

Lab Framework

Text: CORD

Unit number and title: Unit 12 – Using Scientific Notation

Short Description: Develop a scale down reproduction of the Solar System using scientific notation.

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Lab Title Solar System Lab

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**
Make a scale down reproduction of our Solar System
- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)
Students will need prior skills of estimating answers, measuring in English and Metric Units, and using signed numbers and vectors.
- **Vocabulary**
Scientific notation
- **Materials List**
Calculators, student worksheet, rules, and colored chalk
- **GLEs (State Standards) addressed**
Math:
 - 1.1.1 Understand and use scientific notation (grade 9-10)
 - 1.1.5 Compute using scientific notation (grade 9-10)
 - 1.1.6 Complete multi-step computations of real numbers in all forms, including rational exponents and scientific notation, using order of operations and properties of operations. (grade 11-12)Reading:
 - 2.2.1 Demonstrates understanding of different purposes for writing
Writes for career applicationsWriting:
- **Leadership Skills**
- **SCAN Skills/Workplace Skills**
Writing
 - A. Communications thoughts, ideas, information and messages in writing
 - B. Records information completely and accuratelyMath
 - A. Performs basic computations
 - B. Uses basic numerical concepts such as whole numbers and percentages in practical application
- **Set-up information**
 - Make sure the calculators, colored chalk, and tape measures are ready in a specific area

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations;
-**Timeline required**)
 - Teams of two or individual working on specific tasks. Lab can be used as a review of scientific notation or as an introduction to scientific notation.
- **Teacher Assessment of student learning** (scoring guide, rubric)
Students will be assessed on the accuracy of their calculations.
Students will be assessed on the accuracy and creativity of their solar systems.
- **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
- **Optional activities**
- **Career Applications**
Map makers, Architects, Surveyors,

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LAB TITLE: Solar System

STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
Can you scale down the solar system into a workable model?
- **Grouping instructions and roles**
Students may work in teams of two or alone. If students work in teams, students should take turns performing the calculations with the other student checking their answers. If the students work in teams, the students need to take turn drawing their solar system and checking each other to make sure it is correct.
- **Procedures** – steps to follow/instructions
 1. Students are to write the distance from sun in scientific notation
 2. Students need to figure out the scale using the hall way's length as the distance from the Sun to Pluto.
 3. Students need to use the scale they developed to figure out the diameter of each planet in inches, the distance from the sun in inches, and change the inches to feet and inches.
 4. The students also need to figure out the scientific notation for the distance of each planet from the sun.
 5. Once all calculations are done, the students will go outside to the outdoor basketball court and draw their solar systems to their scale on the basketball court using colored chalk.
 6. The students will need to take the scaled data to build their solar system.
- **Outcome instructions**
- **Assessment instructions** (peer-teacher)
Students will be assessed on the accuracy of their calculations.
Students will be assessed on the accuracy and creativity of their solar systems.

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Lab Data Collection

Student: _____ Date: _____

Unit: 12

Lab Title: Solar System

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)

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Solar System Lab

- Complete the chart by converting the distances from the sun to scientific notation. Round the decimal part to the hundredths place.

Data:

PLANET	DIAMETER (KM)	DISTANCE FROM SUN	SCIENTIFIC NOTATION
Sun	1,392,530		
Mercury	4,880	57,900,00	
Venus	12,104	108,200,00	
Earth	12,756	149,600,000	
Mars	6,787	227,900,000	
Jupiter	143,800	778,300,000	
Saturn	120,660	1,427,000,000	
Uranus	50,800	2,869,600,000	
Neptune	49,500	4,496,600,000	
Pluto	2,300	5,900,100,000	

- Determine the scale: The length of the outdoor basketball court is 85 feet; let this represent the distance from the Sun to Pluto
- Use your scale to find the new scaled measurement and fill in a new chart with these measurements. These numbers should all be rounded to four decimal places and the distance from the sun should be rounded to the nearest whole number.

PLANET	DIAMETER (in)	DISTANCE FROM SUN (in)	SCIENTIFIC NOTATION	→ Feet and Inches
Sun				
Mercury				
Venus				
Earth				
Mars				
Jupiter				
Saturn				
Uranus				
Neptune				
Pluto				

- Go outside to the basketball and draw the solar system to your scale using the different colored chalk.