Large Gro-Beast Dinosaurs

GB-106

We are pleased to offer you these measuring and graphing activities for elementary school students. Our Large Gro-Beast Dinosaurs and this lesson will support your students' understanding of this Next Generation Science Standard (NGSS):

Elementary

2-PS1-2: *Students analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.*

Middle School

MS-PS1-2: *Students can analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.*

MS/ETS1.B: *A solution needs to be tested, and then modified on the basis of the test results in order to improve it.*

High School

HS-PS2-6: *Students will observe and communicate scientific information about why the molecular-level structure is important in the functioning of a material.*

Suggested Science Idea(s)

2-PS1-2: Students can conduct simple tests using the Large Gro-Beast Dinosaurs to better understand the rate at which the polymers absorb or evaporate water. Information gathered can be used as evidence to support or refute student ideas about hydrophilic (water-loving) materials.

MS-PS1-2: Students can analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

HS-PS2-6: Students will observe and communicate scientific information about why the substance is able to absorb so much water. Further study of the structure of the hydrophilic polymers will help students to understand that the molecular-level structure is important in the functioning of a material.

What's a Gro-Beast?

Our Gro-Beast Dinosaurs are made from a polymer that readily absorbs water. Materials of this type are said to be **hydrophilic** or water loving. Materials with the opposite property are said to be **hydrophobic** or water fearing. An example of a hydrophobic substance is Magic Sand (SS-2), which repels water and never seems to get "wet."

When the small, colorful dinosaur is placed in water, it will increase in length, mass and volume. It will take about a week to reach its full size, depending upon the purity of the water and type of container used. When removed from water, the expanded dinosaur eventually returns to its original size.

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Activity 1

The Growing Dinosaur

1. Remove your Gro-Beast Dinosaur from its package and give students time to make observations about it. Explain that the dinosaur is going to change once you place it in water. The changes will take some time to occur.

2. Copy and distribute the *Dinosaur Growth Record* worksheet on page 4. Encourage students to write down their predictions on the worksheet. Ask them:

- ✓ Can you estimate how long it is right now? How many centimeters?
- ✓ Can you estimate its mass?
- ✓ How big do you think it will get when it's placed in water?
- ✓ How long will it get after one day? Three days? A week?
- ✓ How heavy do you think it will get?

A few pointers:

In some parts of the country, distilled water may increase the size of your Gro-Beast Dinosaur.

Please keep your Gro-Beast out of direct sunlight! Over time, UV radiation will degrade the polymer.

3. When they're done with their estimates, take measurements of the dinosaur. An easy method for determining the length of its body is to use a string. Hold (or tape) one end of the string to the top of the dinosaur's 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.

NOTE:
If you use the string method for determining the dinosaur'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!

4. You will need a balance to determine the dinosaur's initial mass on Day 1 as well as its increased mass in the days that follow. (EI has **a full line of scales** available.) Once you've recorded the mass and length, place the dinosaur 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 dinosaur reaches its maximum size.

The Shrinking Dinosaur

Place the expanded dinosaur on paper towels or newspapers out of direct sunlight. Continue making measurements as the water slowly evaporates. Notice that the shrinkage of the dinosaur is a much slower process than its growth.

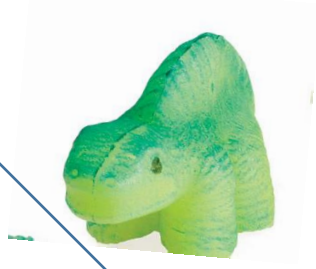
Copy and distribute the *Dinosaur Shrinkage Record* worksheet (on page 5) so students can keep track of their measurements and other observations.

Further Experimentation

Your Gro-Beast Dinosaur can be used for many other science projects. For example, your students can investigate the effect of the growth of Gro-Beast Dinosaurs 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 concentrations of vinegar, baking soda, etc.
- ✓ Different temperatures.
- ✓ Different exposures to direct sunlight.
- ✓ Different carbonated beverages, sugar vs. sugar free soda, etc.

Name: _____



Dinosaur Growth Record

Day	Date	Length	Mass	Observation Notes
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

General Notes:

Name: _____

Dinosaur Shrinkage Record

Day	Date	Length	Mass	Observation Notes
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

General Notes:

Name: _____

Our Dinosaur

You can draw a picture of your dinosaur on the back of this page!

Today, we met our class dinosaur.

I estimate that the length from the tip of its nose to the tip of its tail is _____ cm.

I estimate that it weighs _____ grams.

When we measured our dinosaur, it was _____ cm long.

When we weighed our dinosaur, it was _____ grams.

We predict that our dinosaur is going to grow when we place it in water.

We estimate that when it is fully grown, it will be _____ cm long and it will weigh _____ grams.

We predict that it will take _____ days to reach its full size.

The date will be _____ .

RESULTS:

Our dinosaur reached its full size on: _____
It took _____ days.

Take Your Lesson Further

As science teachers ourselves, we know how much effort goes into preparing lessons. For us, "*Teachers Serving Teachers*" isn't just a slogan—it's our promise to you!

Please visit our website for more lesson ideas:

www.TeacherSource.com/lessons

Check our blog for classroom-tested teaching plans on dozens of topics:

http://blog.TeacherSource.com

Educational Innovations has many hydrophilic materials that can be used in follow-up lessons. Consider our other "Gro-Beasts" shaped like frogs and alligators. These critters start at 1-3" long and expand by up to 600% when left in water. They are fantastic for any grade level, and affordable enough to hand out to every student in your class.

Hydrophilic Growing Spheres, Cubes, Spikes and Crystals are also excellent for investigating concepts like mass, volume, surface area, absorption and more.

Gro-Beast Alligators (GB-202)

Growing Cubes (GB-740)

Growing Frogs (GB-25)

Growing Spheres (GB-702, GB-710, GB-730)

Water Gel Crystals (GB-5C)

Water Gel Spikes (GB-3)

And don't forget our HYDROPHOBIC material!

Magic Sand (MS-2)

Magic Sand is regular sand which has been dyed and coated with a hydrophobic material—a substance which repels water. The coating on the outside of the magic sand repels water and keeps the sand dry, even when submerged in water! Available in four fluorescent colors.