

Unit 01 Lab

Text: CORD

Unit number and title: Unit 01 – Learning Problem-solving Techniques

Short Description: Use paper and masking tape to build a tower

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Lab Title

Unit 01 Paper Tower

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**

Students will be able to:

- ✓ understand the problem solving process
- ✓ make decisions based on given criteria

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

Before doing the lab, students must be able to:

- ✓ measure height
- ✓ use tape
- ✓ fold, cut, manipulate paper
- ✓ add, multiply, subtract, divide
- ✓ sketch

- **Vocabulary**

Economics of decision-making

- **Materials List**

8.5"x11" paper
Masking tape
Distance measuring device (tape measure)

- **State Standards addressed**

A1.8.A Analyze a problem situation and represent it mathematically.

A1.8.B Select and apply strategies to solve problems.

A1.8.C Evaluate a solution for reasonableness, verify its accuracy, and interpret the solution in the context of the original problem.

Reading: (Reading)

Writing: (Writing)

- **Leadership Skills**

Working in groups

Communication

Problem-solving

- **SCAN Skills/Workplace Skills**

1.1 The student will demonstrate the ability to identify, organize, plan, and allocate **resources**. This means that the student is able to demonstrate allocating time, money, materials, space, and staff.

1.2 The student will demonstrate the ability to acquire and use **information** in a family, community, business and industry settings. This means that the student can acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information.

- **Set-up information**

Have accounting sheet with groups, budget, materials, evaluation, points

Group members	Budget	Materials	Points awarded

Have paper ready.

Have yard stick or other measuring device and scissors ready to measure and cut masking tape.

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; **-Timeline required**) (~60 minutes)

Organize in groups of 2 or 3.

Give instructions.

Every team is given a budget of 60 points.

Points are the unit of exchange.

Objective is to build the tallest freestanding tower.

Points are awarded as shown (see rubric).

Give students time to problem solve (make a plan)

Check group budgets and give materials according to their plan

Students build their paper towers using only their bought material

Timeline:

groups (~5 min); planning (~10 min); buying materials and building (~20 min); measuring (~15 min); cleanup (~5 min); debrief (~5 min)

- **Teacher Assessment of student learning** (scoring guide, rubric)

Budget:

Budget	60		
Material cost	Quantity		Total
Pieces of paper		30	
Length of tape (whole multiples of 1 foot)		20 / ft	

Points awarded:

Criterion	Points Available
Tallest in class	+50
Within budget	+10 + leftover from original budget
Over budget	-30 - borrowed amount
Free standing	+10
Free standing and sketch	+10 (must be done before build)
Free standing and under 8 in.	-20
Free standing and over 11 in.	+20
Free standing within ± 1 in of estimate	+10
Free standing within $\pm .5$ in of estimate	+20
Flat piece of paper or no tower	0

- **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

When would you use this? (estimating landscape job, solving problems, making decisions based on possibly conflicting criteria.)

- **Optional activities**
The activity may have different results with different prices, budgets, etc.
- **Career Applications**
Estimating and bidding jobs, solving problems in various fields, collaboration and group work.

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LAB TITLE: Paper Tower

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
Who can build the tallest tower?
(Who can score the most points?)
- **Grouping instructions and roles**
Line up by instructor option (i.e. birthday month and day)
Count off by 3.
Get in groups.
- **Procedures** – steps to follow/instructions
Look at criteria and plan to build the tallest tower with the given criteria.
Determine a budget and materials list based on that budget.
Sketch your tower.
Estimate the height of your tower
Buy materials for your tower.
Build your tower according to your sketch.
Measure the height of your tower.
Evaluate your tower based on given criteria.
Compare your tower height to your estimated/predicted height.
Add up the points from your tower.
- **Outcome instructions**
Did your building make budget?
Was it as tall as you estimated it would be?
Did you score as many points as you thought you would?
- **Assessment instructions** (peer-teacher)
Each team adds up their own points based on the criteria

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Paper Tower

Students: _____ Date: _____

Unit: 01 – Learning Problem-solving Techniques

Budget:

Budget	60		
Material cost	Quantity		Total
Pieces of paper		30	
Length of tape (whole multiples of 1 foot)		20 / ft	
		Total Cost	
Overage/Surplus from budget			

Checklist:

Sketch	
Free Standing	
Estimated Height	
Actual Height	
Difference between estimated and actual height	

Points awarded:

Criterion	Points Available	Awarded
Tallest in class	+50	
Within budget	+10 + leftover from original budget	
Over budget	-30 - borrowed amount	
Free standing	+10	
Free standing and sketch	+10 (must be done before build)	
Free standing and under 8 in.	-20	
Free standing and over 11 in.	+20	
Free standing within ± 1 in of estimate	+10	
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Flat piece of paper or no tower	0	

Summary Statement:

How did your plan for solving the problem work?

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