Grade 6 Advanced Science EOT3 Example Questions

1.	**THREE-DIMENSIONAL THINKING** On the figure below, think about how you would **model** the process that changes liquid water to water vapor. Draw your model in your Science Notebook. Label the transfer of **energy** that takes place during this process.  How does **energy** from the Sun drive the cycling of **matter**?
2.	**COLLECT EVIDENCE** How else does water enter the atmosphere? Record your evidence (B) in your Science Notebook.
3.	**THREE-DIMENSIONAL THINKING** **Model** the three ways water enters the atmosphere in your Science Notebook. Use arrows and labels to show the transfer of **energy** that drives the cycling of water from Earth's surface to Earth's atmosphere.

4.

THREE-DIMENSIONAL THINKING

Use the figure below to think about how you would **model** the process that changes water vapor to liquid water. Draw your model in your Science Notebook. Label the transfer of **energy** that takes place during this process.

5.

COLLECT EVIDENCE

How do clouds form? Record your evidence (C) in your Science Notebook.

6.

Jorge wanted to model two processes that cycle water in the atmosphere for a class project. He began by filling a self-sealing plastic bag half-full of water. After sealing the bag, he taped it to a sunny window. After a few hours, water beaded along the inside of the bag.

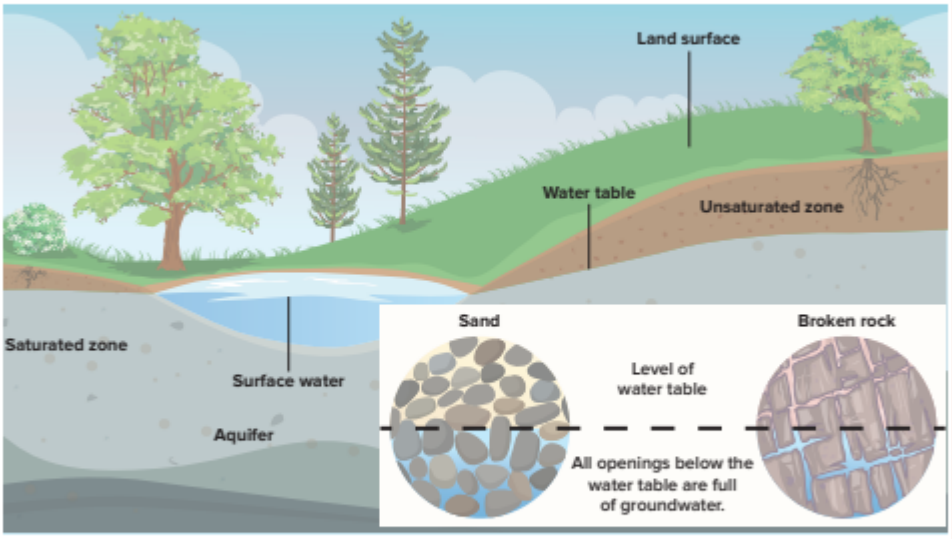
2. Which processes are represented by Jorge's model?

- **A** transpiration and respiration
- **B** condensation and crystallization
- **C** respiration and evaporation
- **D** evaporation and condensation

7.

3. Which statement best describes the transfer of energy in the photo?

- **A** When water changes state from a liquid to a solid, thermal energy is absorbed.
- **B** When water changes state from a solid to a liquid, thermal energy is absorbed.
- **C** When water changes state from a liquid to a solid, thermal energy is released.
- **D** When water changes state from a solid to a liquid, thermal energy is released.

