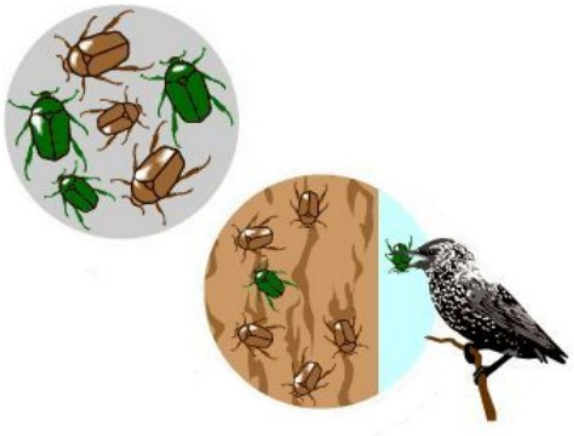
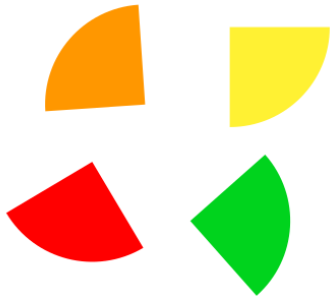
Natural Selection with `Critterbugs'

- Any **population** (group of living things) will have some **variation**, with certain individuals better **adapted** (capable of surviving) than others
- **Natural selection** is the process by which creatures that are better adapted to their environment survive and have more babies. Creatures that are not well adapted die off.
- This allows the population to **evolve** (change over time) to become better adapted.



Part 1: Critter Camouflage

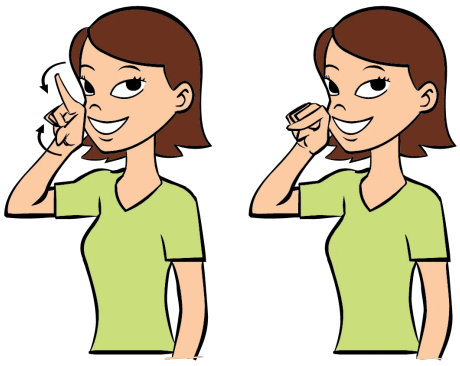
1. Place a red plastic tablecloth folded in half on the floor.



2. Count out 8 'critters' (paper pieces) of each color: red, yellow, orange, green. Scatter the critters over the tablecloth, so that they are well separated and not touching each other.

The pieces represent a novel species of animal: the rare "critterbug". Critterbugs come in many colors. The tablecloth represents the **habitat** where the critterbugs live.

3. You will each be predatory birds that swoop out of the sky to grab the critterbugs. Make a bird beak out of your thumb and pointer finger:



4. Aim for the critterbugs you can most easily see. Altogether, as quickly as you can, pick up one critterbug at a time and bring it back to the tray. Your adult will say "Stop!" when you have brought back 12 of them.

4. When you are done, record how many of each color are left in the habitat:
Remaining critterbugs:

Red	orange	yellow	green

Which color critterbug did the best at surviving the predatory bird attack?

_____

Discuss: Why do you think this is?

Animals sometimes use **camouflage** – making themselves look like their surroundings to avoid getting eaten by predators.
Here are some examples of real animal camouflage: can you spot the animal?

Discuss: Why is camouflage a useful adaptation?

