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Name _____ Date _____

Natural Selection Vocabulary

Adaptation	Biodiversity	Fitness
Genetic variation	Limiting factor	Natural selection
Overproduction	Population	Species
Reproductive success	Heredity	Differential success

1. _____ Group of organisms that can reproduce and produce fertile offspring.
2. _____ Sum of different living things in an area.
3. _____ Producing more offspring than could survive (similar to overpopulation).
4. _____ Heritable differences between organisms in a population.
5. _____ Process in which organisms with more helpful traits survive and reproduce better.
6. _____ Describes how well an organism can survive and reproduce.
7. _____ A trait that helps an organism survive and reproduce better in its environment.
8. _____ Involves the passing of traits from parent to offspring.
9. _____ Something in the environment that limits how many organisms can survive (similar to environmental pressure).
10. _____ Ability to produce fertile offspring.
11. _____ All of the organisms of a species living in one area.
12. _____ Difference in how well some organisms survive and reproduce compared to others.

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Influential Scientists Bellringer

Thomas Malthus	Alfred Russell Wallace
Charles Lyell	Charles Darwin
Alfred Wegner	Jean-Baptiste Lamarck

1. _____ Proposed earlier explanation for evolution involving acquired characteristics and use and disuse; was not correct, but still a strong influence in evolutionary biology.
2. _____ Voyaged on the HMS Beagle as the ship's naturalist. Wrote *On the Origin of Species* and concluded that natural selection was the mechanism of evolution.
3. _____ Wrote *An Essay on the Principle of Population* and his explanations of population growth during times of unlimited and limited resources influenced the idea of competition for resources as part of natural selection.
4. _____ Proposed the theory of continental drift.
5. _____ Wrote *Principles of Geology* and Darwin found his ideas on the changing earth very influential.
6. _____ Independently concluded that natural selection was the mechanism for evolution, but was not the first to publish a book, so he isn't remembered as well. He is considered by some the father of biogeography

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Conditions of Natural Selection Bellringer

Each of the following are necessary for natural selection to occur. Match the descriptions to the correct condition.

Variation in traits Differential success (fitness)

(Over)production of offspring Inheritance

1. _____ Some organisms are better able to survive and reproduce.
2. _____ Mutations in DNA cause different traits in a population.
3. _____ Traits can be passed from parent to offspring.
4. _____ Many organisms will produce lots of offspring to increase the chances of some surviving to reproduce.

Read below and then identify the conditions for natural selection in this scenario.

Peppered moths are usually a light peppered color, and these tend to blend into trees in undeveloped areas. Due to a genetic mutation, dark peppered moths exist. Moths can lay around 50 eggs at a time. In areas near developed cities, the trees are now darker. The darker moths are more common because they avoid predation in these areas and survive to reproduce more often.

Variation in traits: _____

Overproduction: _____

Differential success: _____

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Explain how the color of the moth is an adaptation.

Name _____ Date _____

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Natural Selection and Adaptation Bellringer

Alaskan wood frogs will build up high concentrations of sugar in their blood, which allows them to actually freeze during winters. Their hearts stop beating and they quit breathing. The frogs can survive temperatures as low as -80 ^{o}F. When the weather warms, the frogs thaw out and go about their lives. **What type of adaptation is this?**_____
In terms of natural selection, explain how this trait would give frogs an advantage over frogs that could not do this.

_____

_____

_____

_____

Some desert plants have a special root called a taproot. This root extends deeper into the ground than roots that spread out at the surface. **What type of adaptation is this? _____**
In terms of natural selection, explain how taproots would be an advantage over surface roots in the desert.

_____

_____

_____

_____

Puffer fish have several defenses against predators. When they feel threatened, puffer fish will suck in water and use it to puff up like a ball.

