

#10691

RIVERS: SHAPERS OF EARTH LANDSCAPES

AIMS MULTIMEDIA, 2001

Grade Level: 7-13+

23 Minutes

7 Instructional Graphics Included



CAPTIONED MEDIA PROGRAM RELATED RESOURCES

[#8745 THE GREEN ZONE](#)

[#8923 THE NILE: "LIFEBLOOD OF EGYPT"](#)

[#9717 FRESHWATER](#)

Rivers: Shapers of Earth Landscapes

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Congratulations!

You have chosen a learning program that will actively motivate your students and provide you with easily accessible and easily manageable instructional guidelines and tools designed to make your teaching role efficient and rewarding.

The AIMS Teaching Module (ATM) provides you with a video program correlated to your classroom curriculum, instructions and guidelines for use, plus a comprehensive teaching program containing a wide range of activities and ideas for interaction between all content areas. Our authors, educators, and consultants have written and reviewed the AIMS Teaching Modules to align with the Educate America Act: Goals 2000.

This ATM, with its clear definition of manageability, both in the classroom and beyond, allows you to tailor specific activities to meet all of your classroom needs.

RATIONALE

In today's classrooms, educational pedagogy is often founded on Benjamin S. Bloom's "Six Levels of Cognitive Complexity." The practical application of Bloom's Taxonomy is to evaluate students' thinking skills on these levels, from the simple to the complex:

1. Knowledge (rote memory skills),
2. Comprehension (the ability to relate or retell),
3. Application (the ability to apply knowledge outside its origin),
4. Analysis (relating and differentiating parts of a whole),
5. Synthesis (relating parts to a whole)
6. Evaluation (making a judgment or formulating an opinion).

The AIMS Teaching Module is designed to facilitate these intellectual capabilities, and to integrate classroom experiences and assimilation of learning with the students' life experiences, realities, and expectations. AIMS' learner verification studies prove that our AIMS Teaching Modules help students to absorb, retain, and to demonstrate ability to use new knowledge in their world. Our educational materials are written and designed for today's classroom, which incorporates a wide range of intellectual, cultural, physical, and emotional diversities.

ORGANIZATION AND MANAGEMENT

To facilitate ease in classroom manageability, the AIMS Teaching Module is organized in three sections:

I. Introducing this ATM

will give you the specific information you need to integrate the program into your classroom curriculum.

II. Preparation for Viewing

provides suggestions and strategies for motivation, language preparedness, readiness, and focus prior to viewing the program with your students.

III. After Viewing the Program

provides suggestions for additional activities plus an assortment of consumable assessment and extended activities, designed to broaden comprehension of the topic and to make connections to other curriculum content areas.

AIMS Teaching Module written by Pat Davies

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AIMS Multimedia is a leading producer and distributor of educational programs serving schools and libraries since 1957. AIMS draws upon the most up-to-date knowledge, existing and emerging technologies, and all of the instructional and pedagogical resources available to develop and distribute educational programs in videocassette and CD-ROM.

Persons or schools interested in obtaining additional copies of this AIMS Teaching Module, please contact:

AIMS Multimedia at:
Toll Free: 1-800-367-2467
Fax: 818-341-6700
Web: www.aimsmultimedia.com
Email: info@aimsmultimedia.com

FEATURES

INTRODUCING THE ATM

Your AIMS Teaching Module is designed to accompany a video program written and produced by some of the world's most credible and creative writers and producers of educational programming. To facilitate diversity and flexibility in your classroom and to provide assessment tools, your AIMS Teaching Module features these components:

Themes

This section tells how the AIMS Teaching Module is correlated to the curriculum. Themes offers suggestions for interaction with other curriculum content areas, enabling teachers to use the teaching module to incorporate the topic into a variety of learning areas.

Overview

The Overview provides a synopsis of content covered in the video program. Its purpose is to give you a summary of the subject matter and to enhance your introductory preparation.

Objectives

The ATM learning objectives provide guidelines for teachers to assess what learners can be expected to gain from each program. After completion of the AIMS Teaching Module, your students will be able to demonstrate dynamic and applied comprehension of the topic.

Preparation for Viewing

In preparation for viewing the video program, the AIMS Teaching Module offers activity and/or discussion ideas that you may use in any order or combination.

Introduction To The Program

Introduction to the Program is designed to enable students to recall or relate prior knowledge about the topic and to prepare them for what they are about to learn.

Introduction To Vocabulary

Introduction to Vocabulary is a review of language used in the program: words, phrases, and usage. This vocabulary introduction is designed to ensure that all learners, including limited English proficiency learners, will have full understanding of the language usage in the content of the program.

Discussion Ideas

Discussion Ideas are designed to help you assess students' prior knowledge about the topic and to give students a preview of what they will learn. Active discussion stimulates interest in a subject and can motivate even the most reluctant learner. Listening, as well as speaking, is active participation. Encourage your students to participate at the rate they feel comfortable. Model sharing personal experiences when applicable, and model listening to students' ideas and opinions.

Focus

Help learners set a purpose for watching the program with Focus, designed to give students a focal point for comprehension continuity.

Jump Right In

Jump Right In provides abbreviated instructions for quick management of the program.

After Viewing the Program

After your students have viewed the program, you may introduce any or all of these activities to interact with other curriculum content areas, provide reinforcement, assess comprehension skills, or provide hands-on and in-depth extended study of the topic.

SUGGESTED ACTIVITIES

The Suggested Activities offer ideas for activities you can direct in the classroom or have your students complete independently, in pairs, or in small work groups after they have viewed the program. To accommodate your range of classroom needs, the activities are organized into skills categories. Their labels will tell you how to identify each activity and help you correlate it into your classroom curriculum. To help you schedule your classroom lesson time, the AIMS hourglass gives you an estimate of the time each activity should require. Some of the activities fall into these categories:

Meeting Individual Needs



These activities are designed to aid in classroom continuity. Reluctant learners and learners acquiring English will benefit from these activities geared to enhance comprehension of language in order to fully grasp content meaning.

