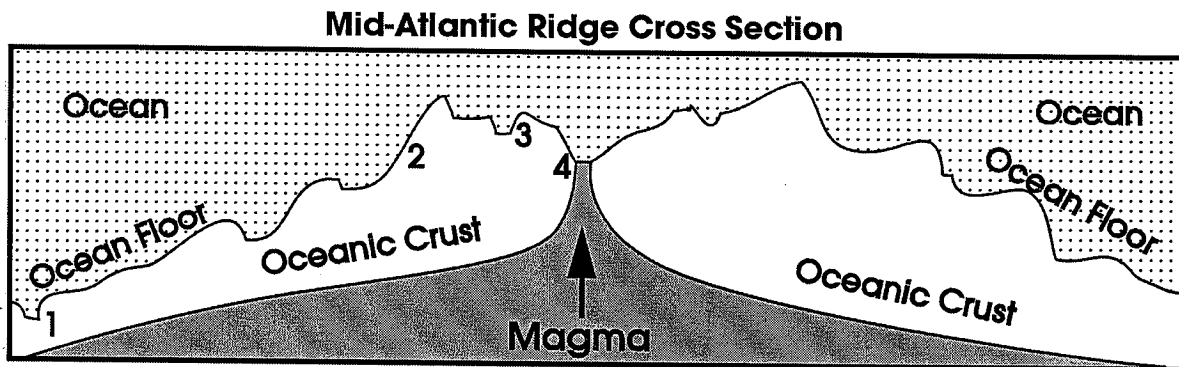


## Blizzard Bag #1 - Biology Assignment

Please read and answer the following OGT practice test on the answer document that follows. This assignment will be due two weeks from the date assigned. The only sheet that needs printed out is the answer document to be turned in.

1. The following diagram shows a cross-section of the mid-Atlantic Ridge.



Which area is likely the oldest crust?

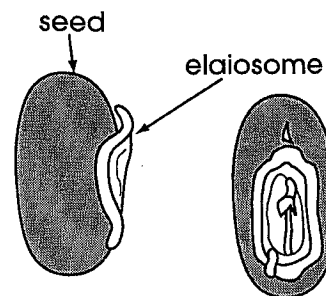
- A. 1
- B. 2
- C. 3
- D. 4

Use the following information to answer questions 2 - 4.

### Ants and Seed Dispersal

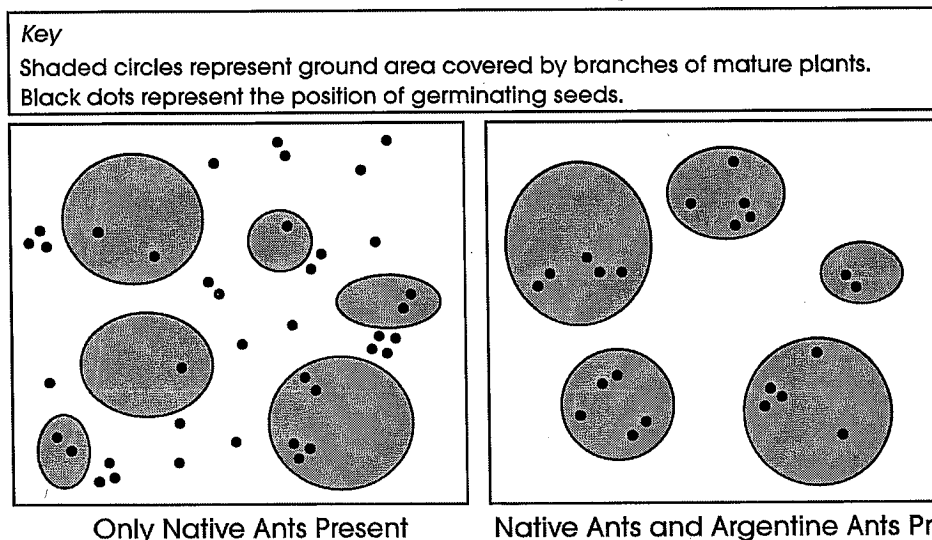
Many species of plants in the family Proteaceae produce seeds with fleshy structures called "elaiosomes." Elaiosomes are protein-rich "food patches" that are attractive to ants.

