

GED Science Day 4



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Essential Questions

Why do organisms evolve?

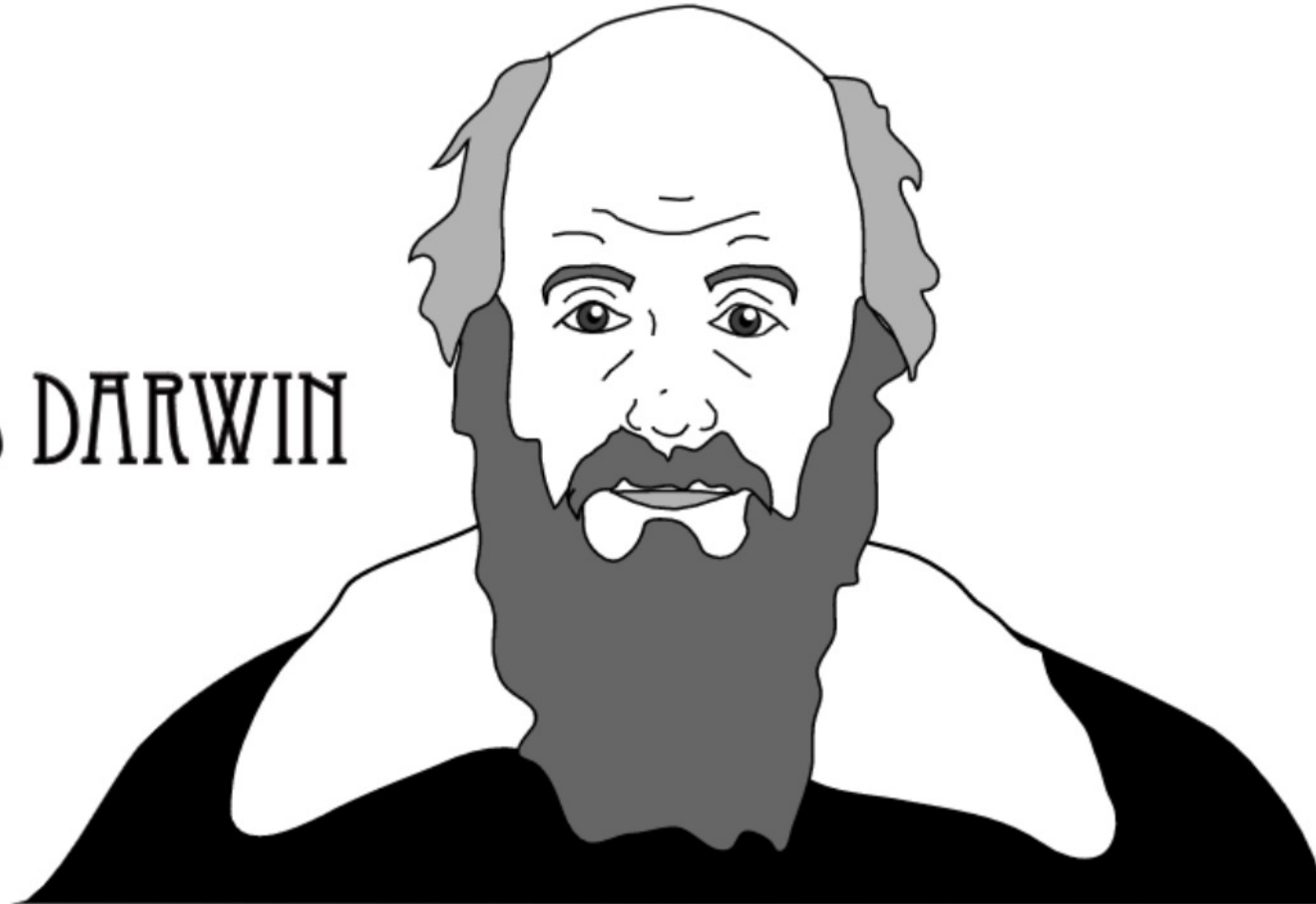
What evidence is there to support the **theory of evolution**?

What role does the environment play in an organism's survival and reproduction?

How do species change over time?