Curriculum Connections

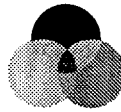


Many of the suggested activities are intended to integrate the content of the ATM program into other content areas of the classroom curriculum. These cross-connections turn the classroom teaching experience into a whole learning experience.



Critical Thinking

Critical Thinking activities are designed to stimulate learners' own opinions and ideas. These activities require students to use the thinking process to discern fact from opinion, consider their own problems and formulate possible solutions, draw conclusions, discuss cause and effect, or combine what they already know with what they have learned to make inferences.



Cultural Diversity

Each AIMS Teaching Module has an activity called Cultural Awareness, Cultural Diversity, or Cultural Exchange that encourages students to share their backgrounds, cultures, heritage, or knowledge of other countries, customs, and language.

Hands On



These are experimental or tactile activities that relate directly to the material taught in the program. Your students will have opportunities to make discoveries and formulate ideas on their own, based on what they learn in this unit.

Writing



Every AIMS Teaching Module will contain an activity designed for students to use the writing process to express their ideas about what they have learned. The writing activity may also help them to make the connection between what they are learning in this unit and how it applies to other content areas.



In The Newsroom

Each AIMS Teaching Module contains a newsroom activity designed to help students make the relationship between what they learn in the classroom and how it applies in their world. The purpose of In The Newsroom is to actively involve each class member in a whole learning experience. Each student will have an opportunity to perform all of the tasks involved in production: writing, researching, producing, directing, and interviewing as they create their own classroom news program.

Extended Activities



These activities provide opportunities for students to work separately or together to conduct further research, explore answers to their own questions, or apply what they have learned to other media or content areas.

Link to the World



These activities offer ideas for connecting learners' classroom activities to their community and the rest of the world.

Culminating Activity



To wrap up the unit, AIMS Teaching Modules offer suggestions for ways to reinforce what students have learned and how they can use their new knowledge to enhance their worldview.

ADDITIONAL ATM FEATURES

Vocabulary

Every ATM contains an activity that reinforces the meaning and usage of the vocabulary words introduced in the program content. Students will read or find the definition of each vocabulary word, then use the word in a written sentence.

Checking Comprehension

Checking Comprehension is designed to help you evaluate how well your students understand, retain, and recall the information presented in the AIMS Teaching Module. Depending on your students' needs, you may direct this activity to the whole group yourself, or you may want to have students work on the activity page independently, in pairs, or in small groups. Students can verify their written answers through discussion or by viewing the video a second time. If you choose, you can reproduce the answers from your Answer Key or write the answer choices in a Word Bank for students to use. Students can use this completed activity as a study guide to prepare for the test.

Reproducible Activities

The AIMS Teaching Module provides a selection of reproducible activities, designed to specifically reinforce the content of this learning unit. Whenever applicable, they are arranged in order from low to high difficulty level, to allow a seamless facilitation of the learning process. You may choose to have students take these activities home or to work on them in the classroom independently, in pairs or in small groups.

Checking Vocabulary

The checking Vocabulary activity provides the opportunity for students to assess their knowledge of new vocabulary with this word game or puzzle. The format of this vocabulary activity allows students to use the related words and phrases in a different context.

Test

The AIMS Teaching Module Test permits you to assess students' understanding of what they have learned. The test is formatted in one of several standard test formats to give your students a range of experiences in test-taking techniques. Be sure to read, or remind students to read, the directions carefully and to read each answer choice before making a selection. Use the Answer Key to check their answers.

Additional AIMS Multimedia Programs

After you have completed this AIMS Teaching Module you may be interested in more of the programs that AIMS offers. This list includes several related AIMS programs.

Answer Key

Reproduces tests and work pages with answers marked.

JUMP RIGHT IN

Preparation

- Read *Rivers: Shapers of Earth Landscapes Themes, Overview, and Objectives* to become familiar with program content and expectations.
- Use **Preparation for Viewing** suggestions to introduce the topic to students.

Viewing

- Set up viewing monitor so that all students have a clear view.
- Depending on your classroom size and learning range, you may choose to have students view *Rivers: Shapers of Earth Landscapes* together or in small groups.
- Some students may benefit from viewing the video more than one time.

After Viewing

- Select Suggested Activities that integrate into your classroom curriculum. If applicable, gather materials or resources.
- Choose the best way for students to work on each activity. Some activities work best for the whole group. Other activities are designed for students to work independently, in pairs, or in small groups. Whenever possible, encourage students to share their work with the rest of the group.
- Duplicate the appropriate number of Vocabulary, Checking Comprehension, and consumable activity pages for your students.
- You may choose to have students take consumable activities home, or complete them in the classroom, independently, or in groups.
- Administer the Test to assess students' comprehension of what they have learned, and to provide them with practice in test-taking procedures.
- Use the Culminating Activity as a forum for students to display, summarize, extend, or share what they have learned with each other, the rest of the school, or a local community organization.

Rivers: Shapers of Earth Landscapes

Themes

Earth processes that change the features and patterns of the planet's surface are major themes in Earth Science and Geography curriculums. The water cycle, Earth's renewable resources, and patterns of land use are related themes.

Overview

In *Rivers: Shapers of Earth Landscapes*, students will observe how, all over the globe, the Earth is modified by the action of running water. They will learn how rivers are formed, how they carve their channels into soil and rocks and eventually flow to larger rivers, to lakes, or to the sea. From seasonal ephemeral streams to major perennial streams such as the Nile and the Mississippi, rivers consistently shape and reshape landforms and enrich habitats.

Students will learn about the classification of streams as well as the effects of major fluvial processes involving erosion, transportation and deposition of soil, rocks and minerals. Students will examine the physical actions of the erosion and deposition processes - watching as a stream's sediment load cuts into the bed and banks of its channel and builds sand bars, levees, and deltas as it drops portions of its load. They will gain insight into the effect of gradient on water velocity and what this means in terms of the water's load capacity and its shaping action on the stream's surroundings. Students will understand how waterfalls are formed, and degraded over time by the force of upstream erosion. They will see that over long periods the dynamics of stream systems themselves are altered as world sea levels rise and fall.

