



Maine  
Department of  
Education

**GRADE**

**5**

Maine Science Assessment  
Released Items (2023)  
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.

Use the information from Waves and Movement to answer questions 1–2.

**Waves and Movement**

After every dance class, Kay and her friends notice that a few of the empty water bottles near the sound speakers have fallen over.

Kay decides to carry out an investigation. She places a line of empty water bottles in a straight row, all the same distance from the sound speakers.



When Kay plays a song for one minute at three different volumes, she observes the bottles to see how many fall over. She then records her results in a table.

<b>Bottles at Three Different Volumes</b>	
<b>Volume</b>	<b>Number of Bottles that Fall Over</b>
loud	7
moderate	6
soft	0

Kay does an additional investigation. She keeps the volume the same but plays a tone instead of a song. She sets up the water bottles the same as she did in her previous investigation and then plays a low-pitched tone through the speaker. She does this multiple times by changing the pitch each time and records her observations.

<b>Bottles at Three Different Pitches</b>	
<b>Pitch</b>	<b>Number of Bottles that Fall Over</b>
high	3
medium	5
low	8

1. Based on the results of **both** investigations, which property of sound can cause an object to move?

1 point

- A pitch only
- B volume only
- C pitch and volume both
- D neither pitch nor volume

**Standards alignment**

Discipline: Physical Science

NGSS Topic: Waves

DCI: PS4.A: Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).

SEP2: Developing and Using Models

CCC2: Cause and Effect

2. Which combination of volume and pitch is the **best** to make the highest number of water bottles fall over? Mark **one** combination of pitch and volume in the chart.

1 point

	<b>Loud Volume</b>	<b>Moderate Volume</b>	<b>Soft Volume</b>	<b>Any Volume</b>
<b>High Pitch</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Medium Pitch</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Low Pitch</b>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Any Pitch</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Standards alignment**

Discipline: Physical Science  
NGSS Topic: Waves

DCI: PS4.A: Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).

SEP2: Developing and Using Models

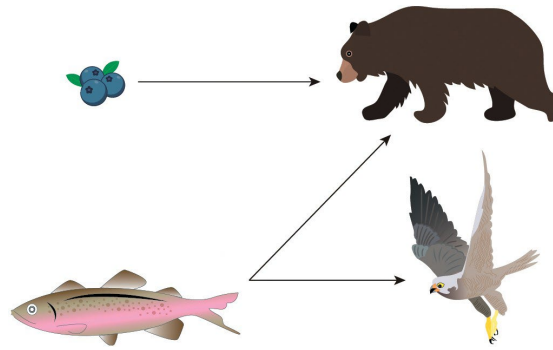
CCC2: Cause and Effect

Use the information from Effects of Building a Dam to answer questions 3–7.

### Effects of Building a Dam

Aaden is managing a large nature preserve. He is studying the relationships between the plants and animals in the area. He wants to understand how a dam in the nature preserve may have affected the population of bears. To better understand the effects of the dam on the bear population, he researches the role bears play in this ecosystem.

#### Food Chain

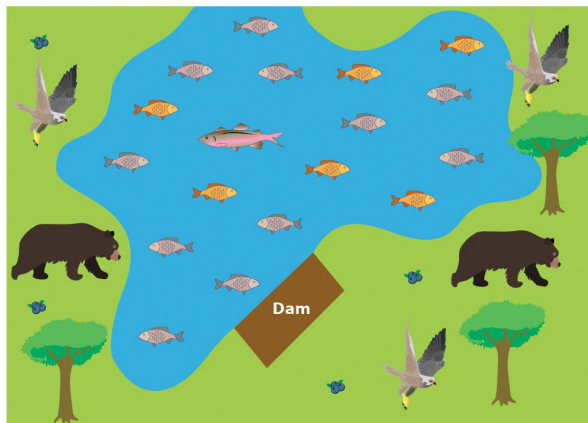


Aaden finds a map of the nature preserve before the dam was built.

#### Map Before the Dam



#### Map After the Dam



3. Which **two** factors are responsible for the change in the number of bears in this nature preserve due to the damming of the creek? Select **two** factors.

