Name_____ Date _____Period _____

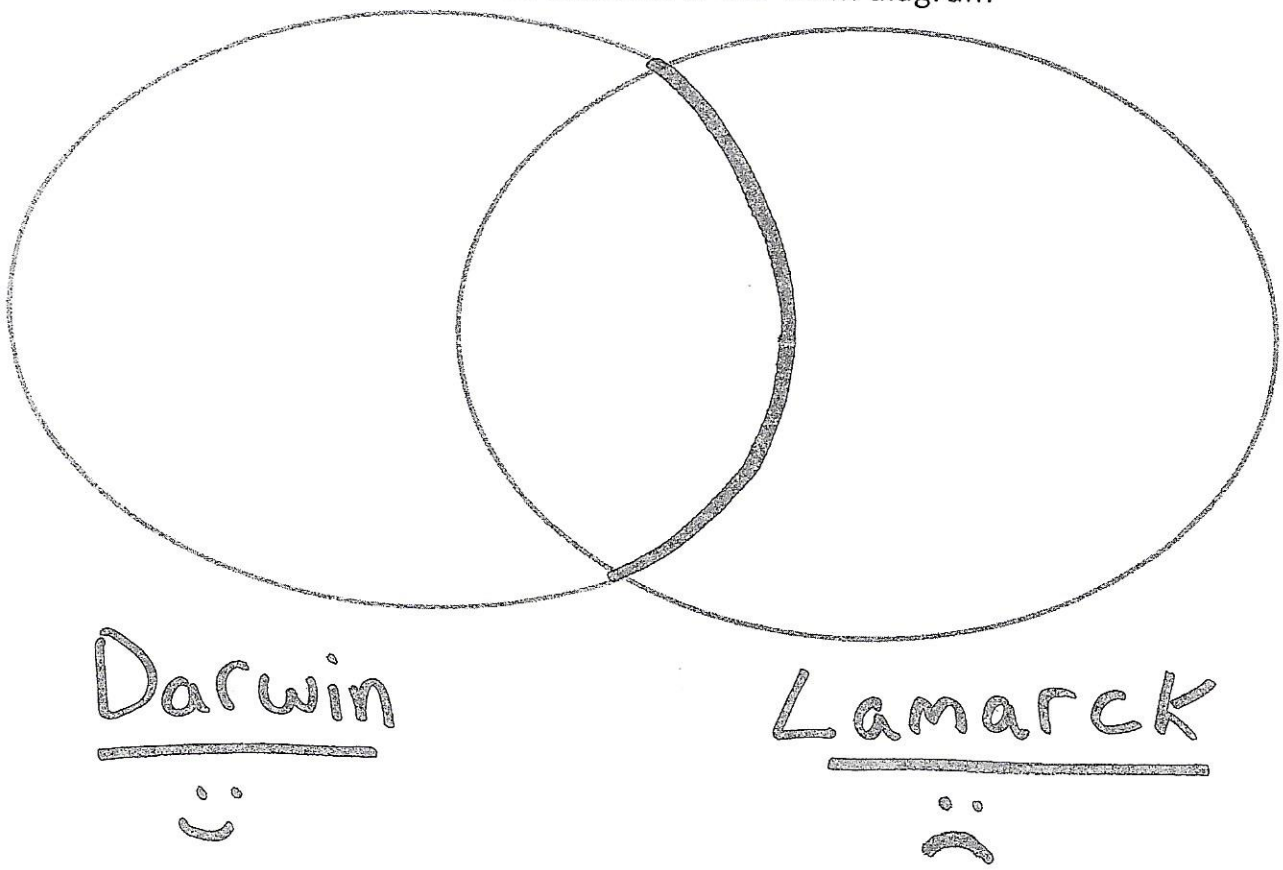
Charles Darwin studied many different species while traveling on the HMS Beagle exploring the Galapagos Islands off the west coast of South America around 1830. He noticed that members of the same species had different characteristics "variations" on different islands. After years of analyzing data, he concluded species do change over time "evolve" based on their environment.

Members of species with the best adaptations will likely live longer, reproduce and therefore pass on those favorable adaptions to their offspring through their DNA. He called his theory evolution by natural selection, also known as "survival of the fittest." This theory is widely accepted today.