Whether the changes they create happen on a geologic timescale, as in the Grand Canyon, or take place in the space of a few

hours, such as a major flood, rivers continue to fill the role of architect in our ever-changing world.

Objectives

- To show the physical processes by which rivers shape the Earth's landforms
- To detail the fluvial processes of erosion, transportation and deposition of soil, rocks and minerals
- To examine the classification of streams
- To illustrate the drainage basins of rivers and river systems
- To explore the roles that water volume, gradient and velocity play in a river's erosive force
- To show how rivers have served as architects of such major Earth formations as the Grand Canyon and the Mississippi Delta

Introduction to the Program

To prepare students for, *Rivers: Shapers of Earth Landscapes*, discuss with them what comes to mind when they think about rivers, river systems, watersheds, and the physical processes that shape the Earth. Write on the board any ideas generated by the group; expect them to include such terms as:

beaches, deltas, drainage basins, erosion, estuaries, floods, groundwater, hydroelectricity, names of famous rivers, precipitation

Discuss the list with the class. Explain that they will be viewing a video in which they will see many of the things they mentioned, along with additional facts and details about rivers' transformation of the planet.

Introduction to Vocabulary

Write the following words on the board and explain that they will be referenced in the video. Some students may be unfamiliar with

the terms. If the meaning of any word is unclear to the group, ask volunteers to use an appropriate reference source to check the term and report their findings to the class.

alluvial, canyon, channel, delta, deposition, distributary, drainage basin, erosion, floodplain, fluvial groundwater, runoff, suspension, tributary

Discussion Ideas

We often think of erosion in terms of patterns of human land use leading to environmental damage. Lead students in a discussion of how - without human intervention - Earth's river systems use erosion as a tool to sculpt the face of the planet. Ask them to consider the physical forces at work in a river system ... to cut through soil and stone, to carry rocks, suspended sediment and dissolved minerals, then deposit these materials downstream ... changing the landscape. What major geographic features can they think of in the U.S. or elsewhere that have been created by rivers?

Focus

Ask students to think for a few moments about the importance of rivers in your community and in your state. How have these waterways shaped the local landscape? What impact do they have on the local economy, on the generation of electrical power, on transportation or recreation? If there are no local rivers of significant impact, ask them to consider the importance of the Mississippi or other major river system. Tell them the physical influence these waterways have on the land impacts the climate and living conditions of all organisms within their vicinity. Ask them to keep these thoughts in mind as they view the program. Let them know you will discuss these and other aspects following the screening.

SUGGESTED ACTIVITIES

Connection to Geography and History

Most of Earth's population centers are situated on the banks of rivers. Have students work in small groups to research and write a report on one of these rivers and the historical timeline of human exploration and settlement, travel and the transportation of goods, economic and cultural importance to communities along its course:

- Lewis & Clark Expedition: the Missouri and Columbia Rivers
- Life on the Mississippi past and present
- The Amazon: world's greatest river
- The Nile: a cradle of civilization
- The Ganges: a river of the people - cultural and religious importance

Ask for a volunteer from each team to share their findings with the class.

Meeting Individual Needs

Have students work alone or in small groups to look up the words *channel*, *deposition*, *drainage basin*, *erosion*, *groundwater*, *runoff*, and *tributary* in the dictionary or other resource. Ask them to find not only the definitions of the words but to also provide examples of each.

Connection to Earth Science

Have students work in small groups to research and write a report on the Colorado River - architect of the Grand Canyon. Ask them to cover the river's source, mouth, a timeline of the shaping of the Grand Canyon, the tributaries of the Colorado, as well as the habitats and biotic community of the river system. Ask for a volunteer from each team to share their findings with the class.

Connection to Geography, Science and Technology

Few events demonstrate the sheer power of a river like a major flood, whose force can inundate a community within a matter of hours, inflicting heavy property damage, injury and death. Humans have sought to control the flooding process for centuries, with varying success. Have students do research and write reports on the process of flooding, along with various methods used to eliminate or lessen its occurrence. Make sure they cover the reasons that - like wildfires - floods are a valuable process as well as a destructive one, and to also note instances where human intervention has had unintended results, such as with Egypt's Aswan High Dam.

(The Aswan High Dam, intended to save the Egyptian countryside from annual flooding has done just that, but it has also stopped the floods' deposition of rich alluvial soils onto the now shrinking delta, resulted in farmers having to use artificial fertilizers in place of the river sediment, caused severe salinity of both Lake Nasser - the dam's reservoir - and the surrounding farmlands, and increased health hazards of the population due to parasitic worms called schistosomes that infest the stagnant water of the reservoir.)

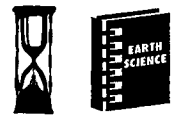
Ask for volunteers to share their reports with the class.



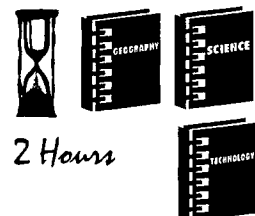
1 Hour



35 Minutes



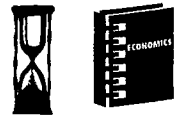
1 hour



2 Hours

Connection to Economics

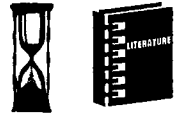
Some 25% of the world's electric power is produced by water. Hydroelectric power plants are located across the U.S. and Canada, in South America, Europe, Asia, Africa, New Zealand, and Australia. Have students work in small groups to research the current status of hydroelectric power in these and other regions. They should also generate timelines to trace the historic use of waterpower in such commercial ventures as lumber, textile, and flour mills. From their research, have a representative from each group create a PowerPoint presentation to relate their findings to the class.



3 Hours

Connection to Literature

Rivers figure prominently in both fiction and nonfiction. For novelists, a river often is more than simply a body of moving water - it may be used as a metaphor for a journey, whether physical or emotional. Ask your school librarian or media specialist for a list of river-themed books, or have students read one or more of the following novels or nonfiction works.



