



Maine
Department of
Education

GRADE

5

Maine Science Assessment
Released Items (2024)
Teacher Version



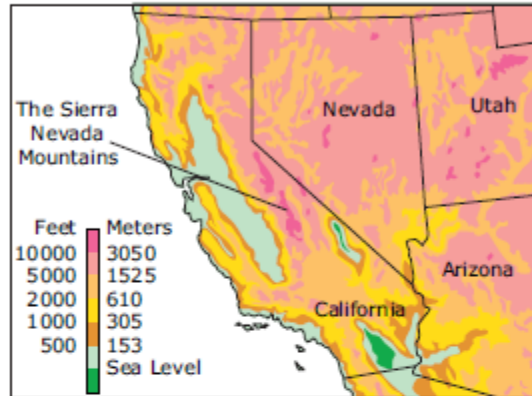
New Meridian

Included in this document are items and their associated stimuli that were operationally administered on the Maine Science Assessment. For each item, the correct answer is provided, along with the Next Generation Science Standards (NGSS) to which it aligns. This includes the disciplinary core idea (DCI), science and engineering practice (SEP), and cross-cutting concept (CCC). In some cases, one of these dimensions may not apply. The number of points the item is worth is also provided, as well as the answer key.

Use the information from Rain Shadow Effect to answer **questions 1–3**.

Rain Shadow Effect

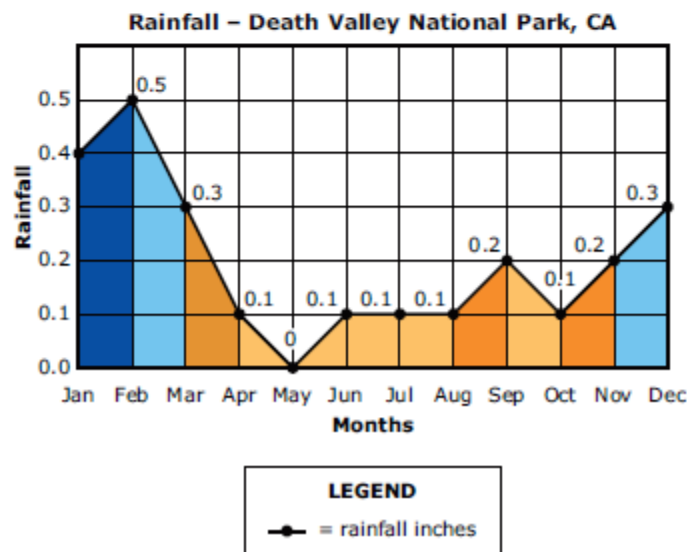
Rian's class is planning to take a trip to a national park in California. The choices are either Yosemite or Death Valley. The teacher shows the class a map of California and tells them that one of the parks is on the East side of the Sierra Nevada and the other is on the West side. The teacher asks Rian and a classmate, Charise, to study how Earth's biosphere, atmosphere, geosphere, and hydrosphere interact so they can figure out which park is located on which side.



Rian researches Death Valley, and Charise researches Yosemite.

Rian finds the following information about Death Valley:

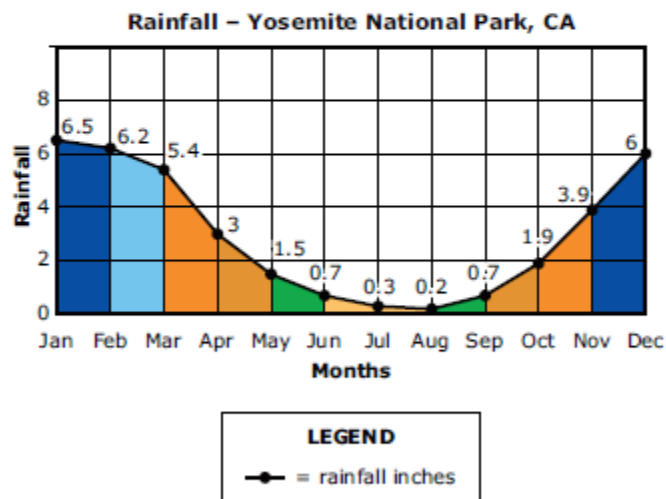
- Climate - hot desert
- Temperature - Highest recorded air temperature was 134°F
- Plant life - saltgrass, cacti, and desert wildflowers
- Animal life - rabbits, kangaroo rats, coyotes, bobcats, lizards



Rain Shadow Effect (continued)

Charise finds the following information about Yosemite:

- Climate - hot, dry summers and warm, wet winters
- Temperature - Highest recorded air temperature was 115°F
- Plant life - wildflowers, giant sequoia trees, hemlock trees, lodgepole pine trees
- Animal life - mule deer, squirrels, black bears, chipmunks



Rian and Charise are surprised at the climate differences between the two parks. Their teacher tells them that the two parks are only 170 miles apart. Rian and Charise wonder how these parks could have such different climates yet be located relatively close to each other in the same state.

