



**PAWS
Science
Grade 8**

**Released Items
With Data**

2014

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Glaciers Study

Students were studying Wyoming glaciers. They wanted to determine if the sizes of the glaciers have changed over time. In order to measure any changes, students looked at photographs of three glaciers in the same mountain range. They found photographs of the glaciers that were taken several years apart. By making careful measurements, they were able to determine the approximate areas of the three glaciers from each photograph. The table shows their data.

Area Results for Three Glaciers

Year of Photograph	Area (km ²)		
	Glacier 1	Glacier 2	Glacier 3
1967	0.26	0.21	0.06
1994	0.21	0.16	0.03
2006	0.21	0.16	0.02
Change in Area (1967–2006)	-19%	-23%	-67%

00 Which statement best explains why glaciers can become a destructive force on Earth's surface?

- A) Glaciers are very thick layers of ice that often last for many years.
- B) Glaciers remove layers of rock and sediment that took years to form.
- C) Glaciers lower the air temperature of a mountain for years at a time.
- D) Glaciers prevent water molecules from moving through the water cycle for years.

Item Information	
Title:	Glaciers Study
Domain:	Earth and Space Systems
Benchmark:	SC8.1.8 The Structure of the Earth System: Students examine the structure of the Earth, identifying layers of the Earth, considering plate movement and its effect, and recognizing landforms resulting from constructive and destructive forces.
Context:	G Earth's Processes and Features
Item Code:	VF407159

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2014	MC	B	2	782	0.442

Score Analysis					
MC	A	B*	C	D	Omit
%Choosing	20.205	44.246	13.811	21.355	0.384

Dif Summary	
Group	Dif Category
Gender	A
Hispanic	A
Native American	
Asian	

Item Notes

00 If glaciers are no longer present on a mountain range, which evidence should scientists use to identify mountains that have been eroded by moving glaciers?

- A) The mountains have broad U-shaped valleys.
- B) The mountains have steep cone-shaped peaks.
- C) The rocks that make up the mountains have frozen.
- D) The plants on the mountains have adapted to living near ice.

Item Information	
Title:	Glaciers Study
Domain:	Earth and Space Systems
Benchmark:	SC8.1.9 The Earth's History: Students systematize the Earth's history in terms of geologic evidence, comparing past and present Earth processes and identifying catastrophic events and fossil evidence.
Context:	G Earth's Processes and Features
Item Code:	VF407160

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2014	MC	A	2	782	0.41

Score Analysis					
MC	A*	B	C	D	Omit
%Choosing	41.049	21.1	15.473	22.123	0.256

Dif Summary	
Group	Dif Category
Gender	A
Hispanic	B-
Native American	
Asian	

Item Notes

00 As the glaciers change over time, the ecosystems near the glaciers will also change. Which statement most likely describes a change in the ecosystems near the three glaciers in this study?

- A) The glaciers provide an increasing amount of energy to producers over time.
- B) Less habitat is available for producers after predator populations increase.
- C) Less energy is available for producers as consumer populations decrease.
- D) The habitat once covered by the glacier is now available for producers.

Item Information	
Title:	Glaciers Study
Domain:	Life Systems
Benchmark:	SC8.1.6 Interrelationships of Populations and Ecosystems: Students illustrate populations of organisms and their interconnection within an ecosystem, identifying relationships among producers, consumers, and decomposers.
Context:	C Interactions and Energy Flow
Item Code:	VF407161

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	D	2	658	0.388

Score Analysis					
MC	A	B	C	D*	Omit
%Choosing	15.35	25.076	20.365	38.754	0.456

Dif Summary	
Group	Dif Category
Gender	A
Hispanic	
Native American	
Asian	

Item Notes

00 Which energy changes can be observed in a glacier that is moving slowly down a mountain?

- A) Kinetic energy changes into radiant energy.
- B) Radiant energy changes into kinetic energy.
- C) Potential energy changes into kinetic energy.
- D) Thermal energy changes into radiant energy.

