Student Workbook

California Education and the Environment Initiative

Earth Science Standard E.5.e.

Rainforests and Deserts: Distribution, Uses, and Human Influences

California Education and the Environment Initiative

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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

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Key Partners:

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Abiotic: Related to the nonliving components or factors within or related to natural systems, such as soil, water, and temperature.

Arid region: An area characterized by minimal precipitation, such as a hot desert, or water that is locked in a solid form, such as a cold desert like Antarctica.

Biological control: The method of controlling pests and plant diseases that relies on predation, parasitism, or other natural mechanisms.

Biomass: The total mass of living matter in a given area; or, plant material (wood, grains, agricultural waste, vegetation) sometimes used as an energy source.

Biome: Large regions of Earth's surface that share similar characteristics of climate and vegetation.

Climate: The prevailing, average weather conditions influenced by temperature, precipitation, humidity, and other meteorological factors in a given region over a long period of time.

Compaction: The compression of soils by driving out air, such as by vehicle traffic, or footprints of humans or livestock.

Desertification: Changes to semi-arid and dry, sub-humid areas that result in the habitat changing to desert.

Drought: A long period of time with little or no precipitation.

Economy: The collection of activities associated with the production, distribution, consumption, and exchange of goods and services within human communities and societies.

Ecosystem: A specific area, such as a kelp forest, that contains a characteristic set of interdependent species that interact with each other and the abiotic components found there.

Ecosystem goods: Tangible materials, such as timber and food, produced by natural systems, that are essential to human life, economies, and cultures.

Ecosystem services: The functions and processes that occur in natural systems, such as pollination, that support or produce ecosystem goods and help sustain human life, economies, and cultures.

Environmental Impact Report (EIR): A report, required by the California Environmental Quality Act (CEQA) of 1970, that requires "major" actions or projects to be assessed as to their potential effects on the environment prior to being implemented.

Geographic distribution: The locations on Earth where biomes, ecosystems, and species are found.

Indigenous (or native): Originating in a particular region or country.

Latitude: An angular measurement of the distance north or south from the Equator.

Local distribution (presence): The specific locations where ecosystems, habitats, and species are found.

National park: Natural places including land, water, and ocean environments, and sometimes historical sites, that are identified by and protected through federal legislation and managed by the National Park Service. Hunting, mining, and consumptive activities are not allowed.

Natural resources: Materials, such as water, minerals, energy, and soil, that people use from nature and natural systems.

Natural system: The interacting components, processes, and cycles within an environment, as well as the interactions among organisms and their environment.

Paleoclimatology: The study of past climate and its causes and effects.

Pharmaceutical: A medicinal drug.

Policy: A broad statement that describes how groups, organizations, and governments intend to implement or enforce their rules, regulations, and laws.

Preserve: A National Park Service designation for an area that is managed under the same guidelines as a national park, except that hunting is allowed.

Rainshadow: An area with little precipitation that lies on the leeward (downwind) side of a mountain.

Semi-arid region: An area characterized by annual average precipitation of 10–20 inches.

Spatial model: A model of the world, that is based on spatial data and relationships, which is used to help understand spatial relationships.

Suburban development: The extension of human communities from large urban centers.

United States Geological Survey (USGS): A federal agency that collects and disseminates scientific information related to Earth's geological, mineral, energy, hydrological, and biological resources.

Wilderness: A federally designated area of sufficient size to permit natural systems to thrive "untrammeled by man, where man himself is a visitor who does not remain."

Name: _____

Instructions: Complete the following tasks in the spaces provided. (5 points each)

1. Identify four human practices that are detrimental to the desert ecosystem.

_____

_____

_____

_____

2. Explain how these practices cause problems.

_____

_____

_____

_____

3. Identify three agencies responsible for making desert management and policy decisions.

_____

_____

_____

_____

4. Identify three fields of scientific study that can be used to gather new knowledge necessary to make appropriate management decisions.