There was another scientist studying how species evolve too. Jean Baptiste de Lamarck proposed a different theory to explain how species evolve. He thought skills and traits developed during a lifetime would get passed to their offspring. His incorrect theory was known as "hypothesis of acquired traits." We know only traits written in our DNA are passed from one generation to the next. If the trait is not written in the DNA it will not get passed on to the next generation.

Directions:

Compare and contrast Darwin and Lamarck in the Venn diagram



Charles Darwin Quiz

Name: _____
Date: _____

1. What was Charles Darwin's main contribution to science?

a. He was ~~the first person to think of the idea of evolution~~
b. He developed the modern theory of evolution
c. He refuted the modern theory of evolution
d. He was the first person to actually witness animals evolving

2. What term would best describe Charles Darwin's decision to sail aboard the HMS Beagle?

a. Unlucky
b. Serendipitous
c. Wretched
d. Uneventful

3. What was the mission that led Darwin's boat to sea?

a. Discovering proof of evolution
b. Claiming South American land for Great Britain
c. Looking for South American gold deposits
d. Mapping the South American coastline

4. What is an inherited trait? – Genetics

a. A characteristic determined by an organism's genes
b. A skill that's developed through practice
c. An organism's place in the food web
d. An organism's relationship to its parents

5. Which of these is an opinion about Darwin?

a. He waited a long time to publish "On the Origin of Species"
b. "On the Origin of Species" is a poorly-written book
c. "On the Origin of Species" was controversial when it was published
d. "On the Origin of Species" had both critics and supporters

7. When is a trait most likely to be passed on to the next generation? Choose the best answer.

a. When it serves no purpose to the organism
b. When it prevents the organism from finding a mate
c. When it gives the organism an abundant supply of water
d. When it becomes an advantage to the organism's survival

8. In what major way did Darwin's ideas diverge from Lamarck's?

a. Lamarck thought changes to an individual animal during its lifetime would be passed on to offspring
b. Lamarck believed that environmental pressures drove evolution
c. Lamarck thought that animals would not have had time to evolve in Earth's short history
d. Lamarck did not believe that species could change over time

9. What can you infer from the fact that Darwin studied theology (religion) before dedicating the rest of his life to science?

a. He didn't like his theology professors at school
b. Theology didn't captivate his mind the same way science did
c. He thought that no one should study theology
d. He remained deeply religious throughout his life

10. Which is the most likely evolutionary response of birds to a food supply of insects living in deep, narrow tunnels?

a. Birds get smaller with each generation, until they can fit inside the tunnels.
b. Birds learn to plug up the tunnels, forcing the insects to the surface for air.
c. Birds begin eating bark and leaves instead.
d. Birds' beaks get progressively longer and thinner with each generation.

Natural Selection Quiz

Date: _____

Class: _____

1.

The Galapagos Islands are where Charles Darwin:

a. Wrote *On the Origin of Species*
b. Studied unusual animals
c. Was exiled after his theories proved unpopular
d. Was born and raised

2. The beaks of finches found on various Galapagos Islands differed based on:

a. The size of their island
b. The length of their wings
c. The available food supply
d. The predators that hunted them

3. What is a common ancestor?

a. An animal that has a lot of offspring.
b. An animal from which two or more different species evolved.
c. An animal that is related to many other species.
d. An animal that's good at escaping from predators.

What is least likely to be an example of a variation within a species?

a. Birth weight
b. Hair color
c. Number of offspring
d. Number of limbs

5. Which of the following is an example of an environmental pressure?

a. The air pressure in the atmosphere
b. Breeding between two members of the same species
c. A lake that's gradually running out of water
d. A fight between two members of the same species

6. In the phrase "survival of the fittest," the term "fittest" refers to:

a. The best-adapted organisms
b. The biggest organisms
c. The smartest organisms
d. The fastest organisms

7. Which variation would be most likely to benefit any organism, regardless of environment?

a. The ability to produce energy more efficiently.
b. The ability to swim deeper.
c. Markings that help it blend into its background.
d. Bigger claws and teeth

8. When nature "selects" a variation, that means that the trait:

a. Gets passed along from generation to generation
b. Causes the population to shrink
c. Has brought about a new species
d. Helps prey escape predators

9. Dogs are an example of:

a. A common ancestor
b. Selective breeding
c. The natural pace of evolution
d. Extinction rates rising

10. On Darwin's tree of life, organisms at the base of a branch:

a. Go extinct from environmental pressures.
b. Evolve into the closest species on the tree's trunk.
c. Give rise to species farther down the branch.
d. Are less fit than species in the middle of a branch.

