Name:_____ Per_____

SKITTLEFISH NATURAL SELECTION LAB

Objective: Explain the concepts evolution, adaptation, natural selection, convergence, and speciation.

Materials:

- ☐ Skittles
- ☐ M&Ms
- ☐ Orange paper
- ☐ Green paper

Skittlefish come in several different colors (red, orange, yellow, green and purple). They live on orange coral reefs.

Stage One:

A. Each population needs 10 skittlefish to live on your "reef"
B. Get **2 skittles** of each color and put them on the orange paper.
C. On the chart below , write down how many skittlefish you have of each color.
D. Each year Seabirds eat 5 Skittlefish. They are **visual predators**; they eat the ones that stand out the most.
E. Choose five (5) Skittlefish for the Seabirds to eat, place the "eaten birds" back in the baggie
F. The Skittlefish that survive are left reproduce.
G. Each skittlefish has **one offspring that is identical in color to itself**. Repeat this for all five years.
H. Answer the first set of questions.
The Population must be 10 organisms each generation**

Orange Reef	Red	Orange	Yellow	Green	Purple	Total Pop
# at start of year 1						10
# at start of year 2						10
# at start of year 3						10
# at start of year 4						10
# at start of year 5						10

1. What variation did you observe in the Skittlefish Population?
   _____
   _____
2. Which color had a disadvantage? Why?
   _____
   _____
3. Which color had an adaptation (an advantage)? Why?
   _____
   _____
4. As you were doing the activity, did you ever see any one skittlefish color change into another color?
   _____
   _____
5. Did your population change over time? Explain how it changed, if it did.
   _____
   _____
   _____
6. WHY did the population change over time?
   _____
   _____
7. Based on your answers above, did individuals evolve, or did the population evolve?
   _____
8. Darwin's idea of Natural Selection has 5 parts. Give an example from this activity for each:
   a) Each population has variations: _____
   b) Some variations are favorable: _____
   c) More offspring are produced than survive: _____
   d) Those that survive have favorable traits : _____
   e) A population will change over time to show the favorable traits:
      _____

STAGE TWO:

- **A.** A new coral reef develops around another island. This one is **green**.
- **B.** An unusually strong storm sweeps 5 of the skittlefish from the original orange coral reef population to the green coral reef
- **C.** Set up the original orange reef population (2 of each color)
- **D.** **Close your eyes and Randomly close** pick 5 skittlefish to survive the storm, put them on green paper
- **E.** The Skittlefish that survive the storm are able to reproduce, each survivor creates a skittlefish exactly like them
- **F.** Fill in the first row of the chart below with the numbers of the skittlefish that will start the new reef
- **G.** Each year, seabirds eat five (5) Skittlefish. They are visual predators, so they eat the ones that stand out the most. Write this down in your chart.
- **H.** Remember each skittlefish has **one offspring that is identical in color to itself**.
- **I.** Repeat this for all five years and then answer the first set of questions.

Green Reef	Red	Orange	Yellow	Green	Purple	Total Pop
# at start of year 1						10
# at start of year 2						10
# at start of year 3						10
# at start of year 4						10
# at start of year 5						10

7. How and why did the population change at this reef?

_____

_____

8. Name three other changes (other than color) that could possible occur within skittlefish (use your imagination and have fun with this) and the circumstances that would make these changes advantageous.

_____

_____

9. Explain how <u>speciation</u> occurs (how a new species can evolve).

_____

_____

10. Explain how a parent species can still exist when a new "daughter" species evolves.

_____

_____

STAGE THREE

A. Pick one of your reefs – either green or orange.
B. Each population needs 12 Sea Mms to live on your "reef", get **2 M&Ms** of each color and put them on your reef. On the chart below , write down how many Sea Mms you have of each color.
C. Each year Seabirds eat 6 Sea Mms. They are **visual predators**; they eat the ones that stand out the most.
D. Choose five (6) Sea Mms for the Seabirds to eat, place the "eaten birds" back in the baggie. The Sea Mms that survive are left reproduce. Each Sea Mms has **one offspring that is identical in color to itself**
E. Repeat this for all five years. Answer the first set of questions.

