

Name _____ per _____ date _____ mailbox _____

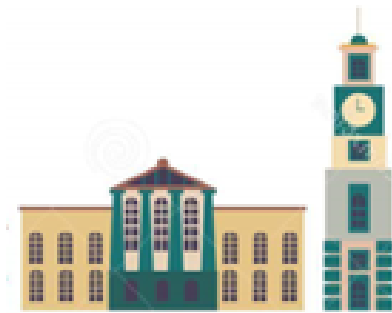
Understanding Scale Models Intro Powers of Ten "A classic" - <https://youtu.be/OfKBhvDjuy0>



Examine the above models of two vehicles. Were they side by side in real life would the scale of these appear to be off? Which seems too large & which seems too small. What does this mean in regard to the scale at which they have been depicted?

Directions Pg1. 1-4 SCALE IT DOWN

Below are two different model street layout views of buildings.



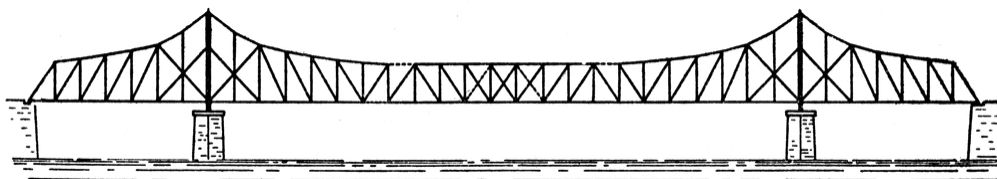
1. If 1cm = 5m how long is the street front tower to tower? _____

2. The clock tower building in reality is 15m tall or about 5stories. What is the scale of this image? How cm equals how many meters?
1 cm = _____ m



(1cm = 100 m) How long is this bridge?

3. An architect has drawn a model bridge for consideration by th NYS Bridge Authority to replace the Mid- Hudson Bridge. Their design must be at least 915m to span the river. Will this bridge work?

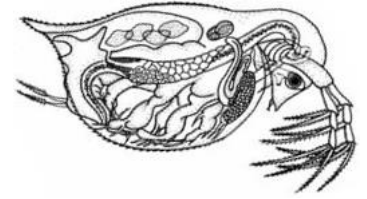


4. Here is a model drawing of the *Walkway Across the Hudson*. From Highland to Poughkeepsie the Walkway spans 1900 meters. What is the scale of this drawing. _____ cm = _____ m

5. **Measure the daphnia with a ruler in mm, (tail to head).**

Pg2. 5-8 SCALE IT UP

Say hi to Daphnia pulex. "Hi Daphnia pulex" Ha! you said hi. Yes it is real and no it is not an alien, but rather a species of zooplankton vital to many deep water lakes in New York State. Daphnia are extremely small however, and likely why you are unfamiliar with them. Because, they are small we measure them in micrometers. 1cm equals 10,000micrometer or (1cm = 10,000 μm).

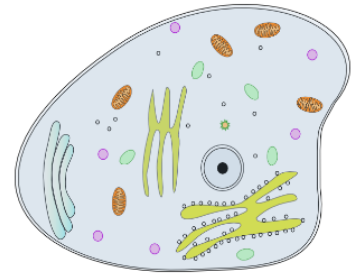


This daphnia is 0.2mm in reality which is 200 μm .
What is the scale of the model image here?

1. Measure the Daphnia, WRITE here \rightarrow _____ mm = 200 μm
2. Set up a proportion & report what 1mm equals to scale in box.

6. **Measure the daphnia cell with a ruler in mm.**

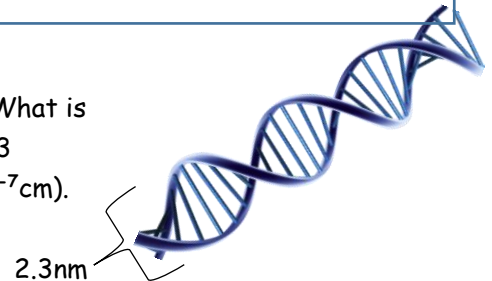
Here we have zoomed in on one of the daphnia's cells. How much has the scale changed by as we zoomed in? The cell is 10 micrometers across in reality. For reference a human skin cell is about 30 micrometers in diameter, so this is smaller.



1. Measure the cell, WRITE here \rightarrow _____ mm = 10 μm
2. Set up a proportion & report what 1mm equals to scale in the box.

7. **Measure DNA diameter.**

The DNA strand found in the daphnia cell is extremely small in diameter, What is the scale in this model. The length of a nucleotide "ladder rung" is about 2.3 nanometers, which is the diameter. 1 nanometer equals 10^{-7}cm (1nm = 10^{-7}cm).
What is the scale depicted here?