In the Cape region of South Africa, native ants carry the Proteaceae seeds back to their nests where they eat the elaiosomes and discard the seeds in underground chambers. A species of Proteaceae seeds, *Mimetes cucullatus* (*M. cucullatus*), will successfully germinate after being placed underground by the native ants.



An ant native to Argentina was accidentally introduced to the Cape's shrub lands and displaced many of the native ants. The non-native ant also feeds on elaiosomes. However, they discard the seeds on the surface. This allows the seeds to be eaten by rodents or destroyed by brush fires. The effects on the dispersal of the Proteaceae *M. cucullatus* in a typical situation are shown in the diagram below.

#### *Mimetes Cucullatus* Seedling Distribution



2. The relationship between the Argentine ants and the native ants is described as

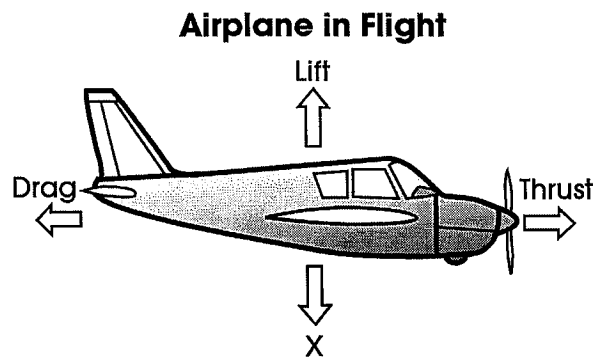
- A. competitive.
- B. parasitic.
- C. commensal.
- D. saprophytic.

3. The relationship between the Proteaceae plants and the native ants is described as

- A. parasitic.
- B. commensal.
- C. predatory.
- D. mutualistic.

4. According to the data, introduction of the Argentine ant has affected *M. cucullatus* by
- A. increasing seedling survival.
  - B. increasing germination rates.
  - C. decreasing seed survival.
  - D. decreasing seed consumption.

5. The picture below shows the four major forces acting on an airplane in flight.



What causes the force indicated by the X?

- A. gravity
  - B. air friction
  - C. magnetic force
  - D. force exerted by the engine
6. Which property of a star can be determined most directly from its color?
- A. mass
  - B. diameter
  - C. precise age
  - D. surface temperature

Use the information to answer questions 7 - 10.

## Cataracts

In 2004, wildlife rescuers found a great horned owl nearly dead from starvation. The owl's eyes had formed cataracts, which cloud the natural lens and inhibit the eye's ability to focus and form clear images. Cataracts can be inherited or acquired as a result of aging, disease and/or use of certain medications. Without clear vision, the owl, named Minerva, had been unable to hunt.

Minerva was taken to the Veterinary School at the University of Wisconsin, Madison, after a local veterinarian confirmed the presence of cataracts. A pair of lenses specifically made for owls was implanted in Minerva's eyes. After the surgery and a recovery period, Minerva was moved to a large, enclosed area where small rodents were released and her ability to hunt was to be evaluated. Scientists confirmed that, if she showed a clear ability to hunt, she would be released back into her natural habitat.

7. Provide two reasons why the researchers' actions in rescuing and operating on Minerva either were or were not ethical. Respond in the space provided in your **Answer Document**. (2 points)

8. Owls are nocturnal hunters and depend on their acute vision for survival. If Minerva's cataracts are determined to be inherited and she is released back into her natural habitat, she could pass the allele for cataracts on to her offspring.

What process would most likely act against any offspring with an allele for cataracts?

- A. immigration
- B. genetic drift
- C. natural selection
- D. adaptive radiation

9. The mutation for cataracts (c) occurs on a gene represented by the letter E. Owls that are homozygous for the mutation ( $E^cE^c$ ) exhibit cataracts. Owls that are homozygous for normal eyes are EE and owls that are carriers of the mutation but do not exhibit cataracts are  $EE^c$ .