Extended

- The Adventures of Huckleberry Finn* by Mark Twain
- Down the Mississippi With Stinky: Two Women, a Canoe and a Kitten* by Dorie Brunner
- Journeys on the Mississippi* by Kay Cooper
- Life on the Mississippi* by Mark Twain
- The Log of the Jessie Bill* by Dean Gabbert
- Paddle to the Amazon: a 12,000-mile canoe adventure* by Don Starkell
- River, Cross My Heart* by Breena Clarke
- The River at the Center of the World* by Simon Winchester
- Sister India* by Peggy Payne
- Tom Sawyer* by Mark Twain

Ask students to analyze their thoughts about the central idea(s) voiced in the book(s). Have students write a summary of their analysis, then lead a class discussion on the main points revealed in the nonfiction works, and the geographic or symbolic role of rivers in fictional literature. Note: questions of class, exploitation, colonialism or racism arise in some of these books, and should be explored along with the historical aspects of that particular time, social structure and geographical location.

Connection to Environmental Science

The acronym NIMBY (not in my backyard) has become much used in recent years, as the population debates the appropriate placement of facilities such as new landfills. Divide the class into three groups: two debate teams and a group of judges. Have the debate teams research the location and construction history of any existing landfills in the area, or to determine the best geographic location for a hypothetical new landfill. Details they will want to consider are: the potential for toxic runoff into the groundwater, the perimeter of the drainage basin of rivers in the area and the floodplain of any nearby rivers or other bodies of water, the underlying bedrock layer (hard shale, and most types of igneous and metamorphic rock are less porous than many sedimentary rocks such as limestone or sandstone.) If the teams research an existing landfill, have them debate the decision to place it there versus another possible location; if researching a proposed new facility, have each team argue in favor of its favorite site. Have the judges decide the debate, explaining to the class the reasoning behind their decision.



2-45 Minute Sessions

In the Newsroom

It can be said that rivers are the arteries of our country, carrying much needed water to the land, transporting people and goods, providing electrical power and recreation. But, through pollution, we have significantly harmed this circulatory system and continue to do so, often without thinking about it.



2 hours

Have students work in small groups to research the past and present environmental damage being done to rivers nationwide (or around the world). Have them also research some of the things individuals can do on their own to help the situation. (Some suggestions would include using only phosphorus-free fertilizers in the garden, washing the car only at carwashes where water is recycled, not allowing antifreeze or other toxic chemicals to be flushed into street drains, keeping - and cleaning - trash out of streams and rivers.) Once research is complete, have the teams put together an "Environmental NewsWatch" show - with volunteers writing, producing, directing, and serving as anchorpersons. If video equipment is available, select a camera operator and record their presentation for review at a later time.

Culminating Activity

Have students work in small groups to create a multi-media presentation about the geographic information they've learned from the program. Brainstorm with the class the topics that should be covered, as well as the types of materials and media they would like to include in their presentation. Have each group present to the entire class; you may wish to set up a school-wide screening so that the class may show their presentations to the entire student population.



Extended

VOCABULARY

The following words and terms are from *Rivers: Shapers of Earth Landscapes*. Read each definition. On the line next to the definition write the letter of the vocabulary word that matches the definition. Then use a separate piece of paper to write each word in a sentence.

- | | | |
|-----------------|-------------------|-----------------|
| A) alluvial | H) drainage basin | O) river |
| B) canyon | I) erosion | P) river mouth |
| C) channel | J) exotic stream | Q) river source |
| D) delta | K) floodplain | R) runoff |
| E) deposition | L) fluvial | S) suspension |
| F) discharge | M) groundwater | T) tributary |
| G) distributary | N) infiltration | |

1. _____ the penetration of water from precipitation through the top surface of the soil
2. _____ the bed through which a stream or river flows; a passage of water that connects two larger bodies of water. Most of these occur naturally; some are of human construction, such as canals.
3. _____ where the river begins, its point of origin
4. _____ a river branch that flows away from the main stream, often found in deltas
5. _____ wearing away the Earth's surface through the actions of running water, glaciers, and winds. Running water carries eroded soil in suspension and deposits it elsewhere.
6. _____ a relatively flat area on either side of a river that may be under water during a flood
7. _____ the dropping of sediment (or load) by a river or stream; as the water loses velocity, the solid particles will no longer stay in suspension.
8. _____ water that infiltrates below the surface of the Earth and supplies wells and springs; water in the zone of saturation, the upper surface of which forms the water table
9. _____ a large stream of flowing water, usually with several tributary streams flowing into it
10. _____ the amount of water that flows past a given point during a specific period of time. This usually is measured in cubic feet per second or gallons per minute
11. _____ precipitation that cannot be absorbed into the ground; it flows over the surface and into streams, rivers, or lakes
12. _____ a valley with steep sides, carved out of the land by a fast-moving river, also known as a gorge
13. _____ the place where a river empties into another body of water such as a lake or the ocean
14. _____ a liquid in which small particles of solid matter are floating, but not dissolved
15. _____ a large stream that originates in a well-watered area far from the desert that it flows through
16. _____ describes soil made up of sand, gravel, silt, or clay deposited by running water
17. _____ an area of sand and soil, usually fan shaped that forms at the mouth of some rivers where the river drops its load of sediment as it flows into the larger body of water
18. _____ a stream or river that feeds into a larger river
19. _____ the area of land from which water drains into a given river or river system; watershed
20. _____ found in, produced by, or relating to a river

CHECKING COMPREHENSION

Read the following sentences and circle the letters of the words that best fill each blank.