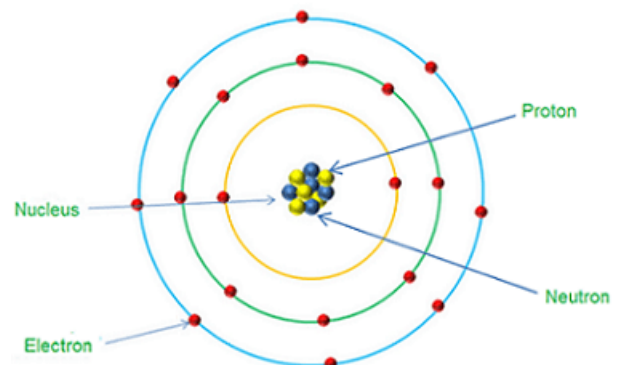


1. Measure the DNA's diameter, WRITE here \rightarrow _____ mm = 2.3nm
2. Set up a proportion & report what 1mm equals to scale in the box.

8. **Measure the atom's electron shell diameter.**

The atom is a building block of this strand of DNA. What is the scale of this model if this atom is 0.2 nanometers in diameter.

1. Measure the DNA's diameter, WRITE here \rightarrow _____ mm = 0.2nm
2. Set up a proportion & report what 1mm equals to scale in the box.



An **atom** is one of the basic units of matter. Everything around us is made up of **atoms**. An **atom** is a million times smaller than the thickest human hair. The diameter of an **atom** ranges from about 0.1 to 0.5 nanometers (1×10^{-10} m to 5×10^{-10} m).

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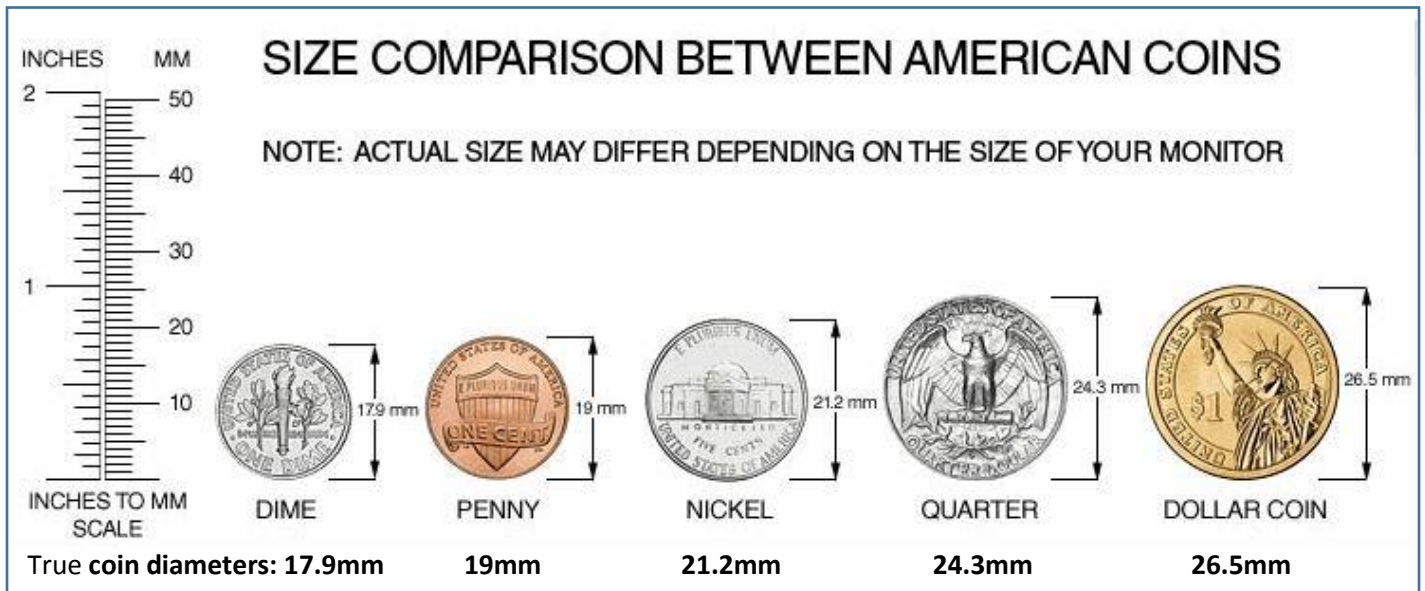
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Scale - this is the ratio of dimensions related to a model, map or even microscopic image that explains the size or distances represented. Scale is typically represented in terms of a ratio. ex: 1:50, 1:1000, 1:300,000. One unit, perhaps 1 inch on the page maybe equal to 50 miles on a map (1":50m) or oppositely a model of a something very small can be blown up to visualize the very small 1cm equaling 1000 nanometers (1cm:1000nm).

