

Lab Framework

Text: CORD Applied Math

Unit number and title: Unit 1 Learning Problem-Solving

Techniques

Short Description: Students will work together in groups to construct a paper tower. They will use only materials given and be allowed a limited amount of time. All students will start at the same time and end at the same time.

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Lab Title Paper Towers

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**
Students will work under a time constriction as a team.
- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)
Students will need to know how to work in a group, communicate well and know how to use a ruler
- **Vocabulary**
No specific vocabulary
- **Materials List**
Three pieces of 8 ½ X 11- inch paper, one piece of ½ - inch X 1 - foot scotch tape, scissors, ruler, pencil
- **GLEs (State Standards) addressed**

Math: EALR 1: The student understands and applies the concepts and procedures of mathematics.

COMPONENT 1.1: Understand and apply concepts and procedures from number sense.

1.1.1 Understand and use scientific notation.

COMPONENT 1.2: Understand and apply concepts and procedures from measurement.

1.2.1 Understand the relationship between change in one or two linear dimension(s) and corresponding change in perimeter, area, surface area, and volume.

COMPONENT 1.3: Understand and apply concepts and procedures from geometric sense.

- 1.3.1 Understand the properties of and the relationships among 1-dimensional, 2-dimensional, and 3-dimensional shapes and figures.
- 1.3.2 Use the properties of and relationships among 1-dimensional, 2-dimensional, and 3-dimensional shapes and figures including prisms, cylinders, cones, and pyramids.

- **Leadership Skills**
Students will be able to work together as a team and will develop good leadership and communication skills
- **SCAN Skills/Workplace Skills**
Interpersonal and Information
- **Set-up information**
Tables set up so that there is enough room for groups to work together in a comfortable environment
- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required**)
Divide students into groups of four, students need to use good communication skills and there is a time limit of 45 minutes from start to finish
- **Teacher Assessment of student learning** (scoring guide, rubric)
There will be a time limit of 45 minutes for the activity, the tower must be freestanding and will be measured from the base to the highest vertical point. Students will be graded on their skills in working together and using good leadership and communication skills. The tower must be able to stand for 10 seconds
- **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
 - students will write a reflection on how the lab was perceived
- **Career Applications**
Engineering, fashion design, carpentry

Paper Towers

OVERVIEW: To build the tallest freestanding tower possible from a single sheet of paper.

OBJECTIVE: Students will cooperatively work together in groups of 4 to build a paper tower using the materials below.

MATERIALS: All materials supplied.

- • Three pieces of 8 1/2 x 11-inch paper
- • One piece of 1/2 -inch x 1-foot scotch tape
- • Scissors

- • Ruler
- • Pencil

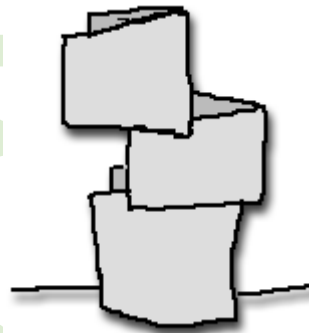
RULES:

1. Each tower must be constructed from paper and tape. No other materials or substitutions are allowed.
2. Students have a 45-minute period in which to construct their towers. Any modifications made to tower after the allotted 45-minute period will disqualify the tower. Late arriving students may enter the contest at any time after the 45-minute period has begun, however, they must stop when everyone else stops. No extra time will be allotted to late starters.
3. Each tower must be freestanding; it must not be attached to, lean against any other surface (e.g. floor, wall, desk, etc.), or inserted in holes in tabletop.
4. Towers must stand for 10 seconds.
5. Towers, whether standing straight/erect or sagging/curved, will be measured from base to highest vertical point. Towers that curve or sag may not be straightened and then measured; they will be measured to the highest vertical point while sagging or curving.

1. Towers will be judged
2. All students will start at the same time.

Reflection Questions:

1. How did you work together as a group?
2. Did you take a leadership role?
3. Did the leader change as the problem progressed?
4. What was your process of steps taken?



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LAB TITLE: Paper Towers

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
Students will build the tallest freestanding tower possible from a single sheet of paper
- **Grouping instructions and roles**
Students must only use the materials given in the 45 minute time allotment
- **Procedures** – steps to follow/instructions
Students are given the materials and will construct the paper towel with only the materials provided. They will have 45 minutes to complete the project
- **Outcome instructions**
Students will be able to work in a group and show problem solving skills by working together and showing leadership capabilities

Teacher will observe students but will not assist in their progress. Teacher will read reflection journals to assess students

Lab Data Collection

Student: _____ **Date:** _____

Unit: 1 Learning Problem-Solving Techniques

Lab Title: Paper Tower

Criteria: Write the problem/objective in statement form

Data Collection: Record the collected/given data

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

Summary Statement:

Other Assessment(s)

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