8.	**COLLECT EVIDENCE** Why does water on Earth's surface flow and where does it go? Record your evidence (B) in your Science Notebook.
9.	**THREE-DIMENSIONAL THINKING** 1. In your Science Notebook, draw a model that shows groundwater, surface water, and the water table. Use the figure below as an example. Use arrows to show which way water might flow.  2. Read the first paragraph on the following page and revise your arrows as needed. 3. What force causes groundwater to flow?
10.	**COLLECT EVIDENCE** How does water become groundwater and where else is water stored? Record your evidence (C) in your Science Notebook.
11.	3. Which pathway of processes would explain how a water molecule from the stream could end up in an ice sheet? **A** evaporation, transpiration, condensation, crystallization **B** evaporation, crystallization, precipitation, condensation **C** evaporation, respiration, crystallization, transpiration **D** evaporation, condensation, crystallization, precipitation

12.	**THREE-DIMENSIONAL THINKING** Models can be used to represent **systems** and their interactions. How did this demonstration **model** energy transfer between the Sun and Earth? Support your reasoning by describing a real-life example in your Science Notebook.
13.	**COLLECT EVIDENCE** What role did conduction play in warming the water in the containers in the opening activity? Record your evidence (D) in your Science Notebook.
14.	**THREE-DIMENSIONAL THINKING** For Earth to radiate thermal energy, it must first absorb thermal energy. However, some natural surfaces on Earth and in the atmosphere are more reflective than absorbent. Examine the photo below.  Use the photo to describe areas of high and low albedo. **Explain** your reasoning in your Science Notebook.

15.

Natia set up an investigation to model heat absorption and release for soil and water. She began by filling one container with water and one container with soil. She measured the initial temperature of the water and the soil. She then exposed both the water and the soil to a heat lamp for 2 minutes. After the time was up, she turned off the light and measured the temperature of both the water and the soil. Her results are indicated in the table below.

Surface Type	Temperature Before	Temperature After
Soil	25°C	27°C
Water	24°C	32°C

2. Are Natia's results valid?

A No. Soil absorbs heat faster than water and therefore the temperature of the soil after exposure to the light should be higher than the water.

B No. The temperature of the soil and water should be the same after exposure to the light.

C Yes. Water absorbs heat faster than soil and therefore her temperature readings are accurate after exposure to the light.

D Yes. Molecules in water are more compact and therefore retain heat better than soil.

16.

4. Explain How can the Sun continue to heat the atmosphere at night?

17.

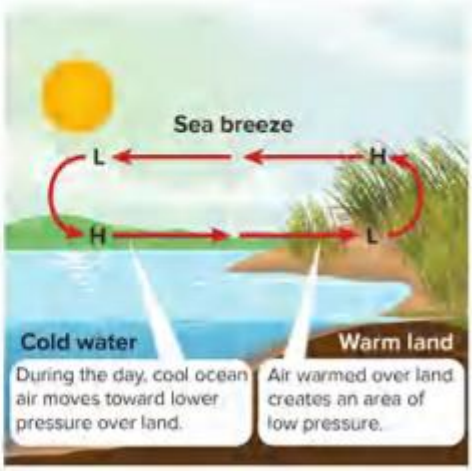
INVESTIGATION

It's a Breeze

GO ONLINE to watch the animation *Sea Breezes and Land Breezes*.

1. Using what you learned in the animation, model the formation of a land breeze in your Science Notebook.

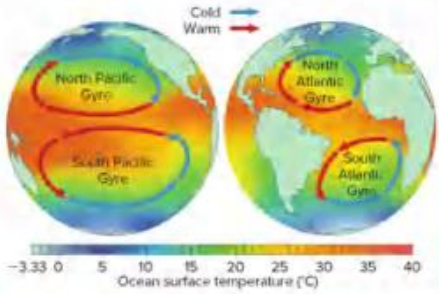
2. Predict whether a sea breeze could occur at night. Explain.



18.

COLLECT EVIDENCE

What causes wind to blow? Record your evidence (A) in your Science Notebook.