Sea Mms	Red	Orange	Yellow	Green	Blue	Brown	Pop Total
# at start of year 1							12
# at start of year 2							12
# at start of year 3							12
# at start of year 4							12
# at start of year 5							12

11. How did your population change over time? -

_____

_____

12. Did this population of species evolve to become similar to the skittlefish?

_____

_____

13. If so, why do you think this happened?

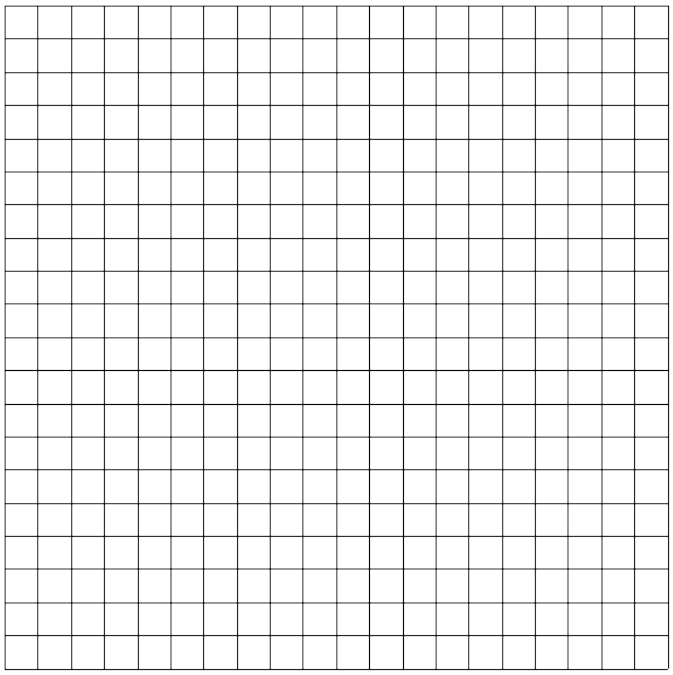
_____

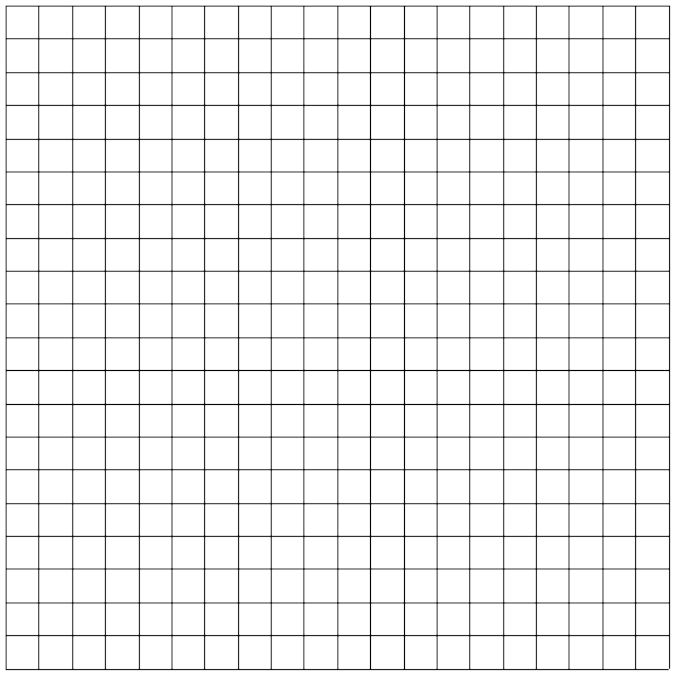
_____

14. Explain how two species that are dissimilar can evolve to look very similar (<u>convergence</u>).

_____

Graph: Make a line graph that shows each phase of the activity. The Y-axis should be # of Skittlefish and X-axis should be Year. Each color will have it's own line. Include a title, label the axis and scale appropriately. Use Graph the graph paper





Analysis: Summarize the results of the lab activity. Describe how this lab models the process of natural selection. Include the terms; variation, adaptation, evolution, speciation and convergence. Explain why evolution happens to a population and not an individual. Use examples from the lab whenever possible, and reference the graphs to discuss any trends seen over the generations. (2-3 paragraphs)