

WAMC Lab Template

Math Concept(s): Scale and Proportion

Source / Text:

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Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

Short Description (Be sure to include where in your instruction this lab takes place):

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Lab Plan

Lab Title: Paper Plane Lab (distance)

Prerequisite skills: The student should be able to take accurate measurements and compile and analyze a set of data

Lab objective: In this lab, students will construct a paper airplane of their chosen design and document the distance they travel. They will compare data and discuss the different characteristics of each construction and speculate about the influence the design had on the performance of the airplane

Standards: *(Note SPECIFIC relationship to Science, Technology, and/or Engineering)*

Mathematics K–12 Learning Standards:

- **HSS-IC.B**
- Make inferences and justify conclusions from sample surveys, experiments, and observational studies

Standards for Mathematical Practice:

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Attend to precision

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- **CCSS.ELA-LITERACY.SL.9-10.1.C**
Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.

K-12 Science Standards

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K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Washington

Technology

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Engineering

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Applied

Leadership/21st Century Skills:

<u>21st Century Interdisciplinary themes</u> (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/> Civic Literacy	
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
<u>21st Century Skills</u> (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	<input type="checkbox"/> Manage Projects
<input type="checkbox"/> Think Creatively	<input type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Produce Results
<input type="checkbox"/> Work Creatively with Others	<input type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<input type="checkbox"/> Leadership and Responsibility
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<input type="checkbox"/> Guide and Lead Others
<u>Critical Thinking and Problem Solving</u>	<input type="checkbox"/> Analyze Media	<input type="checkbox"/> Manage Goals and Time	<input type="checkbox"/> Be Responsible to Others
<input type="checkbox"/> Reason Effectively	<input type="checkbox"/> Create Media Products	<input type="checkbox"/> Work Independently	
<input type="checkbox"/> Use Systems Thinking	<u>Information, Communications and Technology (ICT Literacy)</u>	<input type="checkbox"/> Be Self-Directed Learners	
<input type="checkbox"/> Make Judgments and Decisions	<input type="checkbox"/> Apply Technology Effectively	<u>Social and Cross-Cultural</u>	
<input type="checkbox"/> Solve Problems		<input type="checkbox"/> Interact Effectively with Others	
<u>Communication and Collaboration</u>		<input type="checkbox"/> Work Effectively in Diverse Teams	
<input type="checkbox"/> Communicate Clearly			
<input type="checkbox"/> Collaborate with Others			

Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Copy paper
- Tape measure
- Painters tape

Set-Up Required:

- Mark a starting line on the ground with painters tape

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

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Cooperative Learning:

- For this lab students will work in pairs. Each student will be expected to construct a paper airplane using a design of their choosing and they will each be responsible for

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throwing their own plane for measurements. The pair of students will then be responsible for finding the mean of their two measurements and reporting to teacher.

Expectations:

In this lesson, I expect students to learn the relationship between construction and performance by using distance as a form of measure

Timeline:

- Deciding on a design and construction of a paper airplane should take 10-15 minutes. Conducting the throw/measurement should take a combined 20 minutes for every student to have a turn. Averaging both distances among each pair should take students 2 minutes. Compiling data and discussing design qualities and theorizing about their impact on performance should take 10 min.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- This lab will teach students to follow basic instructions, working collaboratively with a partner, constructing a product and respectfully sharing critiques.

Career Applications

- Working collaboratively. Looking at a constructed item and identifying potential downfalls to improve upon

Optional or Extension Activities

- This activity could be modified to discuss matters of velocity or mass and could even be tweaked to use slightly different weights of paper.

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