Through the process of ____1____ precipitation sinks into the ground and adds to the ____2____ supply. A stream is a course of flowing water moving through a ____3____. An ephemeral stream is one that flows ____4____. The area of land from which a river drains water is known as its ____5____. Geoscientists classify streams by their size or order. A first order stream has ____6____. The major fluvial processes that modify landforms include ____7____. A stream's base level is ____8____. A stream's velocity, volume, type of rocks over which it runs, and the types of stones and gravel it's carrying all affect the ____9____. A stream's gradient affects its ____10____; generally the steeper the gradient, ____11____. In plateau regions, swift-flowing streams may cut deep ____12____ through the landscape, as in ____13____ formed by the Colorado River. As a river's gradient declines, it develops a curving course through ____14____ resulting in looping bends called ____15____. The flat area that is covered with water when a river overflows is called its ____16____. ____17____ deposited by the river is/are important to agriculture. A braided stream is one that ____18____. The sediment deposited by a river as it reaches the sea may form a rich area of land called a/an ____19____ which is often incised with small streams called ____20____ that flow away from the main river.

- | | | |
|---|---|--|
| 1. A) irrigation
B) isolation
C) infiltration | 8. A) its percentage of pollutants to fresh water
B) the lowest point to which it can erode its bed
C) a point at which its gradient steeply declines | 15. A) oxbows
B) point bars
C) meanders |
| 2. A) fuel
B) groundwater
C) surface water | 9. A) rate of evaporation
B) rate of erosion
C) its ability to evade its banks | 16. A) levees
B) floodplain
C) cutoff |
| 3. A) channel
B) canal
C) pipe | 10. A) meandering
B) slope
C) velocity | 17. A) Alluvial soil
B) Saltation
C) Rock strata |
| 4. A) from East to West
B) from North to South
C) only during and shortly after a rain | 11. A) the more curving the meanders
B) the flatter the slope
C) the greater the velocity | 18. A) flows for only a brief period following a rainstorm
B) in which the water flows around sand bars and/or islands
C) shows significant abrasion along its banks |
| 5. A) drainage basin or watershed
B) floodplain or levee
C) order or discharge | 12. A) canyons
B) pinnacles
C) oxbows | 19. A) oasis
B) savanna
C) delta |
| 6. A) numerous tributaries
B) no tributaries
C) the largest fish | 13. A) the Grand Canyon
B) the Devil's Punchbowl
C) Mammoth Caves | 20. A) distributaries
B) tributaries
C) gullies |
| 7. A) predation, symbiosis and parasitism
B) diffusion, osmosis and sublimation
C) erosion, transportation and deposition | 14. A) saltation
B) lateral erosion
C) increases in gradient | |

WORD SEARCH PUZZLE

Read each vocabulary definition below. On the line before each definition write the appropriate word, then find each in the word search. Look up, down, backwards and diagonally to find the words.

WORD BANK
alluvial
canyon
channel
deposition
distributary
erosion
estuary
floodplain
fluvial
groundwater
natural levee
oxbow lake
runoff
tributary
velocity

N	D	E	P	O	S	I	T	I	O	N	Z	V	K	M
G	A	S	D	C	D	V	R	W	W	G	M	E	B	N
Q	W	T	R	Y	P	L	A	I	V	U	L	L	A	N
T	W	U	U	Y	X	Q	K	J	B	C	B	O	L	H
G	J	A	N	R	K	L	E	N	N	A	H	C	K	R
E	K	R	O	A	A	J	K	M	M	N	W	I	B	E
C	R	Y	F	T	C	L	A	C	G	Y	H	T	J	T
Q	Z	O	F	U	Z	W	L	V	H	O	J	Y	Q	A
L	V	W	S	B	W	B	W	E	M	N	C	K	L	W
A	H	J	C	I	V	W	O	H	V	K	D	H	P	D
I	K	W	Z	R	O	X	B	C	W	E	J	L	M	N
V	R	R	S	T	X	N	X	D	W	N	E	N	Y	U
U	H	H	K	S	J	L	O	J	J	K	C	C	X	O
L	W	T	R	I	B	U	T	A	R	Y	R	T	S	R
F	L	O	O	D	P	L	A	I	N	W	H	J	K	G

- _____ a stream or river that feeds into a larger river
- _____ the bed through which a stream or river flows; a passage of water that connects two larger bodies of water. Most of these occur naturally; some are of human construction, such as canals.
- _____ a marine ecosystem containing both fresh and saltwater, formed when a river mouth is overrun with water from the ocean due to rising sea levels or a drop in coastal elevation
- _____ a crescent-shaped body of water formed when a meander is cut off from the rest of the stream and its cut ends are walled off by sediment
- _____ a valley with steep sides, carved out of the land by a fast-moving river, also known as a gorge
- _____ the speed of the flow of water in a river or river system
- _____ the dropping of sediment (or load) by a river or stream; as the water loses velocity, the solid particles will no longer stay in suspension
- _____ a river branch that flows away from the main stream, often found in deltas
- _____ wearing away the Earth's surface through the actions of running water, glaciers, and winds. Running water carries eroded soil in suspension and deposits it elsewhere.
- _____ an earthen wall running alongside a river, formed by sediment deposited as flood waters overrun the riverbank
- _____ a relatively flat area on either side of a river that may be under water during a flood
- _____ found in, produced by, or relating to a river
- _____ water that infiltrates below the surface of the Earth and supplies wells and springs; water in the zone of saturation, the upper surface of which forms the water table
- _____ precipitation that cannot be absorbed into the ground; it flows over the surface and into streams, rivers, or lakes
- _____ describes soil made up of sand, gravel, silt, or clay deposited by running water

TRUE OR FALSE

Place a T next to statements that are true and an F next to statements that are false.

1. _____ Runoff is water that flows from a river's main channel through its distributaries.
2. _____ A second order stream has first order streams as tributaries.
3. _____ A river's mouth, usually located in the mountains, is the point at which a river begins.
4. _____ A perennial stream has water flowing through its channel only during the rainy season.
5. _____ A river's drainage basin is the area of land from which it drains water.
6. _____ The Hudson is a major exotic river in the U.S.
7. _____ A river's watershed is the point at which it flows into a larger river, a lake, or an ocean.
8. _____ The drainage basin of the Mississippi River and its tributaries covers some 320 million square kilometers.
9. _____ The amount of load a stream can carry depends on its volume and velocity.
10. _____ When a river floods, the sharp reduction in velocity of the overflowing water causes it to dump its sediment load creating wall-like structures called levees.