19.	**COLLECT EVIDENCE** Why do ocean waters flow? Record your evidence (C) in your Science Notebook.
20.	**INVESTIGATION** **The Great Ocean Conveyor Belt** **GO ONLINE** to watch the animation *Great Ocean Conveyor Belt*, and then answer the question in your Science Notebook. What is the Great Ocean Conveyor Belt and what does it affect?
21.	**THREE-DIMENSIONAL THINKING** **Analyze** the map of gyres. Then answer the questions in your Science Notebook. 1. In what direction do gyres flow in the Northern Hemisphere? What about in the Southern Hemisphere? Why do you think this **pattern** occurs? 2. Why are the major warm water currents on the western boundaries of oceans and the major cold water currents on the eastern boundaries of oceans? What explains this **pattern**? 3. What **energy** ultimately drives convection in the oceans? 

22.

INVESTIGATION

Pressure Changes

1. Observe the temperature and pressure of two locations.

2. Based on the distribution of molecules, describe whether you think air in a high-pressure system rises or sinks. Explain your reasoning in your Science Notebook.

3. Think back to earlier lessons. Explain why the temperature on land is higher than the temperature over water.

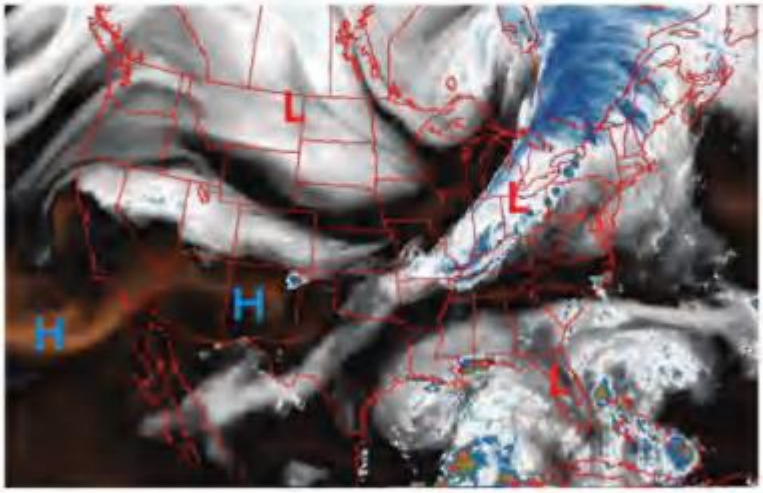
23.

INVESTIGATION

Highs and Lows

The image below shows the amount of water vapor in the atmosphere. Bright and colored areas indicate areas of high moisture content. Black and brown areas indicate little or no moisture present.

1. Locate the areas of high pressure (H) and low pressure (L) on the map.



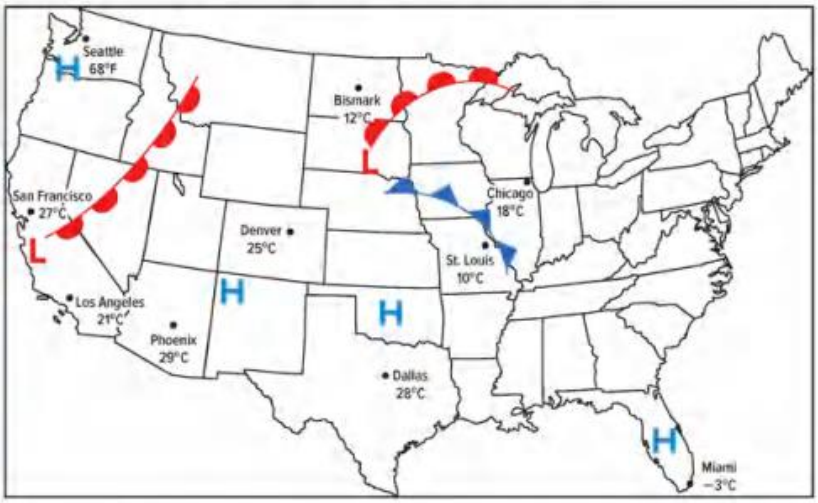
2. In your Science Notebook, describe what weather patterns you observe with each type of pressure system.
3. Infer why the weather patterns you observed are associated with each type of pressure system.

