7th grade science

Name _____ Date _____ Block _____

Solar System Lab

Problem: Create a model of the solar system to scale.

Materials:

Chalk   Meter stick
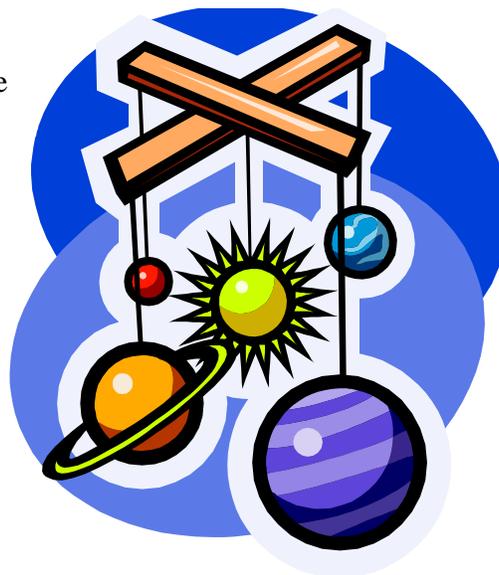
Calculator   Lab Worksheet

Question:

Why is it necessary to use scale distances when dealing with large distances like those

between the planets in the solar system?

_____

_____

Procedure:

1. Convert the various AU (*Astronomical Unit; an AU is the average distance from Earth 150,000,000 km*) distances to centimeters by multiplying by a scale factor of 10 centimeters per AU and complete the chart.

2. Measure & draw a line on the sidewalk 4.5m long.

3. Using the calculated distances, mark the planet on the sidewalk and write the planet's name.

4. When your model is done, please show the teacher for a grade.

Planet	Distance to Sun (km)	Distance to sun (AU)	Scale Distance (1 AU = 10 cm) (*To find scale, multiply the distance to the sun by 10*)
1. Mercury	5.97×10^7	0.39	
2. Venus	1.08×10^8	0.72	
3. Earth	1.50×10^8	1.00	
4. Mars	2.27×10^8	1.52	
Asteroid Belt *(This is where the Dwarf Planet Ceres is located)*	4.14×10^8	2.76	
5. Jupiter	7.78×10^8	5.20	
6. Saturn	1.43×10^9	9.54	
7. Uranus	2.87×10^9	19.19	
8. Neptune	4.50×10^9	30.07	
Dwarf Planet Pluto	5.91×10^9	39.5	
Dwarf Planet Sedna *(This does not go on your scale model, we don't have enough string)*	1.35×10^{10}	90	

When you are finished with your scale model, please show it to your teacher. The teacher will fill out the rubric below:

Labels: (3 – 0) _____ **Accurate: (3 – 0)** _____ **Participation: (3 – 0)** _____

Analyze your Data

1. Explain how a scale distance is determined.

   _____

   _____

2. How much string would be required to construct a model with a scale distance of 1 AU = 2m? _____

3. The rocket ship *HMS Science Queen* goes 700,000 kilometers an hour (this is as fast as the new Solar Probe Plus), which means it can travel 16,800,000 km or 1.68×10^7 in a 24 hr period (day).   Remember 1 AU is 150,000,000. It will take our space ship 8.92 days to go 1 AU. Fill in the chart below to find out how long out our journey through the solar system would take.

Planet	AU from Earth	Time
Sun	1.0	
Mercury	0.6	
Venus	0.3	
Earth	0.0	None, we launch from this planet
Mars	0.5	
Asteroid Belt	1.8	
Jupiter	4.0	
Saturn	7.83	
Uranus	18.0	
Neptune	29.0	
Pluto	38.0	
Sedna	89	

4. If we wanted to go to our nearest neighbor, Alpha Centauri which is 4.35 light years away, how long would it take to get there on our rocket ship? (*1 light year is 9,500,000,000,000 kilometers.)* _____

5. How fast does our rocket ship need to go if we wanted to visit Pluto is less than a year? _____ What is we wanted to make Pluto a day trip? _____

6. The Science Princess Becky wanted to build models of the planets to scale. She isn't sure which scale she should use. Fill out the chart below, and determine what would be the best scale for the Princess to use.

Planet	Diameter in km	Scaled Diameter 600km = 1 cm (BTW 600kn is the distance between CG & San Diego)	Scaled Diameter 4000 km = 1cm (Distance between Casa Grande & NY)
Sun	1,400,000		
Mercury	4,800		
Venus	12,105		
Earth	13,000		
Mars	6,900		
Jupiter	140,000		
Saturn	120,000		
Neptune	53,000		
Uranus	50,000		
Pluto	2,274		
Sedna	1,800		

What is the best scale for her to use? _____

7ᵗʰ grade science

Duke the Great Dane is being sent to all the planets. He weighs 185 lbs. What does he weigh on the other planets? What is your weight on other planets?

Planet	Gravitation Factor Relative to Earth (Times the weight by this number!)	Duke's Weight	Your Weight
Sun	27.9		
Mercury	0.38		
Venus	0.91		
Earth	1	100	
Moon	0.17		
Mars	0.38		
Jupiter	2.54		
Saturn	1.08		
Uranus	.91		
Neptune	1.19		
Pluto	.06		

Conclusion

3 - 5 sentences about what you have learned.

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