1. One factor that affects climate is amount of rainfall.
Which **two** statements about the amount of rainfall at Yosemite and Death Valley are true?
 - A The rainfall in both parks increases in the winter.
 - B The yearly rainfall amount is greater in Yosemite.
 - C Death Valley had more rain in August than Yosemite.
 - D There are more storms in Yosemite than in Death Valley.
 - E Yosemite has more rainfall in the summer than in the winter.

1 point

Standards Alignment for Item 1

Discipline: Earth and Space Science

NGSS Topic: 5.ESS.Earth's Systems

DCI: ESS2.A

Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

SEP4: Analyzing and Interpreting Data**CCC1: Patterns**

Use the information from Rain Shadow Effect on pages 1,2, and 4 to answer **questions 2–3**.

Yosemite National Park's climate is different than that of Death Valley National Park. Charise wonders how the interaction of Earth's spheres affects the climate of each park. Charise wants to investigate to compare how much moisture the plants in each area contribute to the amount of moisture in the air.

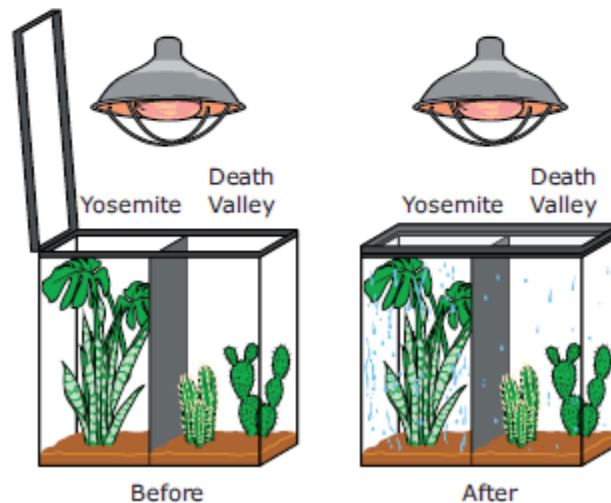
Charise follows these steps to complete her investigation:

Step 1: Divide a 10-gallon fish tank with dark cardboard.

Step 2: Place several plants on the left side of the tank to model the biosphere in Yosemite National Park.

Step 3: Place two cacti on the right side of the tank to model the biosphere in Death Valley National Park.

Step 4: Close the tank, and place a heat lamp above the tank.



2. What do the results of Charise's investigation show?

- (A) There is more water in the atmosphere when there is a decrease in the plants in the biosphere.
- (B) There is more water in the biosphere when there is a decrease in the plants in the biosphere.
- (C) There is more water in the geosphere when there is an increase in plants in the biosphere.
- (D) There is more water in the atmosphere when there is an increase of plants in the biosphere.

1 point

3. **Part A**

What would happen to the amount of water in the atmosphere if Charise reduces the number of plants on the Yosemite side of the tank?

- (A) The amount of water will increase on the Yosemite side of the tank and decrease on the Death Valley side.
- (B) The amount of water will decrease on the Yosemite side of the tank and increase on the Death Valley side.
- (C) The amount of water will decrease on the Yosemite side of the tank and stay the same on the Death Valley side.
- (D) The amount of water will stay the same on the Yosemite side of the tank and decrease on the Death Valley side.

Part B

Charise wonders whether the results of her investigation would have been different had she used different types of plants.

What question should Charise investigate next?

- (A) Will the amount of water that evaporates from each plant depend on the type of plant?
- (B) How will the amount of water that evaporates from the plants change if the amount of heat is increased?
- (C) What will happen to the amount of water that evaporates if there are no plants in the tank?
- (D) Which of the spheres investigated contributes the most to the amount of water in the atmosphere?

1 point for each part

Standards Alignment for Items 2 and 3

Discipline: Earth and Space Science

NGSS Topic: 5.ESS.Earth's Systems

DCI: ESS2.A

Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

SEP3: Planning and Carrying Out Investigations

CCC3: Scale, Proportion, and Quantity