24.

INVESTIGATION

Come Rain or Shine

Examine the map and answer the questions in your Science Notebook.

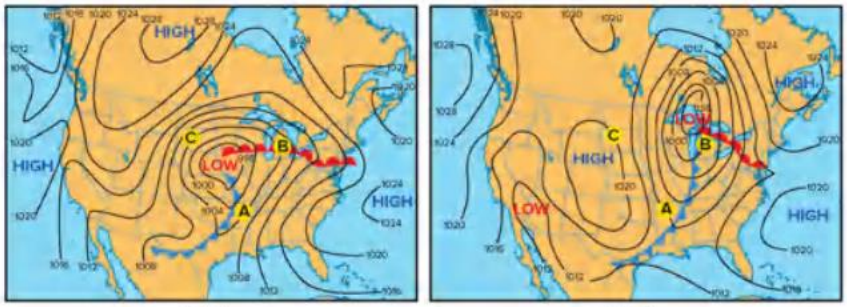


1. Which cities are experiencing clear, dry conditions? Explain why these conditions are occurring.

25.

Summarize It!

Examine the weather maps below.



1. For each location, A, B, and C, describe how the weather changed over the two days.

26.

4. How will the weather change in an area if a cold air mass meets a warm air mass?

   A The humidity will rise.

   B Temperatures will suddenly drop.

   C Air pressure will increase.

   D Winds will shift to the south.

27.

THREE-DIMENSIONAL THINKING
What is the relationship between weather patterns and climate? Write your answer in your Science Notebook.

28.

COLLECT EVIDENCE
How do mountains affect climate? Record your evidence (B) in your Science Notebook.

29.

COLLECT EVIDENCE
How do oceans and other large bodies of water influence climate? Record your evidence (C) in your Science Notebook.

30.

One of the major currents in Pacific Ocean is the California Current. The California Current and its direction of flow are shown on this map.

2. Which weather and climate conditions are most likely to occur in the land areas near the California Current as compared to the land areas near the Gulf Stream?

   A cooler with more frequent rains

   B cooler and relatively dry

   C warmer with more frequent rains

   D warmer and relatively dry

31.

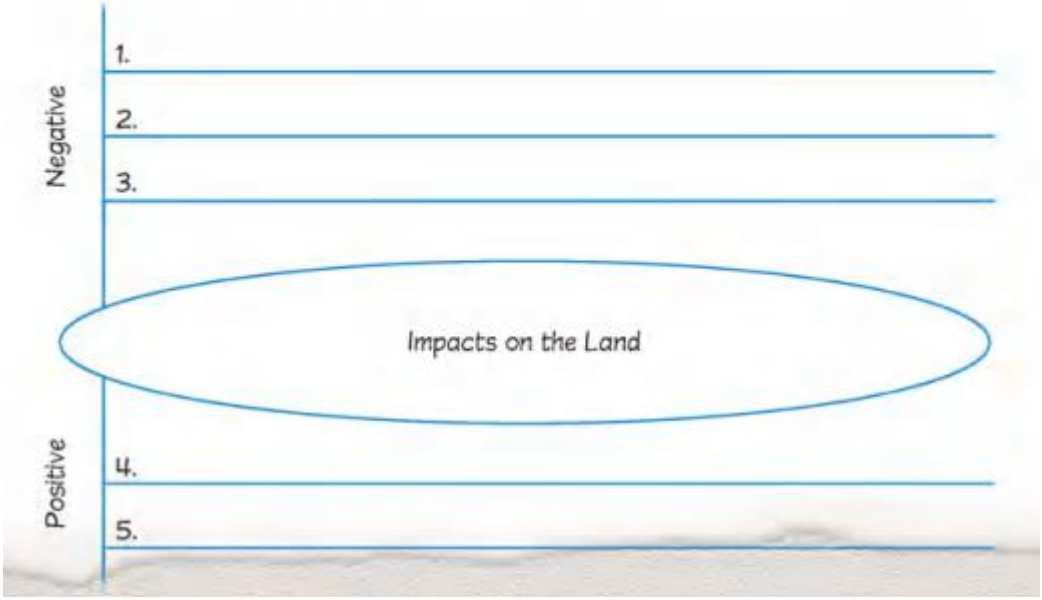
THREE-DIMENSIONAL THINKING
Summarize your understanding of the cause-and-effect relationships between human activities and the environmental impacts on land in your Science Notebook.