Darwin and Evolution

CHARLES DARWIN



Charles Darwin

Charles Darwin was born in Shrewsbury, England, in 1809. From the time he was a young child, Charles liked collecting plants and catching animals. His father, Robert Darwin, was a doctor, and he wanted his son to follow in his footsteps. Charles, however, found the study of medicine boring and surgery stressful. He neglected his university classes, but studied natural history, the study of the development of plants and animals, on his own. Though he did well in school, Darwin spent most of his college years hunting and carrying on his own studies outside of the classroom.

After graduation, Darwin was given the chance to use his expertise. Captain Robert FitzRoy invited Darwin to sail with him on his ship, the HMS Beagle, and help him map the coast of South America and make a study of the natural history of the area. Darwin joined him on his voyage and filled his notebooks with sketches and observations. He collected specimens, samples of plants and animals for scientific study, as they went along.

The expedition included a trip to a group of islands called the Galapagos. Darwin noticed that each of the Galapagos islands had its own varieties of birds and animals. This finding led him to develop his theory of natural selection, which he wrote about in his book, *On the Origin of the Species*. In natural selection, the fittest organisms, or life forms, survive long enough to reproduce. Though Darwin was not the first one to use it, the phrase “survival of the fittest” is another way we refer to natural selection. The theory was the beginning of the modern understanding of evolution, the development of species over time.