THE WATER TABLE

Here is a table of some of the world's more well known rivers. Use reference sources as necessary to complete the statistics requested. The first has been done as an example.

River	Length in Miles	Location	City(ies) on or near the river	Other Details
Amazon	4,000	South America	Manaus,Brazil;Iquitos, Peru	Transports more water to sea than next 3 largest rivers combined; world's 2nd longest river
Colorado				
Congo				
Ganges				
Indus				
Mekong				
Mississippi				
Niagra				

THE WATER TABLE (CONTINUED)

River	Length in Miles	Location	City(ies) on or near the river	Other Details
Nile				
Rhine				
Rio Grande				
St. Lawrence				
Volga				
Yangtze				

VOCABULARY MATCH-UP

Draw a line from the vocabulary words below to their correct definition.

base level	an area of sand and soil, usually triangle shaped that forms at the mouth of some rivers where the river drops its load of sediment as it flows into the larger body of water
braided stream	a stream or river that feeds into a larger river
cutoff	the amount of water that flows past a given point during a specific period of time. This usually is measured in cubic feet per second or gallons per minute.
delta	curves or bends that develop in a river's course as the gradient of the stream decreases
discharge	a chaotic water flow, with currents moving in more than one direction - usually influenced by a steep gradient, high velocity and/or roughness in the streambed
drainage basin	wearing away the Earth's surface through the actions of running water, glaciers, and winds. Running water carries eroded soil in suspension and deposits it elsewhere.
erosion	the bouncing or hopping over the stream bed of smaller rocks or gravel as they are pushed by moving water
floodplain	precipitation that cannot be absorbed into the ground; it flows over the surface and into streams, rivers, or lakes
gradient	particles of solid material, such as sand or gravel, that are transported by the flow of water in a stream
meanders	a relatively flat area on either side of a river that may be under water during a flood
runoff	a stream usually with a high bedload of sediment, that contains sand bars or islands around which the water flows
saltation	the area of land from which water drains into a given river or river system; watershed
sediment	a section of river formed when erosion cuts a channel across the narrow neck of a meander; the river then flows through the new channel instead of through the meander.
tributary	the slope (or vertical drop) of a stream channel; the steeper this is, the higher the stream's velocity
turbulence	the lowest depth to which a stream can erode its channel; sea level is the ultimate example of this

TEST

Fill in the blank or circle the letter for the correct answer to each question.

1. A stream is a flow of water normally confined within a well-defined _____.

- A) canal
- B) flood plain
- C) channel

2. The source of a river is where it _____, while its mouth is where the river _____.

- A) begins; ends by flowing into another river, lake, or the ocean
- B) ends by flowing into another river, lake, or the ocean; is fed by one or more tributaries
- C) drains off into a series of distributaries; is channeled into a hydroelectric plant

3. First order streams have _____ tributaries.

- A) one or two
- B) no
- C) three or more

4. The only tenth order stream in the United States is the _____.

- A) Missouri River
- B) Colorado River
- C) Mississippi River

5. What is included within the drainage basin of a third order stream?

6. Erosion, transportation and deposition of earth materials are all _____.

- A) major fluvial processes
- B) methods through which running water modifies landscapes
- C) A and B

TEST (CONTINUED)

7. A stream flowing into a lake has the lake's surface as its (insert blank).

- A) source
- B) channel
- C) base level

8. Initially, the walls of a canyon cut by a swift-flowing river may show a v-shaped profile. What processes begin widening the canyon at the top?

9. As the gradient declines, what typically happens to a river's course, and what are some of the results of this?

10. A river's flood plain is often an important agricultural region because of (insert blank).

- A) the high concentration of salt deposited in the soil
- B) the influence of its steep gradient
- C) significant deposits of rich alluvial soil

ADDITIONAL AIMS MULTIMEDIA PROGRAMS

You and your students might also enjoy these other AIMS Multimedia programs:

- #2649-EN-VID: *Mountains and Mountain Building Processes*
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- #2650-EN-VID: *Climate, Landscapes and Life: The Tropics*
- #2561-EN-VID: *Climate, Landscapes and Life: Mid-latitude and Polar Regions*
- #2597-EN-VID: *Geography of the World Series: Africa: The Land and Resources*
- #2598-EN-VID: *Geography of the World Series: Africa: The People*
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- #2767-EN-VID: *Columbia: Gateway to South America*
- #2817-EN-VID: *Juanita's Dream: A Mayan's Guide to Guatemala*

ANSWER KEY for page 10

VOCABULARY

The following words and terms are from *Rivers: Shapers of Earth Landscapes*. Read each definition. On the line next to the definition write the letter of the vocabulary word that matches the definition. Then use a separate piece of paper to write each word in a sentence.

- | | | |
|-----------------|-------------------|-----------------|
| A) alluvial | H) drainage basin | O) river |
| B) canyon | I) erosion | P) river mouth |
| C) channel | J) exotic stream | Q) river source |
| D) delta | K) floodplain | R) runoff |
| E) deposition | L) fluvial | S) suspension |
| F) discharge | M) groundwater | T) tributary |
| G) distributary | N) infiltration | |