Which critterbugs are the best camouflaged in their habitat? _____

Part 2: Natural Selection

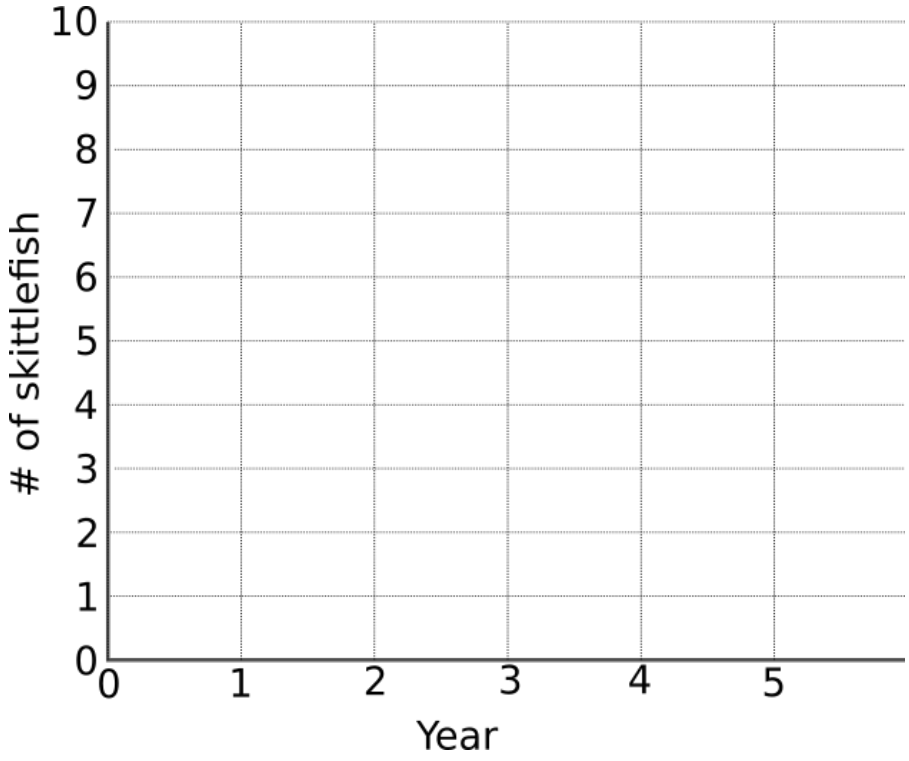
You just simulated a single year of hunting by the predatory birds. Now let's look at what happens over many years.

1. Every year the critterbugs **reproduce**. The baby critterbugs are always the same color as their parent. For each color of critterbug left in your habitat, add in the same number of additional critterbugs in that color. In the table below, write down how many critterbugs you now have of each color (in the row labeled Year 1).

2. Repeat another round of hunting by predatory birds, making sure to capture a total of 12 critterbugs. Then repeat another round of reproduction. Write down how many critterbugs of each color you have after the second year. Continue to simulate several more years.

(after)	**red**	**orange**	**yellow**	**green**
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				

3. Make a graph that shows the **evolution** of critterbug color over time. Use colored pencils to plot the number of critterbugs of each color surviving at the end of the year year. Connect the dots with lines of the appropriate color.



Discuss: What happened to the critterbug population over time?

What is the main color of the critterbug population after 5 years? _____

Did any colors go **extinct** (disappear entirely)?:

_____

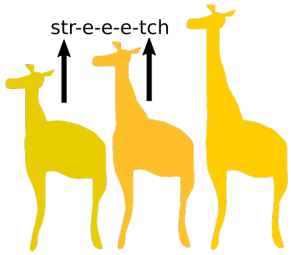
What do you think would happen if you repeated the experiment in a green habitat?
What would be the main critterbug color after a few years? _____

The process you just simulated is called **natural selection**. Any population (group) of creatures will have a variety of traits (for example, color). If one of those traits helps the creatures survive it will be "selected" over time until most of the population has this trait.

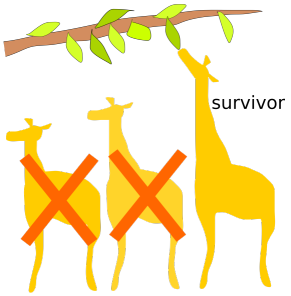
In your experiment, did any individual critterbug change color? _____

Did the overall color of the entire population change? _____

The long necks of giraffes are an adaptation that helps them reach the highest leaves on trees. Years ago, scientists argued over how giraffes evolved this adaptation over time.



(a) One scientist (**Lamarck**) claimed: "Each giraffe stretches its neck as high as it can to get the best leaves. A mother giraffe stretches her neck longer and then passes this longer neck to her baby. Eventually, all the giraffes have longer necks.



(b) Another scientist (**Darwin**) said: "Each mother giraffe has babies with the same length neck as she does. But those mothers which happen to have longer necks are more likely to survive and have babies. So over time the entire population of giraffes will have long necks.

From what you saw in your critterbug simulation, which scientist do you think was right?

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