
International STEM Tinkering Olympiad
Sample Paper
ISTO Junior

1. A group of students observe some sea stars (also known as starfish) while on a field trip. A sea star is shown in the picture below.

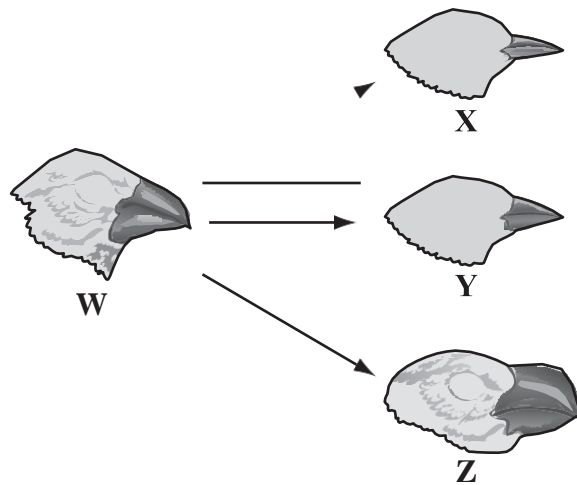


Most of the sea stars have five arms, but two of the sea stars each have an arm that is much shorter than their other arms. A biologist tells the students that the shorter arms were once missing because they were probably eaten by a fish or a crab, but the arms have started to grow back.

Which of the following **best** describes how sea stars are able to regrow their arms?

- A. Sea stars know how to regrow their arms.
- B. Sea stars have the ability to regrow their arms.
- C. Sea stars eat food that causes their arms to regrow.
- D. Sea stars move to warmer water that causes their arms to regrow.

2. The diagram below shows four types of finches labeled W, X, Y, and Z.



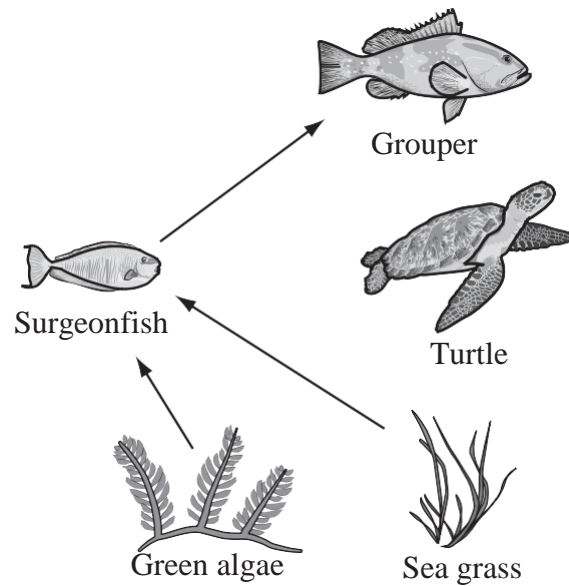
The type of finch labeled W adapted different traits over a long period of time that resulted in the three different types of finches labeled X, Y, and Z. What is the **most likely** reason the finches labeled X, Y, and Z adapted different traits from the finch labeled W?

- A. to look like other birds
- B. to change their environments
- C. to copy behaviors of other similar birds
- D. to help them survive in their environments

3. The chart below lists some organisms found in an ocean ecosystem.

Producer	Herbivore	Carnivore
green algae sea grass	surgeonfish turtle	grouper

A student made the food web below, but some arrows are missing.

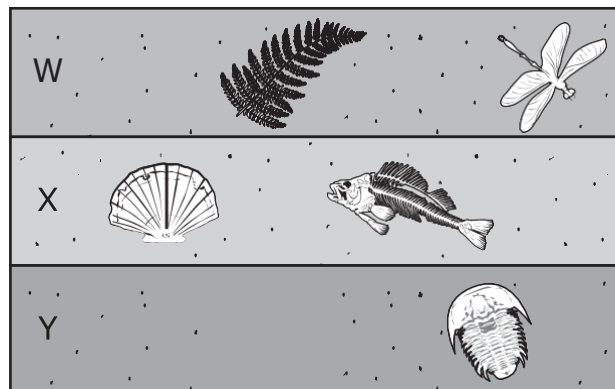


Why should the student add arrows from the green algae and the sea grass to the turtle?

- A. to show that turtles are sometimes eaten by carnivores
- B. to show that turtles can produce food from sunlight and water
- C. to show how turtles get energy and materials for growth from producers
- D. to show how turtles protect producers from being eaten by other herbivores

Answer the Question 4 and 5 from the information given below.

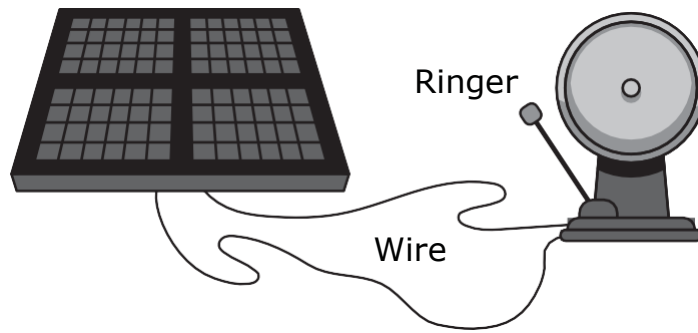
A scientist finds the fossils shown in the rock layers in this diagram.



