Name _____ Date _____

# Adaptations: Beak Shape and Food Type

**Directions:** Read the passage and study the table of model-beak results before answering.

### Beaks as Tools

Eating soup with tweezers would leave you hungry long after the bowl went cold. A beak works a lot like a built-in tool, and each beak shape handles some foods better than others. A northern cardinal has a short, thick beak that cracks open hard seeds. An American robin has a slender, pointed beak that it uses to probe the soil and pull out earthworms. A mallard duck has a wide, flat bill that strains bits of plants and small animals from water.

A trait that helps an organism survive and reproduce in its environment is called an adaptation. Beak shapes vary a little from bird to bird, partly because of alleles passed down from parents. Wear or damage that happens to one bird's beak during its life is not passed on to its chicks. When food is scarce, birds whose beaks fit the available food tend to get more of it, so they are more likely to survive and raise young. Over many generations, the beak shapes that fit the food tend to become more common in the population.

To model this idea, a class used three tools as beaks: tweezers, which are long and thin; a plastic spoon, which is wide and shallow; and small pliers, which are short and strong. Each tool was tested at three food stations. At the worm station, pieces of rubber band stood in for worms and were buried in a tub of dry beans. At the floating-cereal station, cereal rings floated in a pan of water. At the seed station, sunflower seeds had to be cracked open. For each tool, a student had 30 seconds per trial to collect food, and the class ran three trials at every station. The class used the same students, timer, containers, water and amounts of food for every tool.

Total food each tool collected in three 30-second trials at each station

| Tool | Worm station: rubber-band worms pulled out | Floating-cereal station: cereal rings scooped up | Seed station: sunflower seeds cracked open |
|---|---|---|---|
| Tweezers | 36 | 15 | 3 |
| Spoon | 6 | 54 | 0 |
| Small pliers | 12 | 9 | 27 |

**1.** At the floating-cereal station, what did the class change on purpose from one set of trials to the next?

A. The number of cereal rings collected
B. The amount of water in the pan
C. The tool used as a beak
D. The length of each trial

**2.** What was the spoon's mean number of cereal rings per trial at the floating-cereal station?

_____ rings

3. Among the three tools tested, which evidence best supports the idea that the spoon works best for picking up food floating on water?
   A. The tweezers pulled out 36 worms, the most at the worm station.
   B. The spoon pulled out 6 worms, the fewest of the three tools.
   C. The spoon cracked 0 seeds, fewer than either other tool.
   D. The spoon scooped up 54 cereal rings, compared with 15 for the tweezers and 9 for the pliers.

4. Of the three tools tested, which one's results best match the job the passage gives a northern cardinal's beak?
   A. The tweezers, which cracked more seeds than the spoon did
   B. The spoon, which scooped up the most cereal rings
   C. The small pliers, which cracked the most sunflower seeds
   D. The tweezers, which pulled out the most rubber-band worms

5. Which conclusion fits the model-beak totals?
   A. In this model, the tool that did best with worms also did best with seeds.
   B. In this model, the tweezers had the highest total at every station.
   C. In this model, the tools changed their shapes to match each food.
   D. In this model, each of the three tools had the highest total at a different station.

6. According to the passage, how does a bird population come to have beaks that fit its food?
   A. Parent birds pass on to their chicks the beak changes caused by years of eating hard foods.
   B. Every bird in a population hatches with exactly the same beak, already the best shape for the food.
   C. Birds whose beaks fit the food tend to survive and raise more young, so over many generations those beak shapes become more common.
   D. Birds that eat a lot of one food make new alleles for the beak shape that fits it.

7. Look only at the floating-cereal and seed stations. Among the three tools tested, which had the lowest combined total at those two stations?
   A. The spoon
   B. All three tools had the same combined total
   C. The small pliers
   D. The tweezers

8. On an island, earthworms die out, leaving only hard seeds and food floating on ponds, and there is not enough food for every bird. Beak shape varies among the island's birds and is partly inherited. What would most likely happen to the population's beaks over many generations?
   A. Birds with long, thin beaks would pass thicker beaks to their chicks after years of cracking seeds.
   B. Long, thin beaks would likely become less common in the population.
   C. Beak shapes would stay exactly the same, because beak shape is inherited.
   D. Long, thin beaks would become more common, because those birds would search harder for worms.

9. What is one limit of using tools as models of beaks?
   A. The tools collected different amounts of food, so the model has no limits.
   B. The class kept the timer and amounts of food the same, which made the comparison unfair.
   C. Tools only stand in for beaks, so real birds feeding in nature could get different results.
   D. The model proves that every bird in nature eats only one kind of food.