal of the vegetation cover in the Loess Plateau?
5. What were some of the new policies of the Loess Plateau Water Rehabilitation Project? What were some of the results of these policies?

**Activity**

- Research an environmental concern that affects your community. How is your community addressing the problem? Prepare to present your findings with the class.
- Present the information from the film and your research to the class.
- Divide speaking responsibilities equally among your group members and rehearse.
- Your presentation should be 3–5 minutes long.

## ORIGINS OF RIVERS

**Directions:** Take notes on the short film in the space provided below. Use complete sentences.

1. What is the main issue/topic covered in the film?
2. Think of images depicted in the film. Choose two and explain what in particular left an impression on you.
3. Describe some of the differences people are experiencing in their pastures compared to earlier in their lifetimes.
4. What are some of the consequences of the sinking and thinning of permafrost?

### **Activity**

- Research an environmental concern that affects your community. How is your community addressing the problem? Prepare to present your findings with the class.
- Present the information from the film and your research to the class.
- Divide speaking responsibilities equally among your group members and rehearse.
- Your presentation should be 3–5 minutes long.

## POYANG: TALE OF A LAKE

**Directions:** Take notes on the short film in the space provided below. Use complete sentences.

1. What is the main issue / topic covered in the film?
2. Think of images depicted in the film. Choose two and explain what in particular left an impression on you.
3. Locate Lake Poyang on a map and include the map in your presentation to the class.
4. Describe how the establishment of the Three Gorges Dam is related to the drought in the Lake Poyang region.
5. List two additional reasons for the drought in the Lake Poyang region.

**Activity**

- Research a river or a body of water near where you live. Are there issues with pollution? If so, how is your community addressing the problem? Prepare to present your findings with the class.
- Present the information from the film and your research to the class.
- Divide speaking responsibilities equally among your group members and rehearse.
- Your presentation should be 3–5 minutes long.

## THE MELT AND BABY CRIBS ON YANGTZE GLACIERS

**Directions:** Take notes on the two short films in the space provided below. Use complete sentences.

1. What is the main issue/ topic covered in the films?
2. Think of images depicted in the films. Choose two and explain what in particular left an impression on you.
3. How will the ecosystem change if the glaciers melt away?
4. List three reasons why melting permafrost is a concern.
5. What is the message behind putting baby cribs on the glacier?

### **Activity**

- Research an art installment or project that makes a statement or protests something that is happening to the environment. Describe what the statement or protest is about and analyze how art delivers a message about the problem. Present your findings to the class. Feel free to include images.
- Present the information from the films and your research to the class.
- Divide speaking responsibilities equally among your group members and rehearse.
- Your presentation should be 3–5 minutes long.



## FLOODS AND DAMS

**Directions:** Take notes on your assigned webpage in the space provided below. Use complete sentences.

1. What are the main issues/topics covered in your assigned webpage?
2. Think of points brought up on your assigned webpage. Choose two and explain what in particular left an impression on you.
3. Locate the areas in which flooding has occurred and the Three Gorges Dam. Include the map in your presentation to the class.

**Activity***Option 1*

- Research a river or a body of water near where you live. Are these rivers ever a source of concern (flood, drought)? If so, how is your community addressing the problem? Prepare to present your findings with the class.
- Present the information from the website and your research to the class.
- Divide speaking responsibilities equally among your group members and rehearse.
- Your presentation should be 3–5 minutes long.

*Option 2*

- In the United States, the Missouri, the Mississippi, and the Ohio Rivers (to name just a few) have flooded disastrously and still continue to flood from time to time despite efforts to control the flooding. The 1927 Great Flood on the Mississippi is sometimes called “history’s greatest flood.” Research the Mississippi flood of 1927 and compare it with the 1931 flood in China, and determine which one you believe deserves the title. Prepare to present your findings with the class. Feel free to include images.
- Present the information from the website and your research to the class.
- Divide speaking responsibilities equally among your group members and rehearse.
- Your presentation should be 3–5 minutes long.



## NOTE-TAKING SHEET

**Directions:** Take notes on your classmates' presentations. You do not need to take notes on your own group's presentation.

Group \_\_\_\_\_

Group \_\_\_\_\_

Group \_\_\_\_\_

Group \_\_\_\_\_

Group \_\_\_\_\_

Group \_\_\_\_\_

Group \_\_\_\_\_