Item Information	
Title:	Glaciers Study
Domain:	Physical Systems
Benchmark:	SC8.1.13 The Conservation of Matter and Energy: Students identify supporting evidence to explain conservation of matter and energy, indicating that matter or energy cannot be created or destroyed but is transferred from one object to another.
Context:	E Energy Types
Item Code:	VF407164

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	C	2	658	0.421

Score Analysis					
MC	A	B	C*	D	Omit
%Choosing	17.933	17.325	42.097	22.492	0.152

Dif Summary	
Group	Dif Category
Gender	A
Hispanic	
Native American	
Asian	

Item Notes

00 Based on the data in the table, which statement best explains why the three glaciers changed at different rates?

- A) The rate of change in area is averaged over time.
- B) The rate of change in area is related to the initial glacier size.
- C) The rate of change in area is measured using old photographs.
- D) The rate of change in area is controlled by the age of the glacier.

Item Information	
Title:	Glaciers Study
Domain:	Earth and Space Systems
Benchmark:	SC8.1.8 The Structure of the Earth System: Students examine the structure of the Earth, identifying layers of the Earth, considering plate movement and its effect, and recognizing landforms resulting from constructive and destructive forces.
Context:	G Earth's Processes and Features
Item Code:	VF407165

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	B	2	658	0.445

Score Analysis					
MC	A	B*	C	D	Omit
%Choosing	20.213	44.529	11.55	23.556	0.152

Dif Summary	
Group	Dif Category
Gender	A
Hispanic	
Native American	
Asian	

Item Notes

00 Which statement best describes the data collected for the three glaciers over time?

- A) The largest glacier had the greatest increase in area.
- B) The smallest glacier lost the greatest percentage of area.
- C) The glaciers first increased in area before they decreased in area.
- D) The glaciers completely disappeared after the last year of this investigation.

Item Information	
Title:	Glaciers Study
Domain:	Earth and Space Systems
Benchmark:	SC8.1.8 The Structure of the Earth System: Students examine the structure of the Earth, identifying layers of the Earth, considering plate movement and its effect, and recognizing landforms resulting from constructive and destructive forces.
Context:	G Earth's Processes and Features
Item Code:	VF407166

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	B	2	782	0.604

Score Analysis					
MC	A	B*	C	D	Omit
%Choosing	13.043	60.358	19.565	6.777	0.256

Dif Summary	
Group	Dif Category
Gender	A
Hispanic	A
Native American	
Asian	

Item Notes

00 Scientists try to limit the amount of error in their investigations of natural systems. Which of these is the most likely source of error in the glacier investigation?

- A) Calculating the time between each photograph
- B) Studying glaciers from the same mountain range
- C) Determining the year the photographs were taken
- D) Measuring the area of the glaciers from the photographs

Item Information	
Title:	Glaciers Study
Domain:	Earth and Space Systems
Benchmark:	SC8.1.9 The Earth's History: Students systematize the Earth's history in terms of geologic evidence, comparing past and present Earth processes and identifying catastrophic events and fossil evidence.
Context:	G Earth's Processes and Features
Item Code:	VF407167

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	D	2	782	0.569

Score Analysis					
MC	A	B	C	D*	Omit
%Choosing	12.66	17.136	13.043	56.905	0.256

Dif Summary	
Group	Dif Category
Gender	A
Hispanic	A
Native American	
Asian	

Item Notes

00 Why is melting of glacial ice considered a physical change?

- A) The number of atoms in each water molecule changes.
- B) The types of atoms in each water molecule change.
- C) The water molecules react with molecules in the air.
- D) The water molecules experience a change of state.

Item Information	
Title:	Glaciers Study
Domain:	Physical Systems
Benchmark:	SC8.1.11 Physical and Chemical Changes in Matter: Students evaluate chemical and physical changes, recognizing that chemical change forms compounds with different properties and that physical change alters the appearance but not the composition of a substance.
Context:	D Properties and Changes
Item Code:	VF407169

Admin:	Item Type:	Correct Answer:	Item Dok:	Total N-count:	Pvalue/Mean Score:
Spring 2013	MC	D	2	658	0.552

Score Analysis					
MC	A	B	C	D*	Omit
%Choosing	16.413	9.878	18.085	55.167	0.456

Dif Summary	
Group	Dif Category
Gender	A
Hispanic	
Native American	
Asian	

Item Notes