What type of adaptation is this? _____

In terms of natural selection, explain how would puffing up be an advantage. _____

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Name _____ Date _____

Camouflage and Mimicry Bellringer

What is camouflage? _____

_____

What is mimicry? _____

_____

Peter de Lange (pjd1), CC0, via Wikimedia Commons

Explain how the stick bug's appearance helps it survive. _____

_____

Explain how the king snake's appearance helps it survive. _____

_____

Charles James Sharp, CC BY-SA 4.0, via Wikimedia Commons

Explain how the owl moth's appearance helps it survive. _____

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Name _____ Date _____

Speciation Bellringer

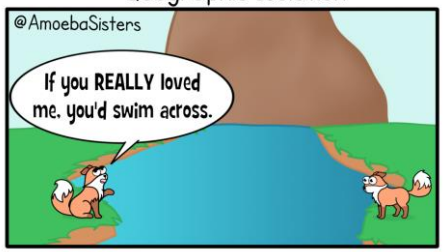
Define speciation: _____

_____

Consider what we've learned about natural selection, environmental pressures, and adaptations to answer the questions below.

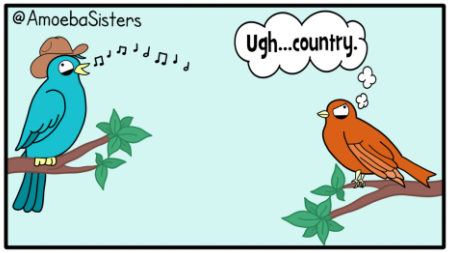
Explain why organisms that are geographically isolated would evolve different from each other.

Geographic Isolation



Besides bird songs, what are some other behaviors that would prevent interbreeding?

Behavioral Isolation



Why don't species interbreed when they are temporally isolated from each other?

Temporal Isolation

Name _____ Date _____

Speciation Bellringer

Define speciation: _____

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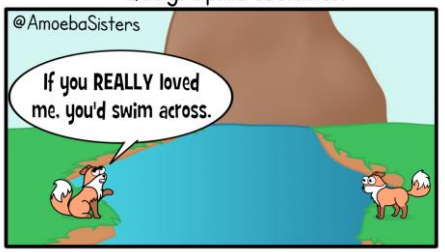

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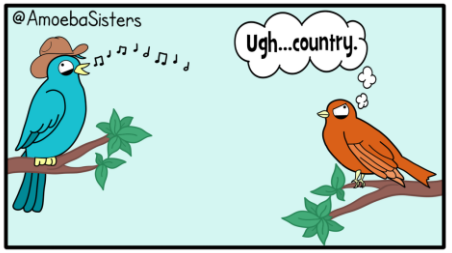

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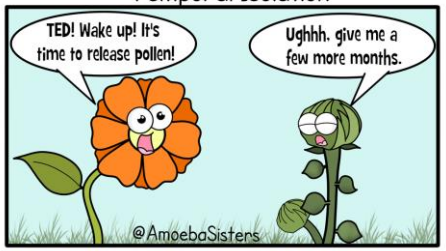
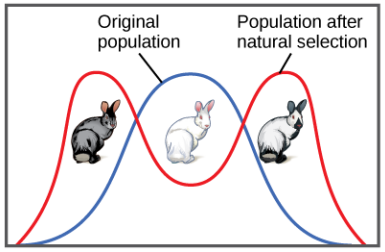


Name _____ Date _____

Types of Natural Selection Bellringer

Label each of the following as **stabilizing selection, disruptive selection**, or **directional selection.** Explain why this is an example of the type of selection you chose.



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Why: _____

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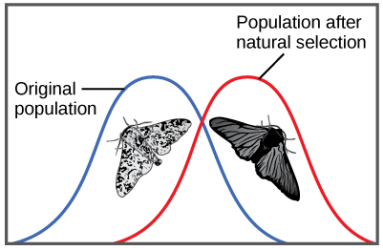

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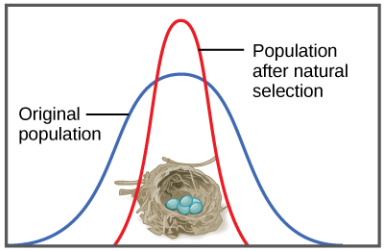