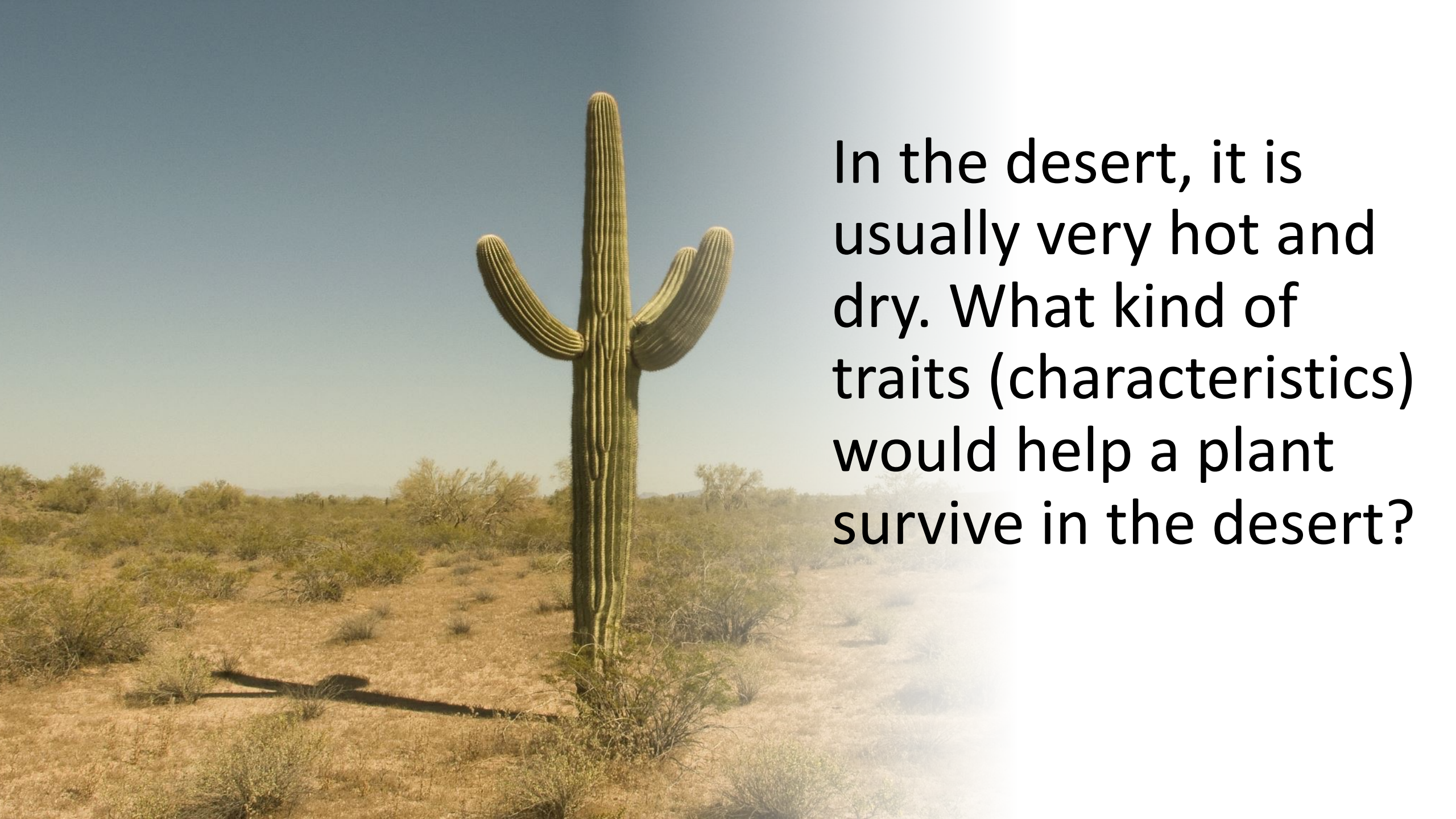
VOCABULARY

Look at the text and define these key concepts:

Natural history _____

Specimen _____

Natural Selection _____

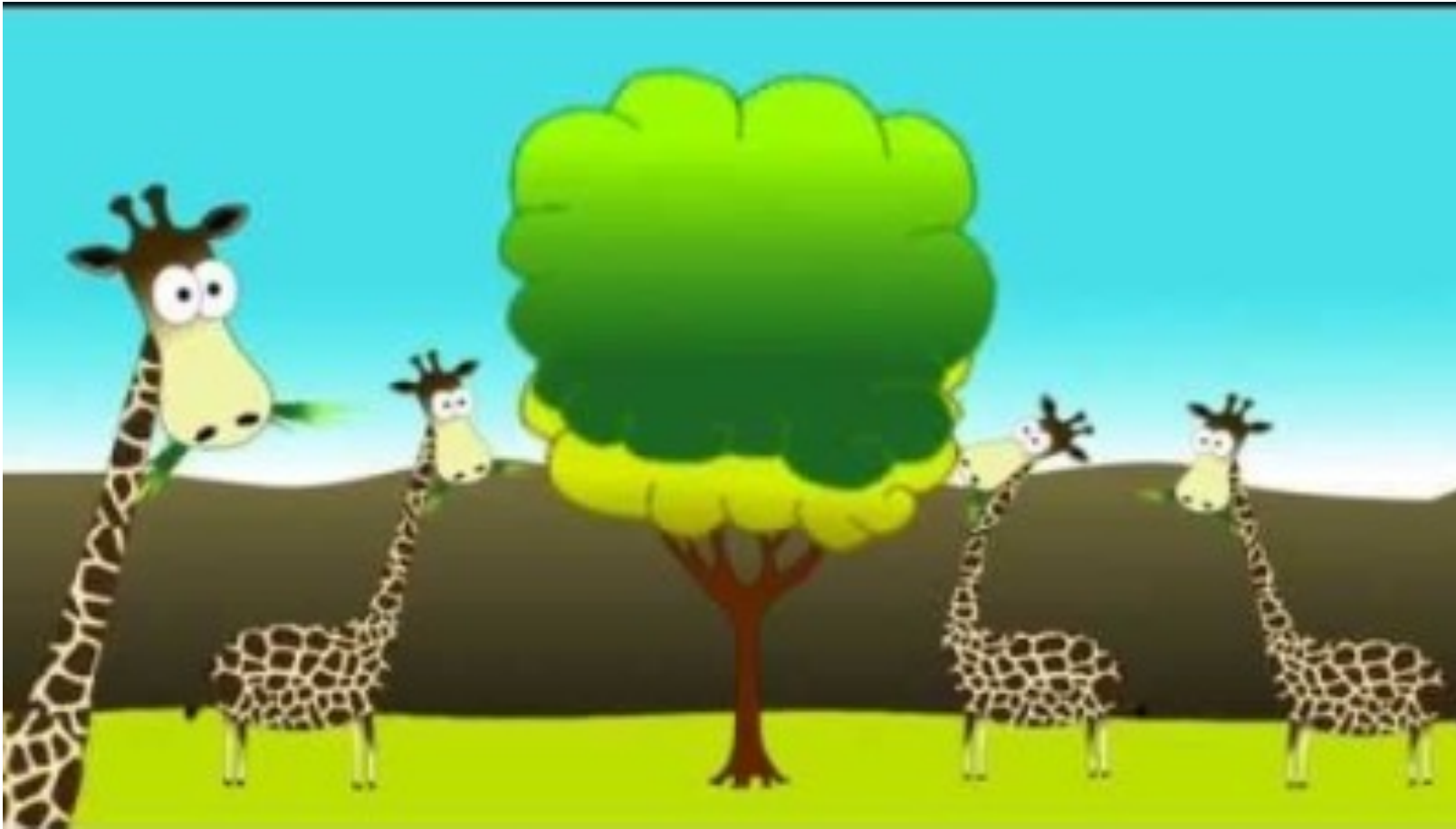


In the desert, it is usually very hot and dry. What kind of traits (characteristics) would help a plant survive in the desert?



Imagine an island with many different herbivores (plant-eaters), but no carnivores (meat-eaters). If a population of wolves suddenly appear on the island, which traits will most likely be favored by natural selection in herbivores? (Which traits will make it easier for the herbivores to survive the wolves?)

Video: Natural Selection



<https://www.youtube.com/watch?v=vnktXHBvE8s>

Making and Identifying Inferences

What is an
inference?



Make and Identify Inferences



An **inference** is a logical guess based on facts, evidence, experience, observation, or reasoning.



You **make inferences** by thinking critically about the details of material being presented to understand any implied meanings.



It is important to not only make your own inferences but also to **identify inferences** being made in scientific materials.



Scientists use facts, evidence, experience, observation, or reasoning to make inferences about natural objects, events, and processes.

Inference Practice: Where Am I?

Read each passage below. Write where you think the passage is happening and explain your answer.

1. As I walked in the door, I was amazed at the beautiful colors and smells. I knew it would be hard to decide what I would buy with my \$3. The chocolate truffles looked delicious, but they were expensive. The jelly beans were not only cheaper, but so colorful! With so much to choose from, I knew I would be here a long time.

2. The water felt so good on such a hot day. I heard the other children laughing and yelling across the way. The concrete was wet from a group of teenagers splashing each other in the corner. The lifeguard watched closely to keep children from running.

What Happens Next?

For each scene below, write what you think will most likely happen next.

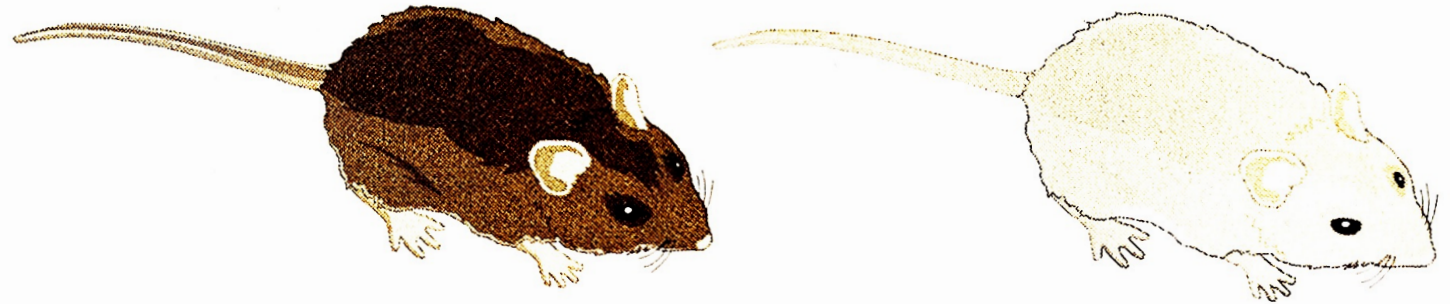
1 It had been a beautiful sunny day. Now George saw the clouds begin to roll in. The gentle breeze of the day started blowing steadily. In the distance the blue sky was now a dark, angry purple. Far away, but coming closer, George saw something that scared him. He ran to the house to tell his mother that they needed to get into the storm cellar right away.