_____

_____

5. Describe the purpose of an environmental impact report.

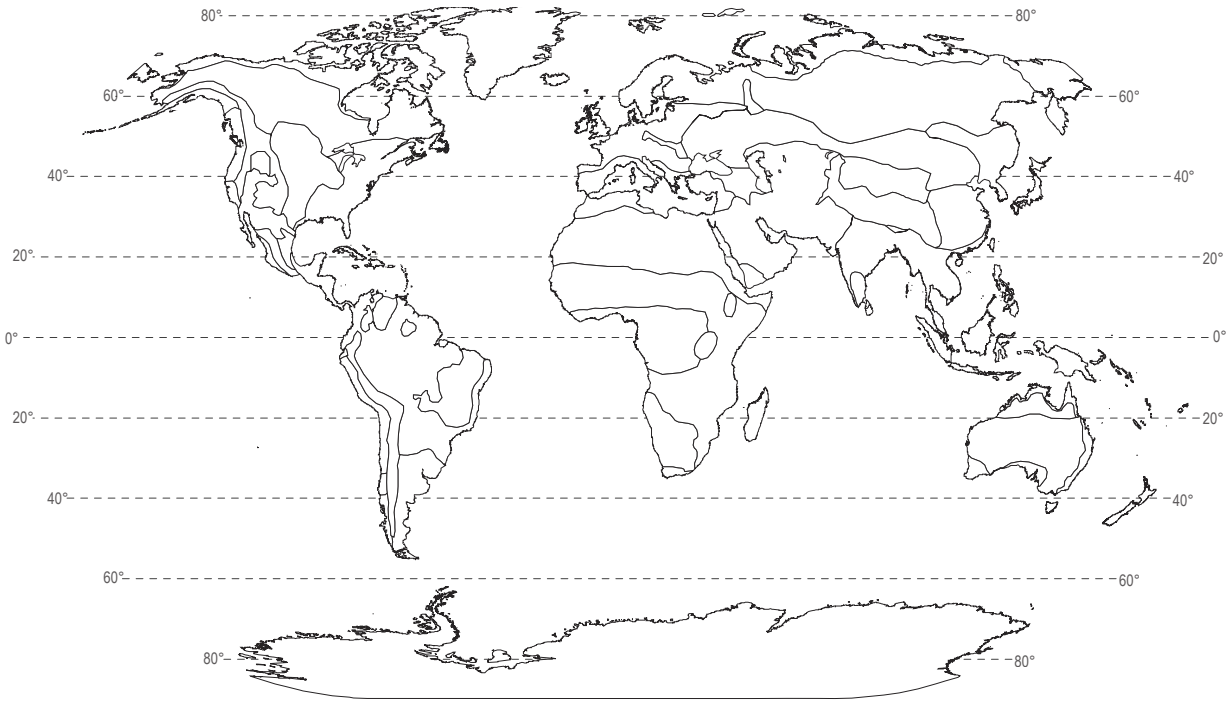
_____

_____

_____

Name: _____

Instructions: Complete the following tasks on the map below. Use your knowledge of latitude to locate the world's tropical rainforests and deserts. Color the rainforest biomes green and the desert biomes brown. (10 points)



Summary Questions

Instructions: Use the map above and what you have learned in class to answer the following questions. (5 points)

1. What is latitude?

_____

_____

_____

2. What are the general latitudes of the world's tropical rainforests?

_____

_____

_____

Name: _____

3. At what latitudes are the world's hot and arid deserts centered? Why are they located there?

_____

_____

_____

_____

4. How do global convection currents and the resulting global climate patterns affect the geographic distribution of the world's desert and rainforest biomes?

_____

_____

_____

_____

5. On the diagram below, add arrows on the blank circulation cells to show how the air and moisture circulate in each of the latitudinal bands.

Name: _____

Instructions: Complete the following tasks in the chart below.

1. Complete the chart below by listing at least five examples each for ecosystem goods, ecosystem services, and human uses related to rainforests.

Rainforests

Ecosystems Goods (5 points)
_____
_____
_____
_____
_____
_____

Ecosystems Services (5 points)
_____
_____
_____
_____
_____
_____

Human Uses (5 points)
_____
_____
_____
_____
_____
_____

Name: _____

Summary Question

Instructions: Use **Importance of Rainforests to Human Lives** (Student Edition, pages 6–7) to respond to the following writing prompt. (5 points)

2. Describe how a rainforest ecosystem is important to human lives and communities. Also, identify whether the ecosystem goods and ecosystem services have local, regional, or global importance.

Name: _____

Instructions: Complete the following tasks in the chart below.

1. Complete the chart below by listing at least five examples each for ecosystem goods, ecosystem services, and human uses related to deserts.

Deserts

Ecosystems Goods (5 points)
_____
_____
_____
_____
_____
_____

Ecosystems Services (5 points)
_____
_____
_____
_____
_____
_____

Human Uses (5 points)
_____
_____
_____
_____
_____
_____

Name: _____

Summary Question

Instructions: Use **Importance of Deserts to Human Lives** (Student Edition, pages 8–9) to respond to the following writing prompt. (5 points)

2. Describe how a desert ecosystem is important to human lives and communities. Also, identify whether the ecosystem goods and ecosystem services have local, regional, or global importance.

Name: _____

Part 1

Instructions: Use readings and class discussions to complete the following chart. (12 points)

Biome	Human Practice	Human Intentions	Actual Effects
Rainforest	Clear-cutting		
	Large-scale farming		
	Extraction of hardwoods		
Desert	Agriculture/grazing		
	Suburban development		
	Recreation		

Name: _____

Part 2

Summary Questions

Instructions: Answer the following questions in the spaces provided.