4. The fossils in which rock layer are the oldest?
- A. Layer W, because the fossils are in the top layer
 - B. Layer X, because the fossils were formed from ocean organisms
 - C. Layer Y, because the fossils are in the bottom layer
 - D. All the layers are of the same age.
5. Which of the following **best** explains why scientists study fossils?
- A. to learn about rocks that formed many years ago
 - B. to learn about different types of very old minerals
 - C. to learn about extinct organisms that lived long ago
 - D. to learn about ancient technologies humans once used
6. A group of students used wire to connect a solar panel to a bell, as shown in the diagram. When sunlight shines on the solar panel, electricity flows through the wire. The electricity causes the ringer to hit the bell and a sound is made.

Solar panel

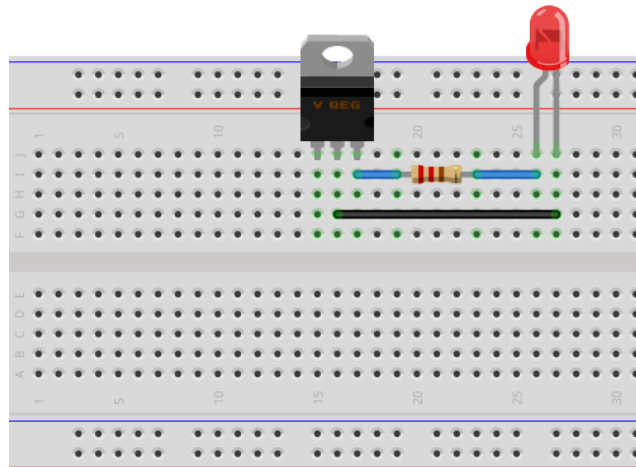
Bell



In the above setup, which type of energy is converted to another type?

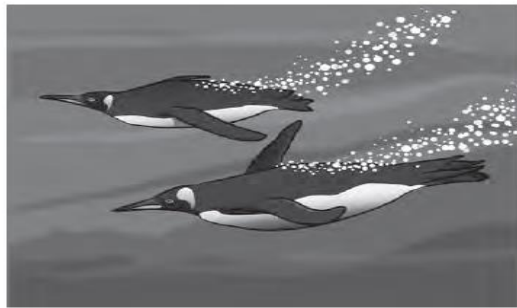
- A. Light energy to Electrical Energy
- B. Electrical Energy to Sound Energy
- C. Heat Energy to Sound Energy
- D. None of the above

7. In the breadboard circuit shown below of LED glowing, which of the following describe the circuit most appropriately?



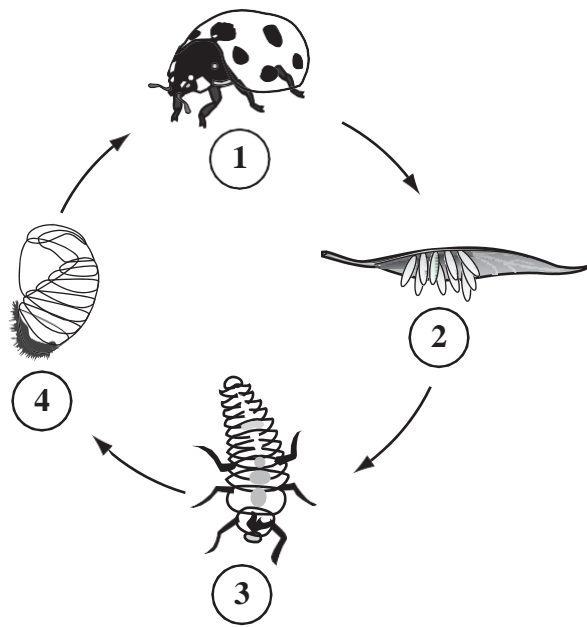
- A. The LED will glow because battery is **NOT** present in the circuit.
- B. The LED will **NOT** glow because battery is **NOT** present in the circuit.
- C. The LED will glow with low brightness **NOT** because battery is NOT present in the circuit.
- D. The LED will fuse because battery is **NOT** present in the circuit.

8. Which of the following **best** describes how most soil forms?
- A. through the growth of trees in a forest
 - B. through the buildup of snow on an iceberg
 - C. through the weathering of rock by wind and water
 - D. through the cooling of lava from a volcanic eruption
9. Emperor penguins are specialized birds that eat fish. Emperor penguins have developed many special characteristics that help them survive in the ocean environment. The picture below shows two emperor penguins swimming in the ocean.



Which of the following characteristics **most** helps the emperor penguins survive in an ocean environment?

- A. having very little sense of smell
 - B. having a very weak sense of taste
 - C. having large feathers that absorb water
 - D. having small wings that move like flippers
10. The diagram below shows four numbered stages in the life cycle of a ladybug.



Which of the following processes must occur between stage 3 and stage 4 of the life cycle?

- A. birth
- B. death
- C. development
- D. reproduction