Plan for the day:

1) USE data calculated to size each celestial body to create the celestial objects assigned your table group. (Relative size of sun, planets asteroid belt and Halley's comet.)

2) Research, write AND share 5 facts about each celestial object (sun table must come up with 10!). Each group gets 2 index cards; sun group records information directly onto SUN.

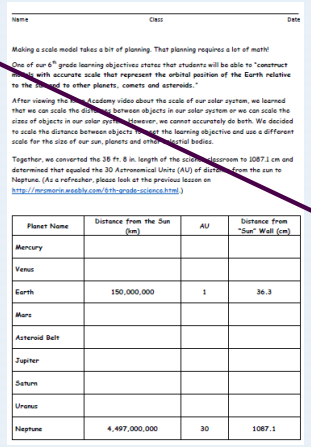
3) Present and ceremoniously hang each object.

Disciplinary Core Ideas:

MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).

Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.



Name Class Date

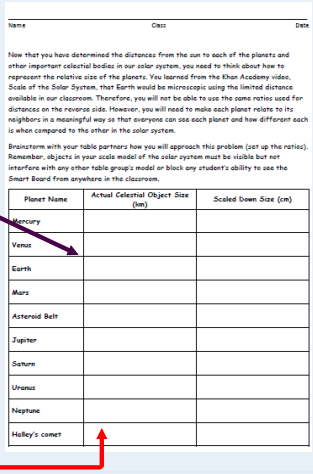
Making a scale model takes a bit of planning. That planning requires a lot of math!

One of our 6th grade learning objectives states that students will be able to "construct models with accurate scale that represent the orbital position of the Earth relative to the sun and to other planets, comets and asteroids."

After viewing the Khan Academy video about the scale of our solar system, we learned that we can scale the distance between objects in our solar system or we can scale the sizes of objects in our solar system. However, we cannot accurately do both. We decided to scale the distance between objects to meet the learning objective and use a different scale for the size of our sun, planets and other celestial bodies.

Together, we converted the 38 ft. 8 in. length of the school classroom to 1087.1 cm and determined that equaled the 30 Astronomical Units (AU) of distance from the sun to Neptune. (As a refresher, please look at the previous lesson on http://mrsmorin.weebly.com/6th-grade-science.html.)

Planet Name	Distance from the Sun (km)	AU	Distance from "Sun" Wall (cm)
Mercury			
Venus			
Earth	150,000,000	1	36.3
Mars			
Asteroid Belt			
Jupiter			
Saturn			
Uranus			
Neptune	4,497,000,000	30	1087.1



Name Class Date

Now that you have determined the distances from the sun to each of the planets and other important celestial bodies in our solar system, you need to think about how to represent the relative size of the planets. You learned from the Khan Academy video, Scale of the Solar System, that Earth would be microscopic using the limited distance available in our classroom. Therefore, you will not be able to use the same ratios used for distances on the reverse side. However, you will need to make each planet relate to its neighbors in a meaningful way so that everyone can see each planet and how different each is when compared to the other in the solar system.

Brainstorm with your table partners how you will approach this problem (set up the ratios). Remember, objects in your scale model of the solar system must be visible but not interfere with any other table group's model or block any student's ability to see the Smart Board from anywhere in the classroom.

Planet Name	Actual Celestial Object Size (km)	Scaled Down Size (cm)
Mercury		
Venus		
Earth		
Mars		
Asteroid Belt		
Jupiter		
Saturn		
Uranus		
Neptune		
Halley's comet		

Sep 25-6:22 AM

Done last class. Complete for HOMEWORK if necessary

Planet Name	Distance from the Sun (km)	AU	Distance from "Sun" Wall (cm)
Mercury	58,000,000	0.4	14.5
Venus	108,000,000	0.7	25.3
Earth	150,000,000	1	36.2
Mars	228,000,000	1.5	54.3
Asteroid Belt	550,000,000	3.7	133.9
Jupiter	778,000,000	5.2	188.2
Saturn	1,427,000,000	9.5	343.9
Uranus	2,871,000,000	19.1	691.4
Neptune	4,497,000,000	30	1087.1

Astronomy text: page 63

Astronomy text: page 71

Oct 2-10:20 AM

Using the same reasoning you used to determine the distance from the sun, determine the model size for EACH celestial body listed by making the SUN how many meter(s) in size.

You will calculate these values on your own.

Work cooperatively!

Use the calculators at the end of the student table.

Return the calculators at the end of class.

Name Class Date

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Venus		
Earth		
Mars		
Asteroid Belt		
Jupiter		
Saturn		
Uranus		
Neptune		
Halley's comet		

Use RATIOS like you did for the distances between the celestial objects!