NATURAL SELECTION

a Skills such as comparing and contrasting and identifying cause and effect can help you make inferences. If a helpful trait occurs more often in a population, what might happen to a harmful trait?

b People often make incorrect inferences. To make accurate inferences, avoid over-generalizing.

Individuals within a species have differing traits. In any environment, certain traits are advantageous, whereas others are neutral or detrimental. Individuals having advantageous traits are better able to survive and, therefore, more likely to reproduce. Likewise, individuals having detrimental traits do not survive to reproduce. An advantageous trait that is heritable, or able to be inherited, is passed on to future generations and becomes more common in the population. Natural selection is the process by which individuals best adjusted to an environment survive and reproduce, thereby perpetuating traits best suited to the environment.



Most deer mice are dark brown. However, deer mice living in Nebraska's Sandhills have lighter coats. This feature allows them to hide from predators more easily in the area's light-colored terrain.

1. Which statement is an inference that can be supported by the information?
 - A. Factors in an organism's environment have little effect on its survival.
 - B. Heritable detrimental traits occur less often in a population over time.
 - C. Natural selection is unrelated to evolutionary change in a species.
 - D. All traits that help members of a species are passed on to future generations.

DIRECTIONS: Study the information. Then use the drag-and-drop options to complete the diagram.

DARWIN'S OBSERVATIONS OF POPULATION SIZE

Charles Darwin traveled around the world, observing plants and animals in many different places. He used his observations to make inferences as he developed his theory of evolution.

Observation 1: Resources such as food and shelter are limited in a given ecosystem.

Observation 2: If all individuals in a population reproduce, the population quickly grows out of control.

Observation 3: In most cases, the size of a population stays basically stable over time.

2. Determine which two drag-and-drop options are appropriate inferences based on the observations. Then record those inferences in order in the boxes below.

INFERENCE 1	INFERENCE 2

Drag-and-Drop Options

Traits that help individuals acquire and use resources are important to survival.

No two members of a population have identical traits.

An increase in population size must lead to an increase in available resources.

Competition for resources keeps many individuals from surviving to reproduce.

DIRECTIONS: Read the passage and question, and choose the **best** answer.

REQUIREMENTS FOR NATURAL SELECTION

Three factors are needed for natural selection to occur. (1) Organisms within a population must have variation in traits. (2) Differential survivability must exist. That is, certain individuals must have a trait that helps them survive and reproduce in their environment. (3) The beneficial trait must be heritable. Given the criteria, if a certain species of beetle can have a green shell or a brown shell and the beetle's main predator usually eats green beetles, then the heritable trait of a brown shell will become predominant in the population over time.


3. Which statement **best** expresses the information used to support the inference made in the last sentence of the passage?
- A. Natural selection can occur only when variation in traits, differential survivability, and heritable advantageous traits exist.
 - B. The color of an organism's exterior and the preferences of its predator are factors needed for natural selection to occur.
 - C. Whenever organisms within a population have varying traits, natural selection can occur.
 - D. When members of a population have a trait that helps them survive in their environment, differential survivability occurs.



Writing a Conclusion

What steps do you take to write a conclusion?

Drawing a Conclusion

- When you draw a conclusion, you use evidence to make an “educated guess,” or informed statement, about a situation or data – a collection of facts and figures.
 - For the GED science test, your conclusion will be based on evidence in a passage. Follow the three-step approach that follows.
- 
- A large yellow triangle is positioned in the bottom right corner of the slide, pointing towards the top right.

- For example, imagine one day you wake up and look out the window and see people wearing heavy coats. You also see people's breath when they exhale.
- Based on the information you have gathered you might conclude that the temperature outside is near freezing. Two pieces of evidence support your conclusion:
 - 1) heavy coats and
 - 2) visible breath
- You could confirm that your conclusion is correct by going to a reliable source, such as the National Weather Service and looking up the weather conditions.

