

Title of the Lesson: The Growing Gator

Estimated Time: 1 class period – 1-4 weeks of data collection

Standards: S2P1. Obtain, evaluate, and communicate information about the properties of matter and changes that occur in objects.

a. Ask questions to describe and classify different objects according to their physical properties. (Clarification statement: Examples of physical properties could include color, mass, length, texture, hardness, strength, absorbency, and flexibility.)

Science and Engineering Practices

Crosscutting Concepts

Asking Questions and Defining Problems

Ask and/or identify questions that can be answered by an investigation.

Analyzing and Interpreting Data

Record information (observations, thoughts, and ideas).
Compare predictions (based on prior experiences) to what occurred (observable events).

Using Math and Computational Thinking

Describe, measure, and/or compare quantitative attributes of different objects and display the data using simple graphs.

Planning and Carrying out an Investigation

Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons.
Make predictions based on prior experiences.

Cause and Effect

Events have causes that generate observable patterns.

Scale, Proportion, and Quantity

Relative scales allow objects and events to be compared and described (e.g., bigger and smaller; hotter and colder; faster and slower).
Standard units are used to measure length.

Big Ideas/Enduring Understandings: Everything is made of matter and can change.
Not all matter changes the same way.

Essential Questions:

How can matter be changed? How do changes affect matter? What are some of the ways matter can change?

Vocabulary:

Matter
Length
Mass
Hydrophilic
Hydrophobic
Polymer

Materials:

1 Gro-Beast Alligator per group of 3-4 students
(can be purchased from <https://www.teachersource.com/>)
Large pan or plastic bin
Water
Ruler or measuring tape/ group
Balance /group

Safety Considerations:

None

Technology Integration:

Students can graph their data electronically and use it to evaluate their results.

Phenomena:

In this phenomena, students observe the changes that occur in an artificial (plastic) alligator over time. This activity provides a great opportunity for students to make careful observations and measurements as they measure the unexpected changes that happen to the material (matter) that make up the gator.

Note: Clarify that it will take some time for the changes to occur.

Engage:

Remove your alligator from its package and give students a chance to make as many observations as possible about it. Explain that the alligator is going to change gradually once you place it in water. Allow students to predict what kind of changes they expect will happen to the gator.

Hand out copies of the Alligator Growth Record worksheet on page 6. Encourage students to make predictions about the experiment and write them down on the worksheet. Ask them:

- Observe your gator closely and use as many words as possible to describe your gator.
- What kind of changes do you predict will happen to the gator when it is placed in water?
- Can you estimate how long it is right now?
- How many centimeters?
- Can you estimate it's mass?
- How long will it get after one day, 3 days, a week?
- How heavy do you think it will get?

Explore:

When students are done with their estimates, take measurements of the alligator. An easy method for determining the length of its curved body is to use a string. Hold (or tape) one end of the string to the tip of its snout and begin laying the string along the body. When the tip of the tail is reached, cut the string. Then, measure the length of the string.

You will need a balance (scale) to determine the alligator's starting mass (weight) on Day 1 as well as its increased mass in the days that follow. Once you've recorded the mass and length, place the alligator in a dishpan of water. Continue making measurements of its mass and length every day (preferably at about the same time of day) until the alligator reaches its maximum size. Encourage students to observe the gator closely each day and note any other changes that occur.

Record all data on the attached Alligator Growth Chart. Use the same procedure when students have removed the alligator from the water to record shrinkage using the Alligator Shrinkage Record.

NOTE: If you use the string method for determining the alligator's length, you may want to fasten each of the daily strings to a piece of paper to make a string bar graph. Try different colored strings each day!

Explain:

Our growing gator is an example of an expandable water toy. They come as lots of different creatures and are often called Grow Monsters. Dinosaurs, reptiles, robots, and eggs are some of the most popular Grow Monsters. You can often find them for sale in dollar stores.

Expandable water toys are made from a chemical that is able to absorb an amazing amount water. This kind of chemical is called a superabsorbent polymer. It is able to soak up tremendous amounts of water because the water is drawn into and held by the molecules of the polymer. This amazing polymer can absorb hundreds of times its own weight in water. Think of this polymer as millions of microscopic sponges that absorb water.

For older students, you might also discuss that these growing creatures also contain a second polymer. While the main polymer is the hydrophilic (water-loving) polymer that is responsible for the water absorbing action, the Grow Monsters also contain a hydrophobic (water-fearing) polymer. The hydrophobic polymers job is to keep the original shape of the creature when it swells up with water.

Elaborate:

Your Gro-Beast Alligator, or other Grow Monster, can be used for many other science projects. For example, your students can investigate the effect of the growth of Gro-Beast Alligators by using:

- Different water sources: pond water, salt water, bottled water, distilled water, etc.
- Different concentrations of various dissolved substances, such as sugar, baking soda, or salt.
- Different solutions with varying pH, such as different strengths of vinegar, baking soda, etc.
- Different temperatures.
- Different exposures to direct sunlight.
- Different carbonated beverages, sugar vs. sugar free soda, etc.

Evaluate: You can use this lesson to teach prediction, as well as analyzing and interpreting data. Each small group of students are assigned to measure the length and determine the mass of the alligator each day. The Growing and Shrinking activities takes about four weeks. Over this period, all students have a chance to take measurements and write them on their individual charts. You will be able to assess each child's measuring skills during this time.

Teacher Notes:

- Encourage students to collect other data measurements (Ex. How much water they are adding/ losing, width of the gator, height of the gator.
- While it works best in small groups, this lesson also works very well as a whole class activity where different groups of students take daily measurements of your class gator. You can then develop a class data chart and a class graph to add to each day.
- Super absorbing animals of all kinds can also be found at dollar stores