Oct 3-7:01 AM

Jupiter's diameter is 142,800 km 14.3 cm

The sun's diameter is 1,400,000 km 140.0 cm

Jupiter is about 1/10th the size of the sun!

Does anyone notice anything interesting about these two numbers?

Mercury

$$\frac{4{,}878 \text{ km}}{1{,}400{,}000 \text{ km}} = \frac{X \text{ cm}}{140 \text{ cm}}$$

$$140 \text{ cm } (4878 \text{ km}) = 1{,}400{,}000 \text{ km } (X \text{ cm})$$

$$\frac{140 \text{ cm } (4878 \text{ km})}{1{,}400{,}000 \text{ km}} = \frac{1{,}400{,}000 \text{ km } (X \text{ cm})}{1{,}400{,}000 \text{ km}}$$

$$\frac{1}{10{,}000} = X \text{ cm}$$

Actually, a km is 100,000 times larger than a cm (100 cm/m and 1,000m/km). So the scale is even smaller than what we calculate above. BUT, because of the way in which this proportion was set up, we can simply move the decimal 4 places to the left and change the units from km to cm.

Oct 6-10:53 AM

	Planet Name	Actual Celestial Object Size (km)	Scaled Down Size (cm)
INNER	Mercury	4,878	0.5
	Venus	12,104	1.2
	Earth	12,756	1.3
	Mars	6,794	0.7
	Asteroid Belt page 122		
OUTER	Jupiter	142,800	14.3
	Saturn	120,520	12.1
	Uranus	51,200	5.1
	Neptune	49,500	5.0
	Halley's comet		
Added →	Sun	1,400,000	140.0

Oct 6-10:59 AM

REMINDER: Each table group will be assigned at least one celestial object to:

1) Provide information that will be hung with the model.

2) Make a two dimensional representation of your assigned celestial object(s) to hang on the solar system for your class.

3) All students will complete page 2 so you know what size to make all the celestial object should be in the class' model.

Oct 6-6:50 AM

All Tables Groups: Information MUST include Period of rotation and revolution!

Table 1 - SUN: 10 facts total (you have lots of space)

Five (5) facts for each celestial body below:

Table 2 - Mercury and Venus

Table 3 - Earth and Mars

Table 4 - Asteroid belt and Jupiter

Table 5 - Saturn and Uranus

Table 6 - Neptune and Halley's comet

Oct 6-6:50 AM

FROM LAST TWO LESSONS:

GOAL for all classes:

Complete the model by the END of our next class meeting (Monday, A-day & Tuesday, B-day)!

Today (Sept 12) (Sept 13)

No pressure!

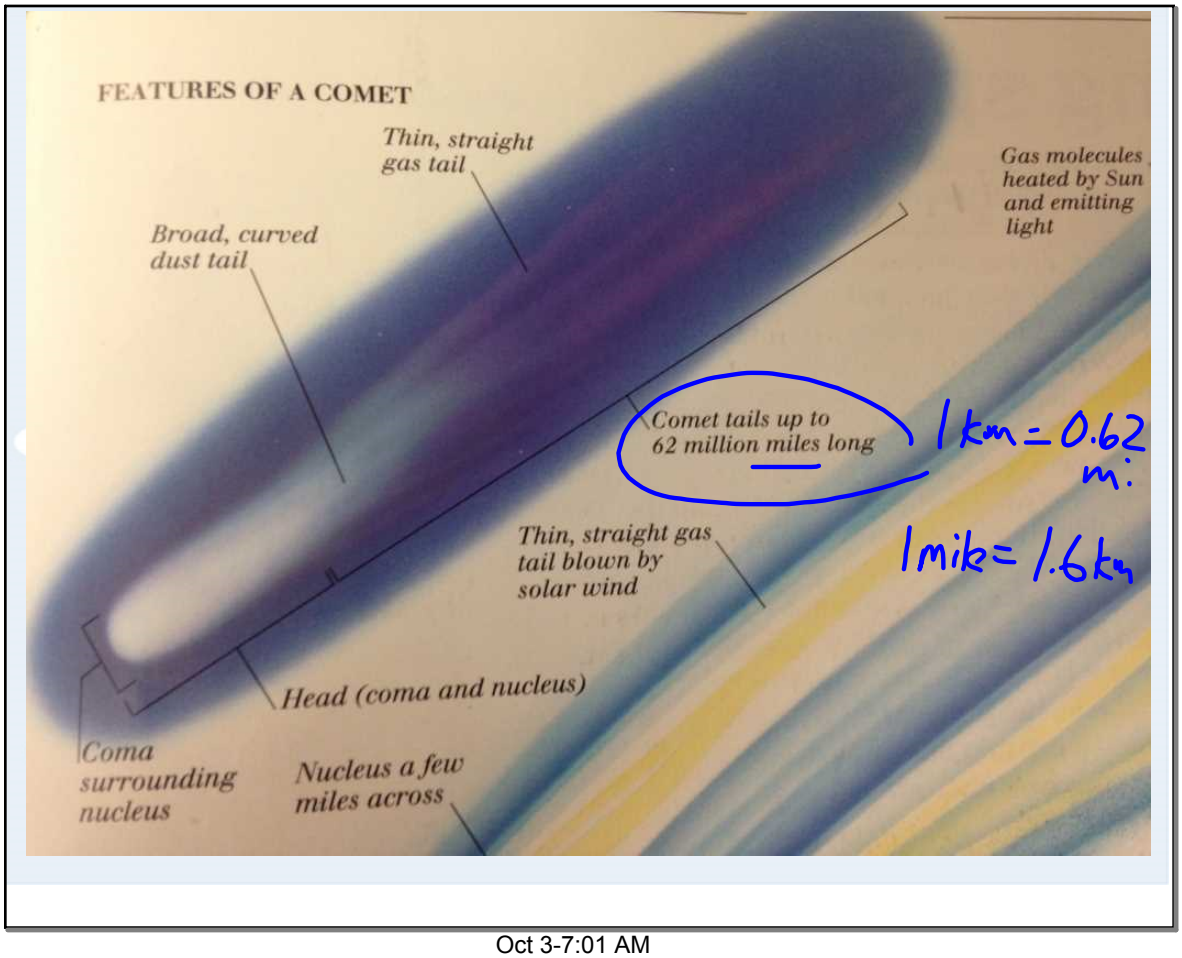
Resources available:

Space Science workbook (yours!) pages 74 -126;

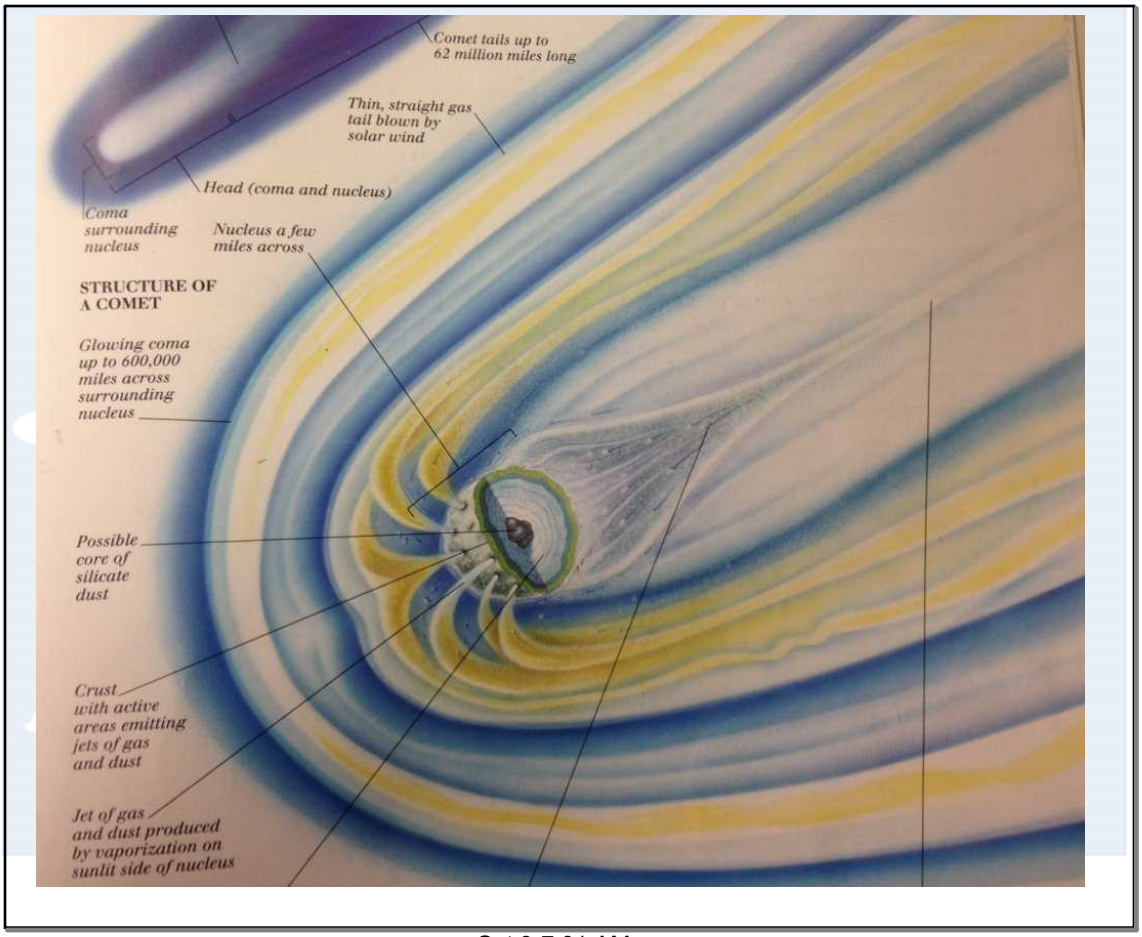
Astronomy text (4-6/table) pages 56 - 83;