1. N the penetration of water from precipitation through the top surface of the soil
2. C the bed through which a stream or river flows; a passage of water that connects two larger bodies of water. Most of these occur naturally; some are of human construction, such as canals.
3. Q where the river begins, its point of origin
4. G a river branch that flows away from the main stream, often found in deltas
5. I wearing away the Earth's surface through the actions of running water, glaciers, and winds. Running water carries eroded soil in suspension and deposits it elsewhere.
6. K a relatively flat area on either side of a river that may be under water during a flood
7. E the dropping of sediment (or load) by a river or stream; as the water loses velocity, the solid particles will no longer stay in suspension.
8. M water that infiltrates below the surface of the Earth and supplies wells and springs; water in the zone of saturation, the upper surface of which forms the water table
9. O a large stream of flowing water, usually with several tributary streams flowing into it
10. F the amount of water that flows past a given point during a specific period of time. This usually is measured in cubic feet per second or gallons per minute
11. R precipitation that cannot be absorbed into the ground; it flows over the surface and into streams, rivers, or lakes
12. B a valley with steep sides, carved out of the land by a fast-moving river, also known as a gorge
13. P the place where a river empties into another body of water such as a lake or the ocean
14. S a liquid in which small particles of solid matter are floating, but not dissolved
15. J a large stream that originates in a well-watered area far from the desert that it flows through
16. A describes soil made up of sand, gravel, silt, or clay deposited by running water
17. D an area of sand and soil, usually fan shaped that forms at the mouth of some rivers where the river drops its load of sediment as it flows into the larger body of water
18. T a stream or river that feeds into a larger river
19. H the area of land from which water drains into a given river or river system; watershed
20. L found in, produced by, or relating to a river

ANSWER KEY for page 11

CHECKING COMPREHENSION

Read the following sentences and circle the letters of the words that best fill each blank.

Through the process of ____1____ precipitation sinks into the ground and adds to the ____2____ supply. A stream is a course of flowing water moving through a ____3____. An ephemeral stream is one that flows ____4____. The area of land from which a river drains water is known as its ____5____. Geoscientists classify streams by their size or order. A first order stream has ____6____. The major fluvial processes that modify landforms include ____7____. A stream's base level is ____8____. A stream's velocity, volume, type of rocks over which it runs, and the types of stones and gravel it's carrying all affect the ____9____. A stream's gradient affects its ____10____; generally the steeper the gradient, ____11____. In plateau regions, swift-flowing streams may cut deep ____12____ through the landscape, as in ____13____ formed by the Colorado River. As a river's gradient declines, it develops a curving course through ____14____ resulting in looping bends called ____15____. The flat area that is covered with water when a river overflows is called its ____16____. ____17____ deposited by the river is/are important to agriculture. A braided stream is one that ____18____. The sediment deposited by a river as it reaches the sea may form a rich area of land called a/an ____19____ which is often incised with small streams called ____20____ that flow away from the main river.

- A) irrigation
B) isolation
C) infiltration
- A) fuel
B) groundwater
C) surface water
- A) channel
B) canal
C) pipe
- A) from East to West
B) from North to South
C) only during and shortly after a rain
- A) drainage basin or watershed
B) floodplain or levee
C) order or discharge
- A) numerous tributaries
B) no tributaries
C) the largest fish
- A) predation, symbiosis and parasitism
B) diffusion, osmosis and sublimation
C) erosion, transportation and deposition
- A) its percentage of pollutants to fresh water
B) the lowest point to which it can erode its bed
C) a point at which its gradient steeply declines
- A) rate of evaporation
B) rate of erosion
C) its ability to evade its banks
- A) meandering
B) slope
C) velocity
- A) the more curving the meanders
B) the flatter the slope
C) the greater the velocity
- A) canyons
B) pinnacles
C) oxbows
- A) the Grand Canyon
B) the Devil's Punchbowl
C) Mammoth Caves
- A) saltation
B) lateral erosion
C) increases in gradient
- A) oxbows
B) point bars
C) meanders
- A) levees
B) floodplain
C) cutoff
- A) Alluvial soil
B) Saltation
C) Rock strata
- A) flows for only a brief period following a rainstorm
B) in which the water flows around sand bars and/or islands
C) shows significant abrasion along its banks
- A) oasis
B) savanna
C) delta
- A) distributaries
B) tributaries
C) gullies

ANSWER KEY for page 12

WORD SEARCH PUZZLE

Read each vocabulary definition below. On the line before each definition write the appropriate word, then find each in the word search. Look up, down, backwards and diagonally to find the words.

WORD BANK

- alluvial
- canyon
- channel
- deposition
- distributary
- erosion
- estuary
- floodplain
- fluvial
- groundwater
- natural levee
- oxbow lake
- runoff
- tributary
- velocity

tributary	a stream or river that feeds into a larger river
channel	the bed through which a stream or river flows; a passage of water that connects two larger bodies of water. Most of these occur naturally; some are of human construction, such as canals.
estuary	a marine ecosystem containing both fresh and saltwater, formed when a river mouth is overrun with water from the ocean due to rising sea levels or a drop in coastal elevation
oxbow lake	a crescent-shaped body of water formed when a meander is cut off from the rest of the stream and its cut ends are walled off by sediment
canyon	a valley with steep sides, carved out of the land by a fast-moving river, also known as a gorge
velocity	the speed of the flow of water in a river or river system
deposition	the dropping of sediment (or load) by a river or stream; as the water loses velocity, the solid particles will no longer stay in suspension
distributary	a river branch that flows away from the main stream, often found in deltas
erosion	wearing away the Earth's surface through the actions of running water, glaciers, and winds. Running water carries eroded soil in suspension and deposits it elsewhere.
natural levee	an earthen wall running alongside a river, formed by sediment deposited as flood waters overrun the riverbank
floodplain	a relatively flat area on either side of a river that may be under water during a flood
fluvial	found in, produced by, or relating to a river
groundwater	water that infiltrates below the surface of the Earth and supplies wells and springs; water in the zone of saturation, the upper surface of which forms the water table
runoff	precipitation that cannot be absorbed into the ground; it flows over the surface and into streams, rivers, or lakes
alluvial	describes soil made up of sand, gravel, silt, or clay deposited by running water

ANSWER KEY for page 13

TRUE OR FALSE

Place a T next to statements that are true and an F next to statements that are false.