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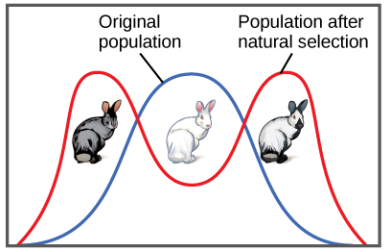

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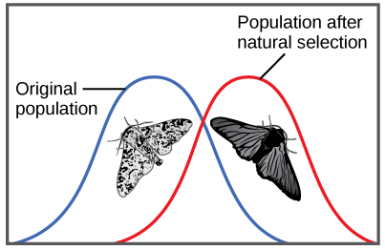

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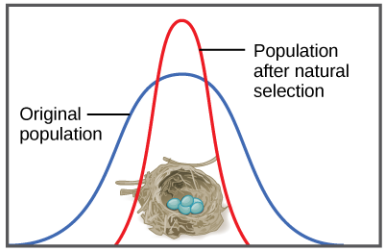

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Types of Natural Selection Bellringer

Label each of the following as **stabilizing selection, disruptive selection**, or **directional selection.** Explain why this is an example of the type of selection you chose.

In a population of butterflies, there are 3 different color variations. The butterflies can be red, orange, or yellow. The pigment that makes the butterflies red also makes them taste bitter. Over time very few yellow butterflies exist, but there is a high number of red butterflies in the population.

Type: _____

Why: _____

_____

A species of fish can be small, medium, or large. The small fish are very fast and able to avoid eagle (predator). The large fish are too big for most eagles to catch and fly off with. The medium fish are slower because of their size and eagles are still able to catch them. Over time the population consists mostly of small or large fish.

Type: _____

Why: _____

_____

Lemurs can be born with short, medium, or long tails. Lemurs with small tails don't balance while leaping as well and are more likely to be eaten by the fossa. Lemurs with long tails are easier for the fossa to catch by the tail as they leap away. Medium-tailed lemurs become more common in the population as they survive to reproduce more often.

Type: _____

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Name _____ Date _____

Mechanisms of Evolution Bellringer

Identify the following as an example of **genetic drift, gene flow, mutation** or **natural selection**. Explain your choice.

Two populations of closely related birds live on different islands. During a storm, some of the birds from one population get carried on the wind to the other island. The birds manage to survive the storm and start breeding with the other birds on the island.

Type: _____

Why: _____

During a tsunami, flooding causes about half a population of hippos to be washed downstream and into the ocean. Hippos cannot swim; the ones washed away were simply in deeper water and couldn't get back to shore.

Type: _____

Why: _____

In a field of sunflowers, there are some flowers that grow taller than others. The taller sunflowers are better at collecting sunlight for photosynthesis because the shorter sunflowers are more in the shade. This helps the taller plants survive and produce more seeds.

Type: _____

Why: _____

Clams have a shell that helps protect them, but they are still eaten by starfish. Some clams are born with thicker shells that make them harder for starfish to eat.

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Common Ancestry Bellringer

List the 5 forms of evidence that scientists use to show evolutionary relationships among organisms.

1. _____
2. _____
3. _____
4. _____
5. _____

Match the forms of evidence to the examples below.

1. _____ Camels, alpacas, and llamas are descended from a common ancestor that migrated across the continents.
2. _____ Preserved remains of organisms can give clues to past environments and show how organisms have changed over time as environments change.
3. _____ Organisms that share a common ancestor often share similar anatomical features that may not be used for the same function.
4. _____ Hippos were once considered to be closely related to modern-day pigs. However, DNA analysis shows that hippos are more closely related to whales than pigs.
5. _____ Early in embryonic development of vertebrate animals, certain features are very similar. This suggests that these were features a distant common ancestor possessed. As organisms evolved into their current forms, the features become more different in later stages of development.

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Comparative Anatomy Bellringer

Label each of the following as **homologous, analogous,** or **vestigial** structures.