1. Describe a human practice and how it can influence the local distribution (presence) of desert ecosystems. (5 points)

Name: _____

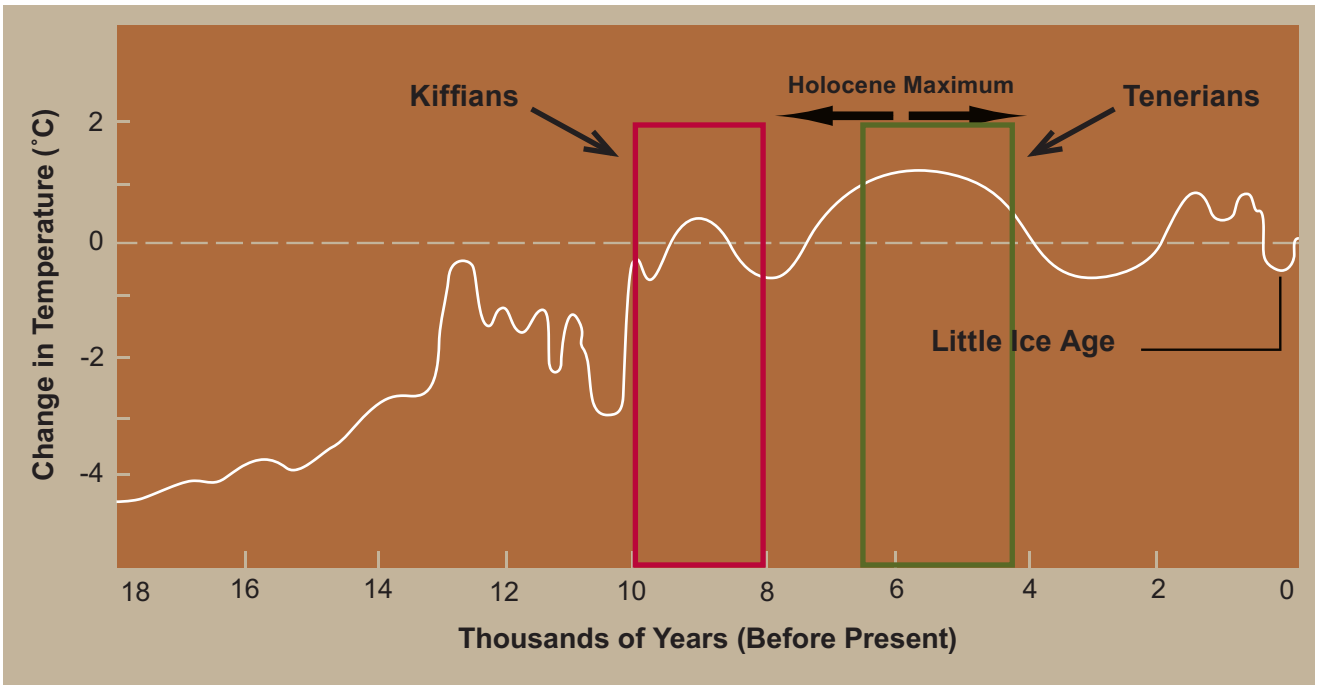
2. Describe a human practice and how it can influence the local distribution (presence) of rainforest ecosystems. (5 points)

Name: _____

In 2000, archaeologists studying a region of the Sahara Desert in north-central Africa found artifacts that indicated that two different cultures lived in this region several thousand years apart when the region did not experience a desert climate.

Instructions: Use **Global Climate Change—The Green Sahara** (Student Edition, pages 10–11) and class discussions to answer the following questions in the spaces provided. (5 points each)

Global Temperature Change over the Past 18,000 Years



1. Based on **Global Temperature Change over the Past 18,000 Years** (above), how did the temperature change during the time periods that the Kiffian and Tenerian people lived in the Sahara?

_____

_____

_____

2. What types of artifacts were discovered from the Kiffian culture?

_____

_____

_____

Name: _____

3. What does this indicate about the ecosystem that existed there during this period?

_____

_____

_____

4. What types of artifacts were discovered from the Tenerian culture?

_____

_____

_____

5. What does this indicate about the ecosystem that existed there during this period?

_____

_____

_____

6. Based on the **Global Temperature Change over the Past 18,000 Years** on previous page and the artifacts from the Kiffian and Tenerain cultures, what could have happened to make these two cultures disappear? (10 points)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name: _____

Instructions: Use these questions to guide your reading of **Recoverability and Vulnerability of Desert Ecosystem** (Student Edition, pages 12–15). Provide written responses for each task. (5 points each)

1. In what four states is the Mojave Desert located?

_____

2. Name four types of land use decisions land managers make regarding the use of the Mojave Desert.

_____

3. What types of information are scientists collecting to use in making land management decisions?

_____

_____

_____

4. Describe a tool that scientists use to show how ecosystems respond to stress.

_____

_____

_____

5. Identify five or more different factors that scientists study and analyze to make management decisions for desert ecosystems.

_____

_____

_____

6. What natural processes and human practices do land use managers focus on as they develop management plans for the Mojave Desert?

_____

_____

_____

Name: _____

7. How are scientists using research about Mojave Desert ghost towns to make land management decisions?

_____

_____

_____

_____

_____

8. Describe two examples of how scientific data is useful in making land use management decisions about the Mojave Desert.

_____

_____

_____

_____

_____

9. Write an essay in response to the following prompt. (10 points)
Describe an example of the role of scientific knowledge in making policy and management decisions about human activity related to desert ecosystems.

_____

_____

_____

_____

_____

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_____

_____

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_____

Name: _____

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