1. F Runoff is water that flows from a river's main channel through its distributaries.
2. T A second order stream has first order streams as tributaries.
3. F A river's mouth, usually located in the mountains, is the point at which a river begins.
4. F A perennial stream has water flowing through its channel only during the rainy season.
5. T A river's drainage basin is the area of land from which it drains water.
6. F The Hudson is a major exotic river in the U.S.
7. F A river's watershed is the point at which it flows into a larger river, a lake, or an ocean.
8. T The drainage basin of the Mississippi River and its tributaries covers some 320 million square kilometers.
9. T The amount of load a stream can carry depends on its volume and velocity.
10. T When a river floods, the sharp reduction in velocity of the overflowing water causes it to dump its sediment load creating wall-like structures called levees.

ANSWER KEY for page 14

THE WATER TABLE

Here is a table of some of the world's more well known rivers. Use reference sources as necessary to complete the statistics requested. The first has been done as an example.

River	Length in Miles	Location	City(ies) on or near the river	Other Details
Amazon	4,000	South America	Manaus, Brazil; Iquitos, Peru	Transports more water to sea than next 3 largest rivers combined; world's 2nd longest river
Colorado	1,450	Colorado, Utah, Arizona, Nevada, California, Mexico	Grand Junction, CO; Lake Powell, UT; Las Vegas and Laughlin, NV; Yuma, AZ; Needles, CA	An exotic river, the Colorado and other erosion factors carved the Grand Canyon over a mile into the Colorado Plateau
Congo	2,900	Democratic Republic of Congo	Mbandaka, Kishasa	Africa's 2nd longest river and world's 7th longest
Ganges	1,560	India and Bangladesh	Calcutta, Kanpur, Varanasi and Benares, India; Rajshahi and Pabna, Bangladesh	Sacred to the Hindu faith; forms fertile Ganges Delta in Bangladesh
Indus	1,800	Tibet, India and Pakistan	Shiquanhe, Tibet; Hyderabad and Multan, Pakistan	Longest river in Pakistan; part of one of world's biggest irrigation systems
Mekong	2,600	Tibet, China, Myanmar, Thailand, Laos, Cambodia, and Vietnam	Nakhon Phanom, Thailand; Louangphrabang, Laos; Phnom Penh, Cambodia; Can Tho, Vietnam	Indochinese peninsula's longest river; its delta is an important "rice basket" for Vietnam
Mississippi	2,340	Minnesota, Wisconsin, Iowa, Illinois, Missouri, Kentucky, Tennessee, Arkansas, Mississippi, Louisiana	Minneapolis, St. Paul, MN; La Crosse, WI; Davenport, IA; Quincy, IL; St. Louis, MO; Paducah, KY; Memphis, TN; Vicksburg, MS; Baton Rouge, New Orleans, LA	USA's primary inland waterway and 2nd longest river; delta covers some 13,000 square miles
Niagra	34	Canada and New York	Buffalo, Niagra Falls, NY; Niagra Falls, Ontario	Connects Lakes Erie and Ontario; site of Niagra Falls

ANSWER KEY for page 15

THE WATER TABLE (CONTINUED)

River	Length in Miles	Location	City(ies) on or near the river	Other Details
Nile	4,160	Egypt, Sudan	Khartoum, Sudan; Cairo, Egypt	World's longest river*, it irrigates nearly 9 million acres in Egypt and Sudan
Rhine	820	Switzerland, Liechtenstein, France, Netherlands, Austria, Germany	Basel, Switzerland; Strasbourg, France; Bonn, Cologne, Germany; Rotterdam, Netherlands	Most important commercial navigation system in Europe
Rio Grande	1,885	Colorado, New Mexico, Texas, Mexico	Albuquerque, NM; El Paso, Laredo, TX; Juarez, Mexico	Marks approx. 2/3 of the international border between Mexico and the U.S.
St. Lawrence	800	Canada and New York	Quebec City, Montreal, Quebec; Kingston, Ontario; Massena, NY	2nd longest river in Canada, it connects Lake Ontario to the Gulf of St. Lawrence
Volga	2,194	Russia	Volgograd, Saratov, Samara	Longest river in Europe, flows through western Russia to its mouth at the Caspian Sea
Yangtze	3,915	China	Shanghai, Nanjing	Longest river in China and 3rd longest in the world

* Note: Although the Nile has long been considered the world's longest river, some geoscientists now believe that the Amazon may in fact be longer. As an additional activity, have students do research on the latest available measurements for these two great rivers.

ANSWER KEY for page 17

TEST

Fill in the blank or circle the letter for the correct answer to each question.

1. A stream is a flow of water normally confined within a well-defined _____.

- A) canal
- B) flood plain
- C) channel

2. The source of a river is where it _____, while its mouth is where the river _____.

- A) begins; ends by flowing into another river, lake, or the ocean
- B) ends by flowing into another river, lake, or the ocean; is fed by one or more tributaries
- C) drains off into a series of distributaries; is channeled into a hydroelectric plant

3. First order streams have _____ tributaries.

- A) one or two
- B) no
- C) three or more

4. The only tenth order stream in the United States is the _____.

- A) Missouri River
- B) Colorado River
- C) Mississippi River

5. What is included within the drainage basin of a third order stream?

The drainage basin of a third order stream includes the drainage basins of all its tributaries.

6. Erosion, transportation and deposition of earth materials are all _____.

- A) major fluvial processes
- B) methods through which running water modifies landscapes
- C) A and B

ANSWER KEY for page 18

TEST (CONTINUED)

7. A stream flowing into a lake has the lake's surface as its (insert blank).

A) source

B) channel

C) base level

8. Initially, the walls of a canyon cut by a swift-flowing river may show a v-shaped profile. What processes begin widening the canyon at the top?

Widening at the top of a canyon may be accomplished through the processes of weathering, mass wasting, and the action of tributary streams.)

9. As the gradient declines, what typically happens to a river's course, and what are some of the results of this?

As gradient declines, the velocity of the river declines and the stream develops a curving course, eroding the sides of its channel and widening its valley. This process is called lateral erosion which, as it progresses, may create cutoffs and oxbow lakes.

10. A river's flood plain is often an important agricultural region because of (insert blank).

A) the high concentration of salt deposited in the soil

B) the influence of its steep gradient

C) significant deposits of rich alluvial soil

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