Step 1: Read and Analyze the Prompt and Passage

Get a clear overview of the task. Take a few minutes to unpack the prompt and skim the passage. Look for action words in the prompt and the words that go with them; then, try putting those key words into your own words. Follow up by skimming the passage with the task in mind. Quickly read and think about the title of the passage. Look for key ideas that relate to the title and the task.

Step 2: Plan and Write

Next, take about 5 minutes to reread the passage, draw the conclusion, and gather the evidence from the passage. Do not include any evidence that is not in the passage itself, even if you know the information is true. Your task is to draw a conclusion based on evidence **in the passage**. Then, use your conclusion and the evidence you have gathered to write your response. To begin, you might take the main task in the prompt then reword it in your introduction.

Prompt

The use of antibacterial soaps is on the rise.

Explain how the soaps could contribute to the development of drug-resistant mutant germs. Support your answer with multiple pieces of evidence from the passage.

Introduction

The rise of antibacterial soaps poses a problem. Evidence shows that it may contribute to the development of drug-resistant mutant germs.

Step 3: Check and Revise

Take a minute or two to read your completed response. Make sure that it does all that the prompt directs you to do. Also check to make sure that it is written clearly and correctly.



Drawing Conclusions



A conclusion is a reasoned understanding of something. Often, a conclusion is based on a collection of inferences.



When you draw a conclusion, you make a statement that explains the overall meaning of various pieces of information and inferences you have made.



A valid conclusion conveys an idea that is supported by all available information and accurate inferences.



Conclusions can be supported by information presented in a text or information presented visually.

SELECTION PRESSURE, ADAPTATION, AND SPECIATION

a To draw a conclusion, make inferences. From this information and what you know, you can infer that selection pressures cause natural selection.

Selection pressures are features of an environment that affect an organism's ability to survive and reproduce in the environment over time. Changes in these pressures, such as climate changes, enable animals having traits suitable to the new environment to flourish and cause others to struggle and possibly even die off.

b From this information, you can infer that adaptations are passed from generation to generation.

→ Over time, selection pressures and natural selection lead to adaptation. Through adaptation, species develop traits that allow them to respond to certain features of their environment. These traits, or adaptations, can be physical or behavioral.

c From this information, you can infer that adaptation is related to evolution.

Biological evolution is a process of constant change over generations. Because adaptation is ongoing, species change over time. Sometimes populations of a species develop different adaptations in response to different selection pressures. These differences can be substantial enough that the populations eventually become separate species. Formation of a new species is called speciation.

1. Which statement is a valid conclusion supported by the passage?
 - A. Over time, changing selection pressures affect a species' ability to survive and reproduce in its environment.
 - B. Species can develop adaptations that allow them to respond to features of their environments.
 - C. Evolution is the result of selection pressures, natural selection, and adaptation.
 - D. If populations of a species develop different adaptations, they always become separate species.

DIRECTIONS: Read the passage, and study the table. Then read the question, and write your response on the lines. This task may take approximately 10 minutes to complete.

SIGNIFICANCE OF ADAPTATIONS IN REPTILES

Almost all amphibians must spend part of their lives in an aquatic habitat to survive. One reason is that they must be able to replenish water they lose through their thin, porous skin. Also, their eggs are laid in water and will dry out and die if they do not remain submerged. Reptiles do not lose much water through their skin, and they lay their eggs on land, sometimes in holes they dig. Despite these differences, scientists think that reptiles share a common amphibian ancestor. This ancestor probably lived more than 300 million years ago. Various adaptations arose in generations of reptile ancestors, allowing them to move to drier environments over time. The table contrasts the traits of amphibians and reptiles.

Group	Characteristics
Amphibians	Eggs lacking shells Development of lungs and legs following birth Moist skin Toes lacking claws
Reptiles	Eggs having fluid contained by leathery shells Born with lungs and legs Scaly skin Toes with claws

2. Draw a conclusion about how adaptation has resulted in the ability of reptiles to live in different environments than amphibians. Include support from the passage and table in your response.

Homework!

Active Assignments



Week 4

To begin, select an activity from All Activities

[Select New Activity](#) 



All Activities

Completion: 0/5 (0%)



No Due Date