# Lab Framework

**Text:CORD**

**Unit number and title: Unit 9 Ratios and Proportions**

**Short Description**: Determine the optimal proportion of the ingredients given to create a bubble solution that will allow for the longest lasting bubbles.

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**Date:6/24/10**

## Lab Title

## Sky Blew Bubble Solution Lab

## LAB PLAN

**TEACHER:** Teacher Prep/ Lesson Plan

- **Lab Objective**

  Students will work in small groups to discover the optimal proportion of ingredients to make the longest lasting bubble. They will experiment with and manipulate the proportions of each ingredient and record the data for each trial.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)

  Measurement techniques for liquids.
  Problem solving skills
  Measuring in metric and English units

- **Vocabulary**

  Ratio,

- **Materials List**

  5 Scales
  5 plastic cups
  5 teaspoon measuring spoons
  5 Stop watches
  5 - 6 oz. bottles with lids and bubble wand
  5 small bottles of glycerin
  Large Dawn Ultra
  Large Joy Ultra
  5 – 1 gallon jugs distilled water
  5 bottles blue food coloring
  Granulated sugar
  Small bottle clear corn syrup
  Stir sticks

- **State Standards addressed**

  Math: GLE 5.2.1 Analyze mathematical patterns and ideas to extend mathematical thinking and modeling in other disciplines.
  A1.2.B Recognize the multiple uses of variables, determine all possible values of variables that satisfy prescribed conditions, and evaluate algebraic expressions that involve variables.

- **Leadership Skills**

Students will work in groups of 4. Each student will have one of the following roles: Group leader, time-keeper, data-keeper, or materials manager. These roles will rotate daily over the 5 days we will be doing this lesson.

- **SCAN Skills/Workplace Skills**

  **Writing**

  B. Records information completely and accurately.

  **Arithmetic**

  A. Performs basic computations

  D. And uses tables, graphs, diagrams, and charts to obtain or convey quantities

- **Set-up information**
  - Provide a scale, measuring spoon, mixing cup, stop watch and stir stick to each group table.
  - Have ingredients up front for materials manager to retrieve at the beginning of the period.

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required)**
  - Students work in groups no larger than 4
  - Leadership roles are defined daily
  - Students are expected to work cooperatively on this assignment
- **Teacher Assessment of student learning** (scoring guide, rubric)

  Criteria Checklist:

  Criteria Points

  Planning

  1. Materials organized for experiment: / ½
  2. Experimentation process outlined: / 1
  3. Number of Grams in a bottle of Sky Blew / ½

  Experimentation

  1. Ratio of four main ingredients / 1
  2. Careful experimentation process followed / 1
  3. Ratio of all ingredients in final recipe / 1
  4. Number of grams per teaspoon (each ingredient) / 1

  Product Report & Marketing

  1. Bottle - design / 1
     Bottle - 4 bullet points included / 2
     Bottle - Grams of each ingredient in bag / 1

  2 Report - Recipe / 2

  Report - Amount of materials needed (2 marks each set of calculations) /
  6

  Method of experimentation included / 2

  3 Report submitted on time.

  Final Result: / 20
- **Summary of learning** (to be finished after student completes lab)

  -discuss real world application of learning from lab

  -opportunity for students to share/present learning

  Real World Applications: Weighing, measuring, manipulating variables in mixing solutions. Solving problems, working collaboratively for a common goal

  Opportunities for students: Students will present their bubble solution to the class and will present their group bottle design to the class.

- **Optional activities**
  Students could use the skills learned in making recipes during the Daily Living Skills class.

- **Career Applications**
  Marketing – Designing and promoting of product and packaging
  Product research and development – Manipulating the proportions of ingredients in a solution to enhance it's performance
  Sales – Promoting a product to potential customers

# LAB TITLE: Sky Blew Bubble Solution Lab

## STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**

  Playing with bubbles is a favorite activity of many children - the Fizzle Not Bubble Company you work for is about to embark on a campaign to develop and market a new brand of bubbles "Sky Blew" which will be in direct competition with the market leader "Fairview Floaters".