1 point for both correct answers

- A less habitat
- B fewer eagles
- C fewer large fish
- D more small fish
- E more blueberries

4. Aaden is studying maps of the area and wonders how building the dam has affected the bear population.

What effects does the dam have on the bear population? Write the letter of **three** observations in the correct place in the chart.

1 point for all correct

Positive Effects	Negative Effects
E	A and B

- A. Bears have less habitat.
- B. Bears have less food to eat.
- C. There are no negatives.
- D. There are no positives.
- E. Bears have less competition.

### **Standards alignment (same for items 2 and 3)**

Discipline: Life Science

NGSS Topic: Matter and Energy in Organisms and Ecosystems

DCI: LS2.A The food of almost any kind can be traced back to plants. Organisms are related in food webs in which some animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

SEP2: Developing and Using Models

CCC2: Cause and Effect

**5.** Aaden wants to figure out whether building the dam was good or bad for the bears.

Was building the dam a positive change for the bear population? Use details from **both** maps to explain your answer.

---

---

---

---

---

---

2 points possible, can earn partial credit  
See scoring rubric on the next page.

**Standards alignment**

Discipline: Life Science

NGSS Topic: Matter and Energy in Organisms and Ecosystems

DCI: LS2.A The food of almost any kind can be traced back to plants. Organisms are related in food webs in which some animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

SEP1: Asking Questions and Defining Problems

CCC2: Cause and Effect

## Scoring rubric for item 5

Points	Qualities of the Student Response
2	<p>The response must indicate an understanding that the dam was a negative change for the bear population. In addition, the response must identify at least one negative consequence - less blueberry bushes, less large fish, or less habitat.</p> <p><b><u>Example Student Response:</u></b></p> <p>It's a negative change because there would be less habitat for the bears.</p>
1	<p>The response demonstrates a partial understanding of the prompt. The response may:</p> <ul style="list-style-type: none"><li>• identify that the result is negative for the bears does not include a negative consequence to support the answer.</li><li>• Provide a negative consequence but does not explicitly identify the dam as negative</li></ul>
0	<p>The response demonstrates minimal understanding of the prompt. The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.</p> <ul style="list-style-type: none"><li>• e.g., Response indicates the dam was a positive change.</li></ul>

6. Aaden wants to consider how he could increase the population of bears in the nature preserve.

Would each solution be likely to increase the bear population? Mark **Yes** or **No** for each solution.

2 points for all 5 correct, 1 point for 3-4 correct

	Yes	No
Plant more blueberry bushes near the lake.	<input type="radio"/>	<input type="radio"/>
Drain the lake and restore the creek.	<input type="radio"/>	<input type="radio"/>
Plant more trees near the lake.	<input type="radio"/>	<input checked="" type="radio"/>
Stock the lake by adding large fish.	<input checked="" type="radio"/>	<input type="radio"/>
Stock the lake by adding small fish.	<input type="radio"/>	<input checked="" type="radio"/>

### **Standards alignment**

Discipline: Life Science

NGSS Topic: Matter and Energy in Organisms and Ecosystems

DCI: LS2.A The food of almost any kind can be traced back to plants. Organisms are related in food webs in which some animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

SEP1: Asking Questions and Defining Problems

CCC: none

7. Another nature preserve in the same area and with similar organisms wants to know how a dam might affect their ecosystem. Select **all** that apply.

1 point for  
all 3  
correct

Which effects might this preserve expect to see in their ecosystem?

- A decrease in large fish population
- B less habitat for organisms that live on land
- C more shelter for the organisms that live on land
- D increase in population of organisms that live on land
- E fewer food resources for many of the organisms that live on land

### **Standards alignment**

Discipline: Life Science

NGSS Topic: Matter and Energy in Organisms and Ecosystems

DCI: LS2.A The food of almost any kind can be traced back to plants. Organisms are related in food webs in which some animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plant parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

SEP3: Planning and Carrying Out Investigations

CCC2: Cause and Effect