Name: _____ Class: _____ Date: _____ ID: A

Evolution by Natural Selection Test

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. Charles Darwin explained how species evolve using the theory of...
a. Randomness
b. Natural Selection
c. Camouflage
d. Inheritance of acquired traits

____ 2. Adaptation is ...
a. a group of organisms that share similar characteristics
b. a structure that doesn't seem to have an function
c. any variation that makes an organism better suited for it's environment
d. the scientist who developed the theory of evolution

____ 3. Evolution is ...
a. a group of organisms that share similar characteristics and can reproduce among themselves
b. a structure that doesn't seem to have a function
c. is an inherited trait that makes an individual different from other members of its species
d. changes in inherited characteristics over time

____ 4. Variation is...
a. is an inherited trait that makes an individual different from other members of its species
b. the model that describes evolution as a slow gradual process
c. the model that describes evolution as a rapid event due to mutations of a few genes
d. is any variation that makes an organism better suited for it's environment

____ 5. Jean Baptiste de Lamarck attempted to explain how species evolve using the theory of .... even though he was incorrect.
a. Mutations
b. Natural Selection
c. Camouflage
d. Inheritance of acquired traits

____ 6. Species is ...
a. is an inherited trait that makes an individual different from other members of its species
b. a group of organisms that share similar characteristics and can reproduce among themselves
c. is any variation that makes an organism better suited to it's environment
d. changes in a species over time

____ 7. What is the significance of the Galapagos Islands to the theory of evolution...
a. It's where Darwin was born and raised
b. It's where Darwin studied unusual animals
c. It's where Darwin was exiled after his theories about evolution proved unpopular
d. It's where Darwin wrote his book "On the Origin of Species"

Name: _____ ID: A

____ 8. What trait best determines whether two animals belong to the same species?
a. The environment they live in
b. Their physical appearance
c. Their ability to breed with one another and have similar DNA
d. Their evolutionary relationship to humans

____ 9. Which of the following is an environmental pressure?
a. A lake that is running out of water
b. The air pressure in the atmosphere
c. When there is plenty of food and water for all animals
d. A fight between two members of the same species

____ 10. Which of the following is an example of an adaptation?
a. A chameleon's extremely long tongue to help it hunt
b. A frog's green skin which acts as camouflage to hide from predators
c. A camel's hump which is used to store water
d. All of the above

____ 12. How are camels especially suited to their environment?
a. Their eyelashes make them look attractive
b. They're able to go without water for long period of time during droughts
c. They get along well with other members of their species
d. The hump doesn't help them

____ 13. Which of the following is most likely a favorable mutation?
a. A mutation that makes a rabbit able to run faster
b. A mutation that changes a rabbit's fur to bright orange
c. A mutation that changes the color of a rabbit's eyes
d. A mutation that makes a rabbit slower

____ 14. In the phrase "survival of the fittest," to what does the term "fittest" refer?
a. The most colorful organism
b. The fastest organism
c. The biggest organism
d. The best adapted organism

____ 15. What is a common ancestor?
a. An organism that has a lot of offspring
b. An organism that is related to many other species
c. A common organism from which two or more different species evolved
d. An organism that is good at escaping from predators

____ 16. An example of variation is ...
a. rabbits who can all run exactly the same speed
b. frogs who all have the same mating call
c. bears who all live in Canada
d. squirrels with different color furs

Name _____ Date _____ Period _____

Charles Darwin came up with five rules which explain how species can change over time.

Directions:

Please put the following rules in the correct order by placing the correct number 1-5 before each rule.

___ "Organisms produce more offspring than can survive."

___ "Over time, the offspring with more helpful variations make up the majority of the population or may become their own species."

___ "Some variations are passed to offspring"

___ "Differences (variations) occur among individuals of a species."

___ "Some variations are helpful. Individuals with helpful variations will survive and reproduce passing on their traits."