What percentage of the offspring in a cross between parents with the genotypes EE and  $E^cE^c$  will exhibit cataracts?

- A. 0%
- B. 25%
- C. 50%
- D. 75%

10. All cataracts were originally thought to be acquired; however, recent research indicates that some cataracts are genetic in nature.

What type of study would be most likely to lend support to the claim that cataracts can be inherited?

- A. analysis of cataract thickness in several species
- B. studying age-related onset of cataracts within a species
- C. linkage studies on DNA from families with a history of cataracts
- D. comparing characteristics of cataracts caused by specific diseases

Use the information to answer questions 11 - 14.

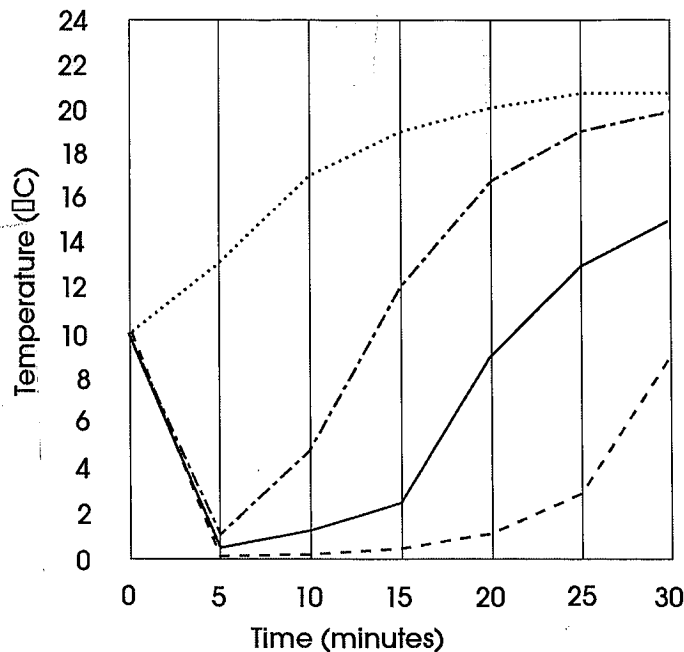
### Water Temperature Experiment

Students studied the effect of ice on the temperature of a sample of water. First, they put 500 mL of cold water (at 10°C) into each of four beakers. Next, they measured and recorded the initial temperature of the water in each beaker. Then, they added various amounts of ice as shown in the table below. They continued to measure the temperature over a period of 30 minutes. Their results are shown in the graph below. The temperature of the room during the experiment was 22°C.

**Data Table**

Beaker	Amount of Ice (in scoops)	Volume of Water (in milliliters)
A	0	500
B	1	500
C	2	500
D	3	500

## Results of Experiment



### KEY

Beaker A	.....
Beaker B	-----
Beaker C	—————
Beaker D	- . - . - .

11. Which was the dependent (responding) variable in this experiment?
- the temperature of the water
  - the amount of ice added to each beaker
  - the initial amount of water in each beaker
  - the amount of time during which observations took place

13. After reviewing these results, Archie suggested, "The more ice you add to a drink, the colder the drink will become." Using data collected in the experiment, write an explanation to Archie for why his conclusion is incorrect and what effect additional ice will have on the temperature of his drink. Respond in the space provided in your **Answer Document**. (2 points)

12. During the first five minutes of the experiment,
- the total energy of the system decreased by half.
  - kinetic energy is transferred from the ice to the water.
  - thermal energy is transferred from the water to the ice.
  - thermal energy is transferred from the water to the surrounding air.

14. Which was the independent (manipulated) variable in this experiment?
- the amount of water in each beaker
  - the amount of ice added to each beaker
  - the initial temperature of the water in each beaker
  - the amount of time during which observations took place

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Mod: \_\_\_\_\_

Blizzard Bag #1: OGT Review

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