_____ Bat wings and the human hand

_____ Butterfly wings and bat wings

_____ Whale flukes (tail) and fish tails

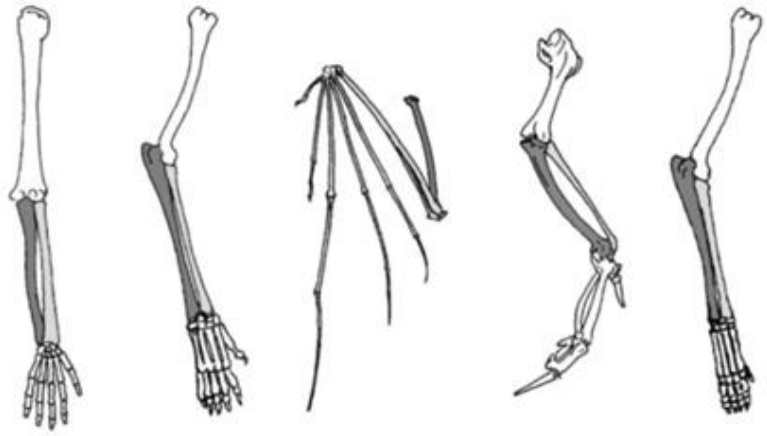
_____ Wisdom teeth

_____ Whale hip and ankle bones

_____ Seal flipper and dog leg

Based on the diagram, which two organisms are more closely related? Explain your reasoning.

Human Lion Bat Bird Wolf



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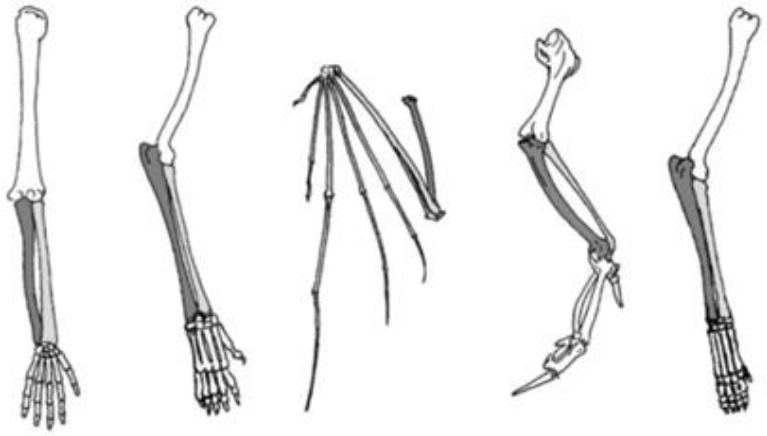

_____

_____

_____

Name _____ Date _____

Comparing Biomolecules Bellringer

What biomolecule codes for the sequence of amino acids in a protein?

_____

Which of the following are the actual code that is read by the body to produce proteins?

a. type of sugar
b. order of sugars and phosphates
c. sequence of nitrogen bases

The diagram shows the number of differences between amino acid sequences in different mammals. Use the diagram to answer the questions below.

Sperm Whale	3								
Porpoise	3	2							
Giraffe	10	9	9						
Hippo	4	3	3	9					
Cow	9	8	8	3	8				
Camel	12	11	11	15	12	14			
Deer	11	10	10	3	10	4	16		
Pig	11	10	10	12	11	13	14	13	
Peccary	14	12	13	17	14	16	16	18	7
	Right Whale	Sperm Whale	Porpoise	Giraffe	Hippo	Cow	Camel	Deer	Pig

How many differences are there between a porpoise and cow? _____

How many differences are there between a camel and giraffe? _____

Which animal is most closely related to a peccary? _____

Which animal is most closely related to the sperm whale? _____

Hippos are most closely related to: _____

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Name _____ Date _____

Misconceptions Bellringer

Explain why each statement is incorrect.

Organisms evolve to adapt to their environments.

_____
_____
_____
_____
_____

Evolution can't be directly observed because it happens so slowly.

_____
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Humans are descended from chimpanzees.

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