

Bubble Gum Calculations

Grades: 4th-8th

Duration: 60 Minutes

Program Description

Determine the percent of the mass of a piece of bubble gum that is sugar and flavorings, and compare the percentages for different types of gum. The results might surprise you!

Louisiana GLE:

Grade 4 Science:

1. Ask questions about objects and events in the environment (e.g., plants, rocks, storms) (SI-E-A1)
2. Pose questions that can be answered by using students' own observations, scientific knowledge, and testable scientific investigations (SI-E-A1)
3. Use observations to design and conduct simple investigations or experiments to answer testable questions (SI-E-A2)
4. Predict and anticipate possible outcomes (SI-E-A2)
6. Use a variety of methods and materials and multiple trials to investigate ideas (observe, measure, accurately record data) (SI-E-A2)
7. Use the five senses to describe observations (SI-E-A3)
8. Measure and record length, temperature, mass, volume, and area in both metric system and U.S. system units (SI-E-A4)
9. Select and use developmentally appropriate equipment and tools (e.g., magnifying lenses, microscopes, graduated cylinders) and units of measurement to observe and collect data (SI-E-A4)
13. Identify and use appropriate safety procedures and equipment when conducting investigations (e.g., gloves, goggles, hair ties) (SI-E-A7)
23. Determine linear, volume, and weight/mass measurements by using both metric system and U.S. system units to compare the results (PS-E-A2)

Grade 4 Math

13. Determine when and how to estimate, and when and how to use mental math, calculators, or paper/pencil strategies to solve multiplication and division problems (N-8-E)
14. Solve real-life problems, including those in which some information is not given (N-9-E)
22. Select and use the appropriate standard units of measure, abbreviations, and tools to measure length and perimeter (i.e., in., cm, ft., yd., mile, m, km), area (i.e., square inch, square foot, square centimeter), capacity (i.e., fl. oz., cup, pt., qt., gal., l, ml), weight/mass (i.e., oz., lb., g, kg, ton), and volume (i.e., cubic cm, cubic in.) (M-2-E) (M-1-E)
24. Recognize the attributes to be measured in a real-life situation (M-2-E) (M-5-E)

Grade 4 English Language Arts

34. Adjust pacing to suit purpose, audience, and setting when speaking
35. Interpret, follow, and give multi-step directions

37. Demonstrate active listening strategies, including asking questions, responding to cues, and making eye contact
38. Adjust speaking content according to the needs of the audience

Grade 5 – 8 Science Inquiry

1. Generate testable questions about objects, organisms, and events that can be answered through scientific investigation (SI-M-A1)
2. Identify problems, factors, and questions that must be considered in a scientific investigation
4. Design, predict outcomes, and conduct experiments to answer guiding questions (SI-M-A2)
6. Select and use appropriate equipment, technology, tools, and metric system units of measurement to make observations (SI-M-A3)
7. Record observations using methods that complement investigations (e.g., journals, tables, charts) (SI-M-A3)
8. Use consistency and precision in data collection, analysis, and reporting (SI-M-A3)
9. Use computers and/or calculators to analyze and interpret quantitative data (SI-M-A3)

Grade 5 Science

1. Measure a variety of objects in metric system units (PS-M-A1)

Grade 5 Math

13. Write a number sentence from a given physical model of an equation (e.g., balance scale) (A-2-M) (A-1-M)
20. Identify appropriate tools and units with which to measure time, mass, weight, temperature, and length (M-3-M)

Grade 5 English Language Arts

32. Adjust diction and enunciation to suit the purpose for speaking
33. Use complete sentences and standard English grammar, diction, syntax, and pronunciation when speaking
35. Restate or describe oral directions/procedures for tasks
36. Adjust volume and inflection to suit the audience and purpose of presentations
38. Demonstrate active listening strategies
39. Deliver formal and informal presentations for a variety of purposes, including:
 - book reports
 - personal experiences
 - explanations of projects (ELA-4-M4)
41. Participate in group and panel discussions

Science 6 Grade

1. Measure and record the volume and mass of substances in metric system units (PS-M-A1)
4. Differentiate between the physical and chemical properties of selected substances (PS-M-A3)
5. Compare physical and chemical changes (PS-M-A3)

Grade 6 Math

15. Match algebraic equations and expressions with verbal statements and vice versa (A-1-M)

Grade 7 Math

6. Set up and solve simple percent problems using various strategies, including mental math (N-5-M) (N-6-M) (N-8-M)

Grade 8 Math

8.Solve real-life problems involving percentages, including percentages less than 1 or greater than 100 (N-8-M) (N-5-M)

Key Terms:

Electronic Balance: A tool used to measure mass

Gram: The metric base unit used to measure mass

Mass: The amount of matter in an object

Percent by Mass: The percent mass of a mixture that is one substance

Polymer: Any of various chemical compounds made of smaller, identical molecules (called monomers) linked together. Some polymers, like cellulose, occur naturally, while others, like nylon, are artificial. Polymers have extremely high molecular weights, make up many of the tissues of organisms, and have extremely varied and versatile uses in industry, such as in making plastics, concrete, glass, and rubber.

Qualitative observations: Observations that do not have hard numbers associated with them.

Quantitative observations: Observations that have been measured.

Connections to Permanent Exhibits:

Units of Mass: This exhibit is an equal-arm balance with different units of mass that children can play with on both sides of the scale; Located in the math area.

Solar System: At each planet kiosk, students can measure their weight on Earth and on another planet. By looking at the planet model they can determine why they would weigh more on Jupiter (the most massive planet) than on Earth (not a massive planet). Located on the 2nd floor balcony around the dome.

Web Resources:

The Great Idea Finder

<http://www.idealfinder.com/history/inventions/bubblegum.htm> Tells the story of the invention of bubble gum. (Chewing gum was invented before historical records were created, but bubble gum is a relatively recent invention.)

Math.com

<http://www.math.com/school/subject1/lessons/S1U1L7GL.html#sm1> Has a nice tool with a grid of 100 squares and buttons with different percents on them. When you press the 5% button, 5 of the squares are colored in. Website goes on to show relationship between fractions and percent with a word-problem workout.

Purplemath.com

<http://www.purplemath.com/modules/percentof.htm> Basic Percentage Exercises Provides simple percentage problem setup and examples.

Pre-Visit Activities

Lesson Plans on Percent are widely available. This program puts word problems into practice by answering a measurable question.