Type	Causes	Effects
Deforestation		
Agriculture		
Urbanization		
Waste Disposal		

32.

Summarize It!

1. Create a graphic organizer like the one shown below in your Science Notebook. Use it to **record** some of the negative and positive impacts that humans have on the land.



33.

Study the nitrogen cycle shown in the figure below. Nitrogen is an element that cycles naturally through ecosystems. Living things use nitrogen to make proteins. When these living things die and decompose or produce waste, they release nitrogen into the soil or the atmosphere. Scientists estimate that human activities have doubled the amount of nitrogen cycling through ecosystems.

2. How does the use of fertilizers affect the environment?

- **A** Fertilizers decrease the amount of nitrogen in the environment. A decrease in nitrogen can cause an increase in lightning and storms.
- **B** Fertilizers increase the amount of nitrogen in the environment. Excess nitrogen can pollute groundwater and surface water.
- **C** Fertilizers decrease the amount of nitrogen in the environment. This affects the rate at which plants and animals decompose.
- **D** Fertilizers increase the amount of nitrogen in the environment. An increase in nitrogen disrupts plant processes.

34.

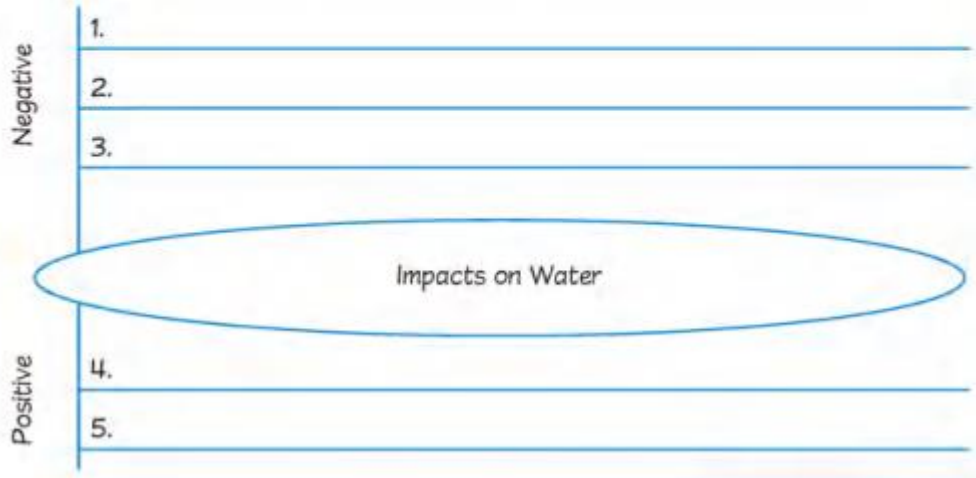
COLLECT EVIDENCE

What are the causes and effects of water pollution? Record your evidence (B) in your Science Notebook.

35.

COLLECT EVIDENCE

What are ways in which we can monitor or minimize human impact on Earth's water? Record your evidence (C) in your Science Notebook.

36.	**Summarize It!** 1. In your Science Notebook, create a graphic organizer like the one shown below. Use it to **record** some of the negative and positive impacts that humans have on Earth's water. 
37.	How do latitude and altitude affect the climate?
38.	Which part of Earth receives the most solar energy from the sun?
39.	Draw a model of the water cycle.
40.	What is an airborne pollutant source?
41.	Give three examples of ocean pollution sources.