The Periodic Table of Elements

6	Atomic Number = Number of Protons = Number of Electrons
C	Chemical Symbol
CARBON	Chemical Name
12	Atomic Weight = Number of Protons + Number of Neutrons*

NON-METALS

METALS

1 H HYDROGEN 1																	2 He HELIUM 4
3 Li LITHIUM 7	4 Be BERYLLIUM 9											5 B BORON 11	6 C CARBON 12	7 N NITROGEN 14	8 O OXYGEN 16	9 F FLUORINE 19	10 Ne NEON 20
11 Na SODIUM 23	12 Mg MAGNESIUM 24											13 Al ALUMINUM 27	14 Si SILICON 28	15 P PHOSPHORUS 31	16 S SULFUR 32	17 Cl CHLORINE 35	18 Ar ARGON 40
19 K POTASSIUM 39	20 Ca CALCIUM 40	21 Sc SCANDIUM 45	22 Ti TITANIUM 48	23 V VANADIUM 51	24 Cr CHROMIUM 52	25 Mn MANGANESE 55	26 Fe IRON 56	27 Co COBALT 59	28 Ni NICKEL 59	29 Cu COPPER 64	30 Zn ZINC 65	31 Ga GALLIUM 70	32 Ge GERMANIUM 73	33 As ARSENIC 75	34 Se SELENIUM 79	35 Br BROMINE 80	36 Kr KRYPTON 84
37 Rb RUBIDIUM 85	38 Sr STRONTIUM 88	39 Y YTTRIUM 89	40 Zr ZIRCONIUM 91	41 Nb NIOBIUM 93	42 Mo MOLYBDENUM 96	43 Tc TECHNETIUM 98	44 Ru RUTHENIUM 101	45 Rh RHODIUM 103	46 Pd PALLADIUM 106	47 Ag SILVER 108	48 Cd CADMIUM 112	49 In INDIUM 115	50 Sn TIN 119	51 Sb ANTIMONY 122	52 Te TELLURIUM 128	53 I IODINE 127	54 Xe XENON 131
55 Cs CESIUM 133	56 Ba BARIUM 137		72 Hf HAFNIUM 178	73 Ta TANTALUM 181	74 W TUNGSTEN 184	75 Re RHENIUM 186	76 Os OSMIUM 190	77 Ir IRIDIUM 192	78 Pt PLATINUM 195	79 Au GOLD 197	80 Hg MERCURY 201	81 Tl THALLIUM 204	82 Pb LEAD 207	83 Bi BISMUTH 209	84 Po POLONIUM 209	85 At ASTATINE 210	86 Rn RADON 222
87 Fr FRANCIUM 223	88 Ra RADIUM 226		104 Rf RUTHERFORDIUM 263	105 Db DUBNIUM 268	106 Sg SEABORGIUM 266	107 Bh BOHRIUM 272	108 Hs HASSIUM 277	109 Mt MEITNERIUM 276	110 Ds DARMSTADTIUM 281	111 Rg ROENTGENIUM 280	112 Uub UNUNBIUM 285	113 Uut UNUNTRIUM 284	114 Uuq UNUNQUADIUM 289	115 Uup UNUNPENTIUM 288	116 Uuh UNUNHEXIUM 292	117 Uus UNUNSEPTIUM NOT YET OBSERVED	118 Uuo UNUNOCTIUM NOT YET OBSERVED

57 La LANTHANUM 139	58 Ce CERIUM 140	59 Pr PRASEODYMIUM 141	60 Nd NEODYMIUM 144	61 Pm PROMETHIUM 145	62 Sm SAMARIUM 150	63 Eu EUROPIUM 152	64 Gd GADOLINIUM 157	65 Tb TERBIUM 159	66 Dy DYSPROSIUM 163	67 Ho HOLMIUM 165	68 Er ERBIUM 167	69 Tm THULIUM 169	70 Yb YTTERBIUM 173	71 Lu LUTETIUM 175
89 Ac ACTINIUM 227	90 Th THORIUM 232	91 Pa PROTACTINIUM 231	92 U URANIUM 238	93 Np NEPTUNIUM 237	94 Pu PLUTONIUM 244	95 Am AMERICIUM 243	96 Cm CURIUM 247	97 Bk BERKELIUM 247	98 Cf CALIFORNIUM 251	99 Es EINSTEINIUM 252	100 Fm FERMIUM 257	101 Md MENDELEVIUM 258	102 No NOBELIUM 259	103 Lr LAWRENCIUM 262

KEY

- = Solid at room temperature
- = Liquid at room temperature
- = Gas at room temperature
- = Radioactive
- = Artificially Made

* The atomic weights listed on this Table of Elements have been rounded to the nearest whole number. As a result, this chart actually displays the mass number of a specific isotope for each element. An element's complete, unrounded atomic weight can be found on the It's Elemental web site: http://education.jlab.org/itselemental/index.html