Mouse Change-Over-Time Name _____ Period _

Player 2 _____

Mouse Generations Data Chart (Tally your results.)

Sand Color	Gener -ation	Lived White	Lived Brown	Died White	Died Brown
	1				
	2				
	3				
	4				
	5				

The Mouse Generations:

__1. Work on this lab with one another person. Keep the cards organized for the next use.
__2. You need 3 piles: Mouse Cards, Event Cards and Mutation Cards. Mix each pile.
You need a sign for the **Sand Color** and a sign for future piles of **Live Mice and Dead Mice**.
__3. The first environment is **Brown Sand Dunes**. You will use the cards to model what might happen to a group of mice that live in an environment of brown sand dunes.

___Listen for Sand Change!

__4. Player 1: Choose 2 Mouse Cards, one from each parent, to represent the hair color traits in the sex cells.
a) Gene allele B is dominant for Brown hair color, or Brown mice. BB and Bb produce brown mice.
b) Gene allele b is recessive for white hair. "bb" produces white mice.
__5. **Choose an event card.**
a) A Survival card means the mouse survives (lives).
b) A Disease or a Predator All card means the mouse dies.
c) A Predator Contast card means the mouse dies if its color contrasts with the sand dunes. (Only brown mice die if sand dunes are white.)
d) A Mutant Mouse card? Choose a Mutation Card. **Paperclip the Mutation Card to 1 mouse card**.
__6. **Record the fate of the mouse with a tally mark (𝍸) in the data table. (Everyone tally for everyone at table.**)
__7. Place the mouse (2 cards) in the correct pile, Live or Dead.
__8. Put the Event Card at the bottom of its pack.
__9. **Player 2 (or the next player): Starts at #4.** Take turns. Record all results.

Record Mutations here that result in live mice. Use them if you work a 2nd day.
_____
_____

___Listen for Generation Change!

__10. **NEW GENERATION:** Start a new generation if you run out of mouse cards, or if there is an announcement.
__11. a) Move your **Live Mice** Mouse Cards and use them for new mice. **Mutations stay with their mouse card.**
__12. b) Leave the dead mice in the Dead Mice pile untouched.
__13. c) You may use Mouse Cards from your original Mouse Card pile.

___Work until you have data for both brown and white sand.

__14. Graph the live populations of each color of mouse.
Mark environmental changes with a vertical line.

___Continue to Page 2.

Mouse Name_____ Period__
Change-Over-Time Player 2_____

Consider: Natural Selection→ Change-Over-Time → Evolution

__15. This activity is designed to help you think about Change-Over-_____ or the slow evolving of traits. When the environment changes, some organisms do better, some do _____. Those that do better will survive, have offs_____ and pass their genetic _____ on to the next gen_____ Over time, a whole species can change.

__16. A Mutation (an unpredictable change in a chromosome or D _ _) sometimes cause a noticeable change that increases or _____ the ability of an organism to sur_____. Helpful mutations start with 1 organism and spread slowly by re_____ . Organisms that have generations of helpful mutations become "Super" organisms". An "Super" example is disease-causing bacteria that are resistant to antibiotics.

__17. The increase in survival, reproduction & population is called Natural Selection. When Natural Selection results in trait change(s) in an entire group or species, it is also Change-Over-Time or evolution. Most changes are small and go unnoticed.

__18. If a mutation causes a mouse to have white fur with pale brown spots, then that mouse may be able to avoid predators on either white or _____ sand and produce spotted brown offspring. If, as the sand changes colors, the spotted mice are the only survivors, then that would be Change-over-_____ and an example of a species evolving. Enough change becomes a new species, which is a group with similar DNA that produce similar offspring.

__19. If the environment changes so much that not enough offspring survive and reproduce, then the species may become e_____.

__20. If the beach (and its mice) were divided into multiple new beaches, (as the G_____ Islands where Charles Darwin visited and studied) then over time a new species may develop on only one of the new _____ .