  Your have been given the job of product development and marketing. Your tasks are listed below.

  What process will you follow to ensure your product is the best it can be?
  How will you ensure human error cannot affect product development? (See Helpful Hints.)
  Collection of materials - which other students will you collaborate with to bring in the materials?
  Information on the competitor - how many ounces of bubble solution does Fairview Floaters sell per bottle?

- **Grouping instructions and roles**

  What process will you follow to ensure your product is the best it can be?
  How will you ensure human error cannot affect product development? (See Helpful Hints.)
  Collection of materials - which other students will you collaborate with to bring in the materials?
  Information on the competitor - how many ounces of bubble solution does Fairview Floaters sell per bottle?

  Helpful Hints:
  When making the product during the experimentation phase it is best to make enough that several trials can be carried out.
  Be sure to start with a new mixture if you choose to change the recipe.
  When compiling the product report, refer to the Criteria checklist to check you have included all requirements.

  Grouping: Students will work in groups of 4.
  Each student will have one of the following roles:
  - ✓ Group leader – organize and direct the group
  - ✓ Time-keeper – ensure that the group gets started on time and ends the days activities in time to put all materials away prior to the end of class.
  - ✓ Data-keeper – Keeps information on proportions of ingredients for at least 5 trials including the time a bubble stays intact (from the time the bubble is blown until it bursts) for each trial.
  - ✓ Materials manager – Gathers materials to conduct each days lab, ensures that enough of each material is available for your group and that all materials are put away prior to the end of class.

- **Procedures** – steps to follow/instructions

  Experimentation:
  Materials for the initial solution:

  - ¼ part Glycerin
  - 15 parts distilled water
  - 1 part Dawn Ultra Dish Soap
  - 1/8 part blue food coloring

Optional materials to add to the bubble solution:

- Clear corn syrup
- Granulated sugar
- Joy Ultra Dish Soap

1. Calculate the ratio of the four initial ingredients: glycerin : distilled water : dish soap : food coloring

2. By experimentation, calculate the ratio of all ingredients that makes the longest lasting bubbles. glycerin : distilled water : dish soap : food coloring : *optional ingredient(s). Record the length of time the bubble stays intact.
(Note: You will need to describe the method used so that the process can be repeated when final production begins)
3. Using the scales - find the mass of each ingredient that you are including in your recipe.
Product Report & Marketing:
1. Design a bottle to market your product in, labeling laws require you to list the following information on the packet:
· Name of product / designer / company
· Total number of grams (Net) of the product in the bottle
· Each ingredient used
· The number of grams of each ingredient
2. Write a report to the Manager of " Fizzle Not Bubble Company ". In your report you must include:
· The final recipe for "Sky Blew"
· The ratio of each of the ingredients
· The bottle
· The amount of materials needed to produce: One Bottle of "Sky Blew"
One Box (40 Bottles)
One Carton (25 Boxes)
· The method of experimentation and any other notes
3. Compile the product report and submit it to the manager by _(give date)_____.

- **Outcome instructions**
    a. The group leader will rate each team member daily on his or her performance of the assigned group role. He will give each team member a + or - rating on the daily assignment sheet.
    b. On Friday each group is going to present their findings and final product design to the class.
    c. Data sheets and final product will be turned in Friday with each group members name on the final notebook.

- **Assessment instructions** (peer-teacher)
    - At the conclusion of this assignment each group member will assess himself by giving a recommended grade and rationale for that grade.

# Lab Data Collection

**Student:** _____ **Date:** _____

**Unit:** _____

**Lab Title:**

**Criteria: Write the problem/objective in statement form**

**Data Collection: Record the collected/given data**

**Calculations: Complete the given calculations to solve for an answer(s)**

**Summary Statement:**

**Other Assessment(s)**