Various items at the Student Table (return when done)

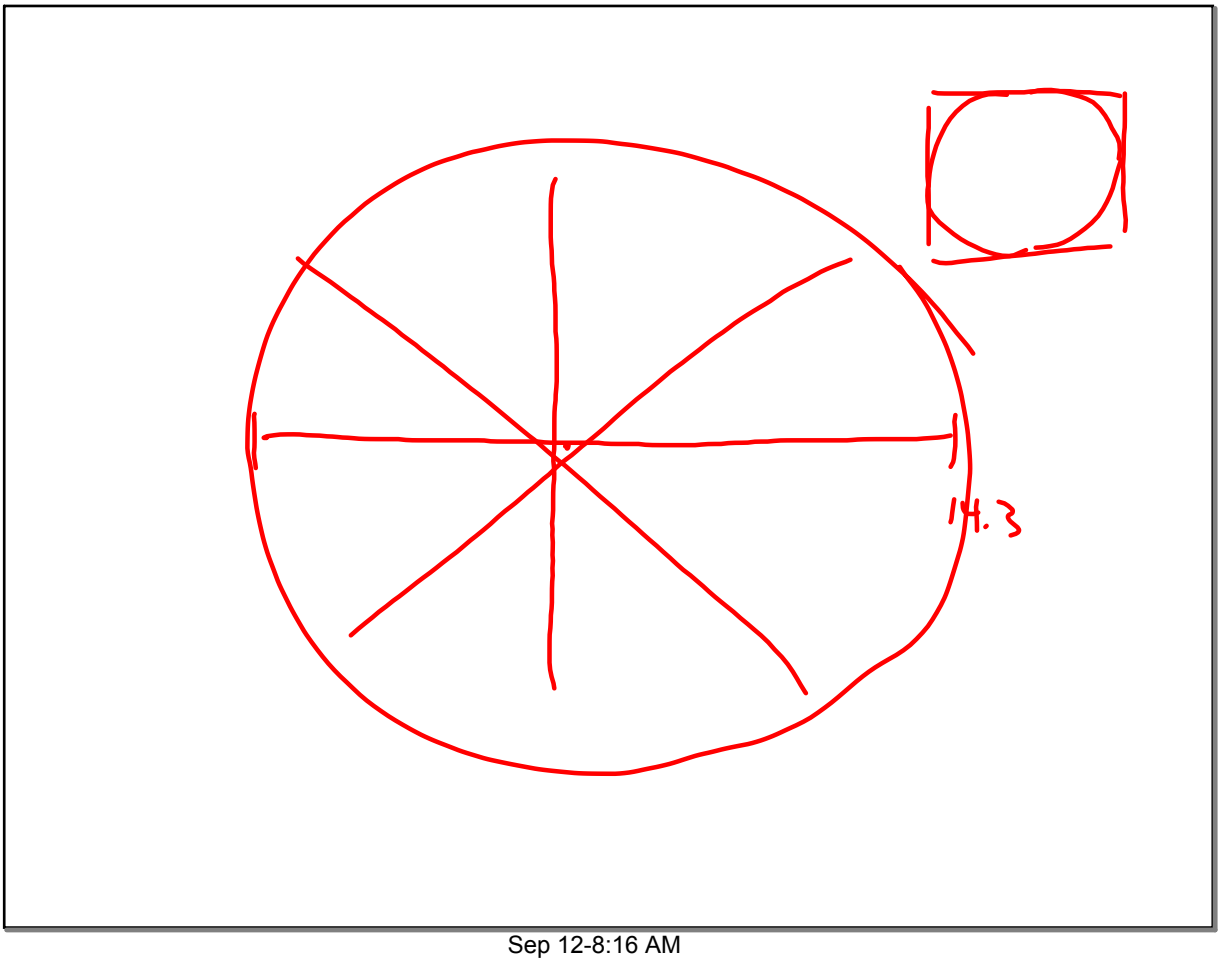
Oct 6-6:50 AM



Oct 3-7:01 AM



Oct 3-7:01 AM



Sep 12-8:16 AM

Attachments

- Scale of Earth and Sun.mp4
- Scale of Solar System.mp4