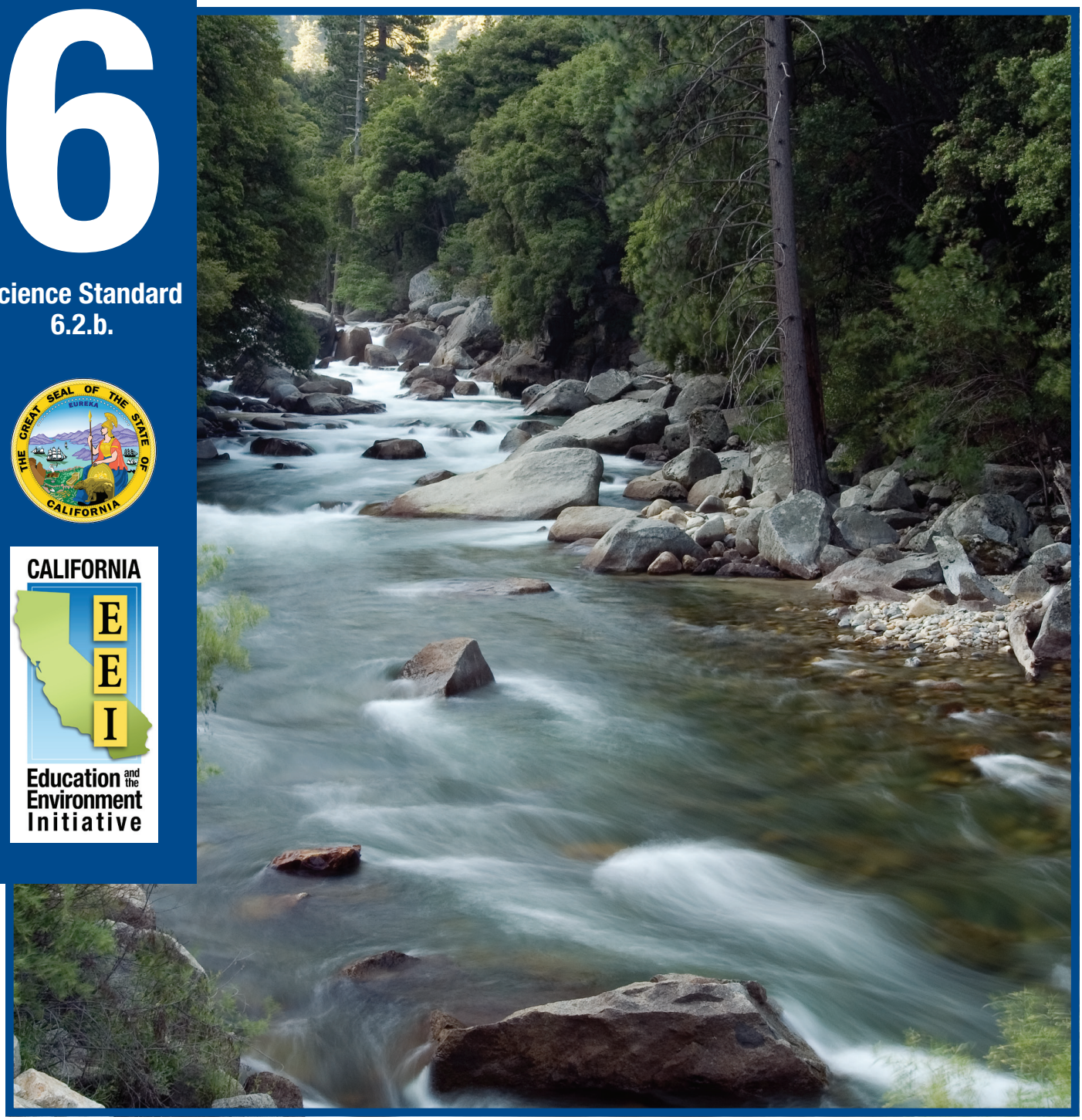
6

Science Standard
6.2.b.

Student Workbook

California Education and the Environment Initiative



The Dynamic Nature of Rivers

California Education and the Environment Initiative

Approved by the California State Board of Education, 2010

The Education and the Environment Curriculum is a cooperative endeavor of the following entities:

California Environmental Protection Agency
California Natural Resources Agency
Office of the Secretary of Education
California State Board of Education
California Department of Education
California Integrated Waste Management Board

Key Leadership for the Education and Environment Initiative:

Linda Adams, Secretary, California Environmental Protection Agency
Patty Zwarts, Deputy Secretary for Policy and Legislation, California Environmental Protection Agency
Andrea Lewis, Assistant Secretary for Education and Quality Programs, California Environmental Protection Agency
Mark Leary, Executive Director, California Integrated Waste Management Board
Mindy Fox, Director, Office of Education and the Environment, California Integrated Waste Management Board

Key Partners:

