

Gummy Bear Lab - Teacher Stuff

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Intro

In this 2+ day lab, students will predict what will happen to a gummy bear after it has been soaking in water overnight. Students will measure length, volume and mass, and relate the changes in linear dimension to changes in volume. After soaking a gummy bear in water overnight, it will expand.

Math Skills

Volume Scaling/Ratios
Graphing

Science Skills

Density Interpreting Data
Mass Observation Skills
Measurement Estimation

Materials

- gummy bears (2 sizes if possible)
- small water containers/cups
- graduated cylinders
- balance
- metric rulers
- student worksheet or overhead
- plastic wrap to cover balance pans
- calculators (optional)

Teacher Notes/Things To Do

1. There are two pages to this lab. Page one is handed out and done on the first day. Page two is for the second day.
2. Talk about not eating the equipment.
3. Before handing out worksheets, present the problem and discuss things that need to be recorded to notice any changes in the bear.
4. Discuss the definitions of length, height, and width, and different ways to measure volume.
5. Explain the concept of density and why it is an important measurement.
6. Remind students to measure the gummy bears carefully because they are small.
7. Graduated cylinders can also be used to measure volume via displacement (Archimedes' Principle).
8. Gummy Bears are extremely fragile after soaking in water. Make sure students retrieve all pieces to measure everything accurately.
9. Gummy bears expand in water because they are made of gelatin (same stuff as Jello™). They expand and basically become pieces of Jello™.

9. Compare the changes in density, small vs. large bears, or have students come up with their own questions to ask. Many different relationships can be looked at.
10. Discuss how/why doubling the linear dimensions increases the volume by eight times.

Extension

1. Making bar graphs to compare data.
2. Compare how much more candy is available for consumption after it has been soaking in water.
3. Discuss size and scale in animals.
 - Why elephants sleep standing up (Tissue will get damaged otherwise)
 - There are no birds the size of ants and no beetles the size of cows - anatomy would not function, different respiratory/circulatory systems.
4. Fill a jar with gummy bears. Have students guess how many are in the jar based on calculations and explanations.
5. Write stories about the origins of gummy bears or how they were invented.
6. Invent a new type of gummy candy that does not exist. Write or draw a proposal and present it to the class. (ex. hot gummy bears, gummy bears with crickets in them)

Ingredients of Gummy Bears

Fructose, corn syrup, sugar, sorbitol, **gelatin**, citric acid, lactic acid, fumaric acid, malic acid, "artificial" and/or "natural" flavors, red dye #40, yellow dye #5, yellow dye #6, blue dye #1, beeswax, coconut oil, carnauba wax, mineral oil, partially hydrogenated soybean oil, pear concentrate, confectioner's glaze.

Gelatin (which is made from slaughterhouse by products, i.e. cow bones and hoofs) combines with various sweeteners, dyes, and oils to yield the delicious gummy candy.

Reference

A Question of Size, Exploratorium 1996 guide on their "Exploration of Size and Scale" exhibit