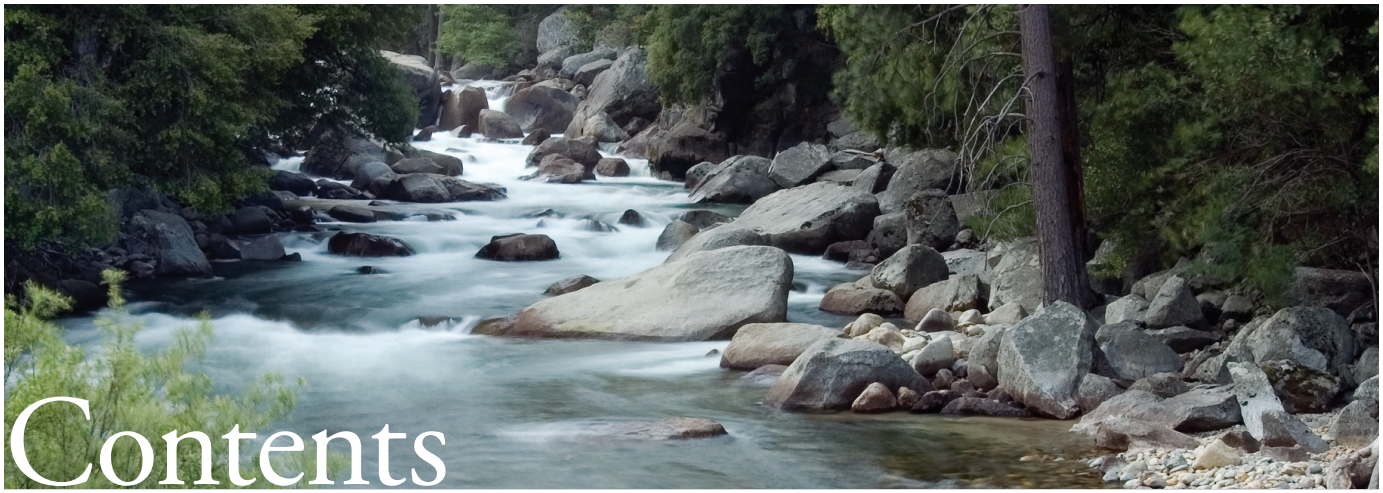
Special thanks to **Heal the Bay,** sponsor of the EEI law, for their partnership and participation in reviewing portions of the EEI curriculum.

Valuable assistance with maps, photos, videos and design was provided by the **National Geographic Society** under a contract with the State of California.

Office of Education and the Environment
1001 I Street • Sacramento, California 95812 • (916) 341-6769
http://www.calepa.ca.gov/Education/EEI/

© Copyright 2010 by the State of California
All rights reserved.
This publication, or parts thereof, may not be used or reproduced without permission from the Office of Education and the Environment.

These materials may be reproduced by teachers for educational purposes.



Contents

Lesson 1 Introducing a River System

River Words: Going With the Flow 2

Lesson 2 Holding Sediment in Suspension

How Much Energy Does It Take? 3

Lesson 3 Benefits Rivers Bring Us

Rivers for Life 5

Lesson 4 Ebb and Flow: Rivers' Changing Courses

Ebb and Flow: A River's Changing Course 8

Lesson 5 Flow and Flooding: River Control

Los Angeles River Before and After 10

Name: _____

Instructions: Write the word in the column at the left that you think matches each definition listed on the right.

Word	Definition
First Guess: _____ Correct Word: _____	The bed of a stream, a river, or other waterway.
First Guess: _____ Correct Word: _____	A large, usually triangle-shaped area at the mouth of a river that gradually builds up as the river deposits sediments.
First Guess: _____ Correct Word: _____	The depositing or settling of rock or soil from one place in another.
First Guess: _____ Correct Word: _____	To wear away.
First Guess: _____ Correct Word: _____	The periodic seasonal pattern of flooding in a river system.
First Guess: _____ Correct Word: _____	A flat area along a river that floods when water flows outside of a river's banks.
First Guess: _____ Correct Word: _____	The springs or small streams that supply water where a river first starts.
First Guess: _____ Correct Word: _____	Stones, sand, and soil carried by water, wind, or glaciers.
First Guess: _____ Correct Word: _____	The land area that drains water into a particular body of water such as a stream, river, lake, or ocean.

Name: _____

Moving water has energy. The faster water moves, the more energy it has. That energy can do a lot of work.

Your teacher has prepared some bottles of water for you to observe. Each bottle contains sediment. Each bottle will be shaken for 30 seconds to get the water inside to move. Then the bottle will be set in a place where you can clearly see the water inside.

Instructions: Observe the materials inside the bottles carefully once they are set down. Make notes about what you see (every 15 seconds) by circling descriptions in the chart below. (Your teacher will call out the time.)

	15 sec.	30 sec.	45 sec.	60 sec.	75 sec.	80 sec.	95 sec.	120 sec.
Water in bottle	**Very Cloudy** **Partly Cloudy** **Clear**	**Very Cloudy** **Partly Cloudy** **Clear**	**Very Cloudy** **Partly Cloudy** **Clear**	**Very Cloudy** **Partly Cloudy** **Clear**	**Very Cloudy** **Partly Cloudy** **Clear**	**Very Cloudy** **Partly Cloudy** **Clear**	**Very Cloudy** **Partly Cloudy** **Clear**	**Very Cloudy** **Partly Cloudy** **Clear**

Instructions: Read and answer the following questions about today's demonstration. (2 points each)

1. Which material stopped moving as soon as the bottle stopped being shaken and the energy decreased?

   _____

2. Which material still moved after two minutes, when the energy was low?

   _____

3. Which material requires the most energy to move?

   _____

4. Which material requires the least energy to move?

   _____

Name: _____

5. Gold is very heavy. Do you think gold settles to the bottom of a fast-moving or a slow-moving river?

_____

6. Which type of sediment is carried by even the slowest-moving rivers?

_____

7. Where would you expect a river to have the most energy—coming down a mountain or moving over flat land?

_____

Name: _____

Instructions: Each of the "cards" below highlights one way rivers benefit people. Write one benefit and a one- or two-sentence explanation about each benefit in the space provided. (5 points each)

Irrigation

Benefits: _____

_____

_____

Explanation: _____

_____

_____

Recreation

Benefits: _____

_____

_____

Explanation: _____

_____

_____

Soil Renewal

Benefits: _____

_____

_____

Explanation: _____

_____

_____

Name: _____

Power Generation

Benefits: _____

_____

_____

Explanation: _____

_____

_____

Transportation

Benefits: _____

_____

_____

Explanation: _____

_____

_____

Fish and Wildlife

Benefits: _____

_____

_____

Explanation: _____

_____

_____

Name: _____

Drinking Water

Benefits: _____

_____

_____

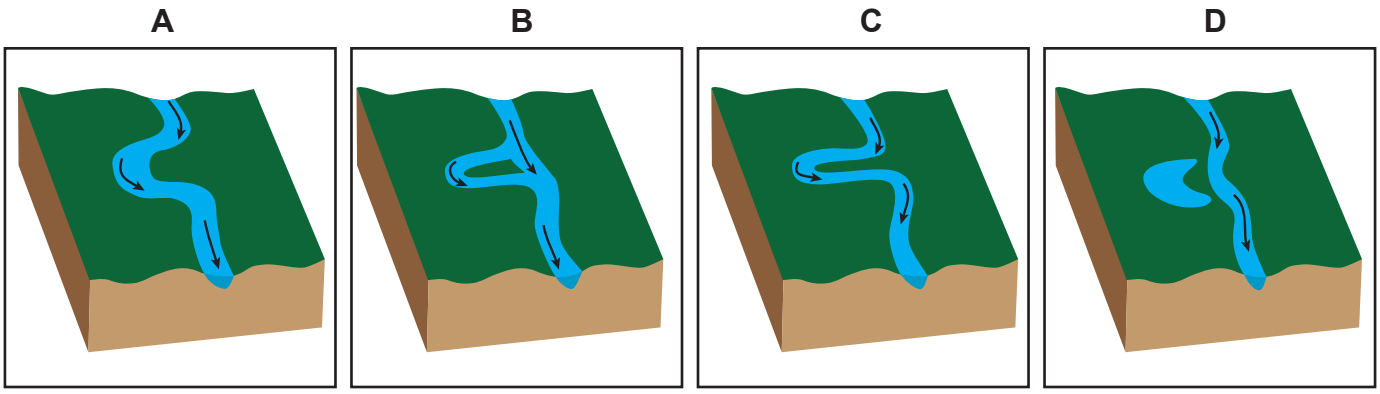
Explanation: _____

_____

_____

Name: _____

Instructions: Look carefully at the pictures, then answer the questions below.



1. The pictures above illustrate a river changing course over time. Which of the following describes the most likely order of change in the river? (2 points)
   a. A – B – D – C
   b. A – C – B – D
   c. C – A – B – D
   d. C – A – D – B

2. Describe one positive effect and one negative effect that the changing course of a river can have on people and communities. (4 points)

   Positive Effect: _____

   _____

   _____

   Negative Effect: _____

   _____

   _____

Name: _____

3. Look at the following photograph of a river. Use arrows to label the following: (6 points)
   a. where erosion is happening
   b. where deposition is happening
   c. where an oxbow lake may form

4. Many people live on floodplains. Describe the benefits and drawbacks of living on a floodplain. Do you think that it is a wise idea for people to settle on floodplains? Why or why not? (6 points)

_____

_____

_____

_____

_____

_____

_____

_____

Name: _____

Instructions: Describe five effects that the projects to control the Los Angeles River had on the animals and plants that depended upon the river. (2 points each)

1. _____

2. _____

3. _____

4. _____

5. _____

California Education and the Environment Initiative

Printed on post-consumer recycled paper