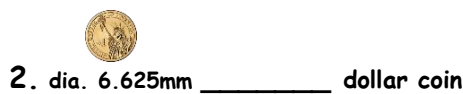


It is best to first think in terms of a fraction, then convert to a ratio. The penny below is approximately 9.5mm in diameter. The diameter of this penny is how much of an actual penny?

Scale is a ratio, so we can use proportions to solve.



The diameter is $\frac{1}{2}$ of normal penny so the scale is [1:2]. Another way to think it, 1mm here is equals 2mm if the penny represent an image of actual penny.





**1. Do these objects appear to be to scale (proportionally speaking)?
Yes or no, explain.**



2. Assume this image has been altered. The scale of which part has been photoshopped. Has it been scaled up or scaled down?



3. Assume this image has been altered. The scale of which part has been photoshopped. Has it been scaled up or scaled down?



4. Describe the scale of this camera.

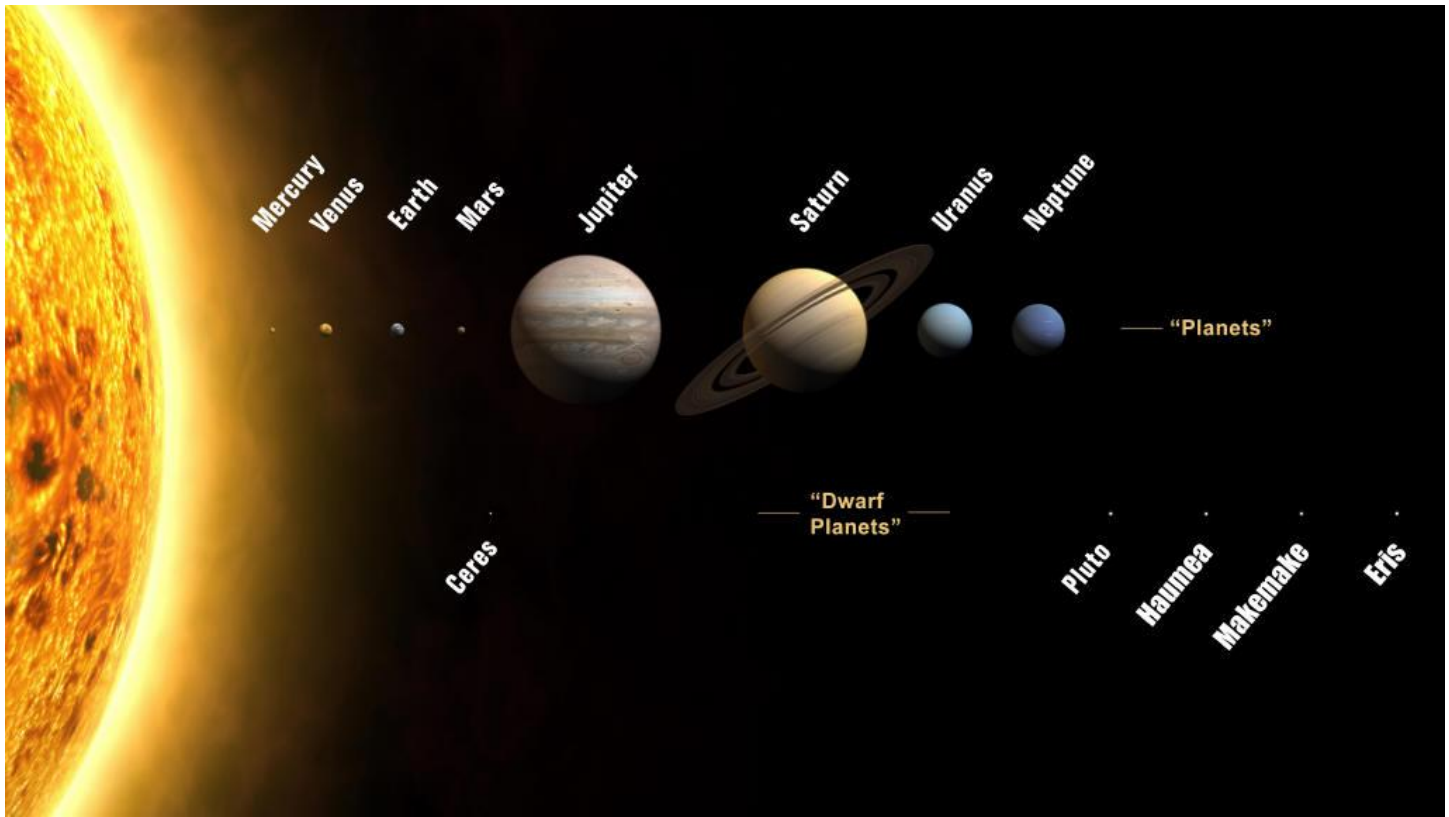




5. Which object appears to be a model? Has the object been scaled up or scaled down?

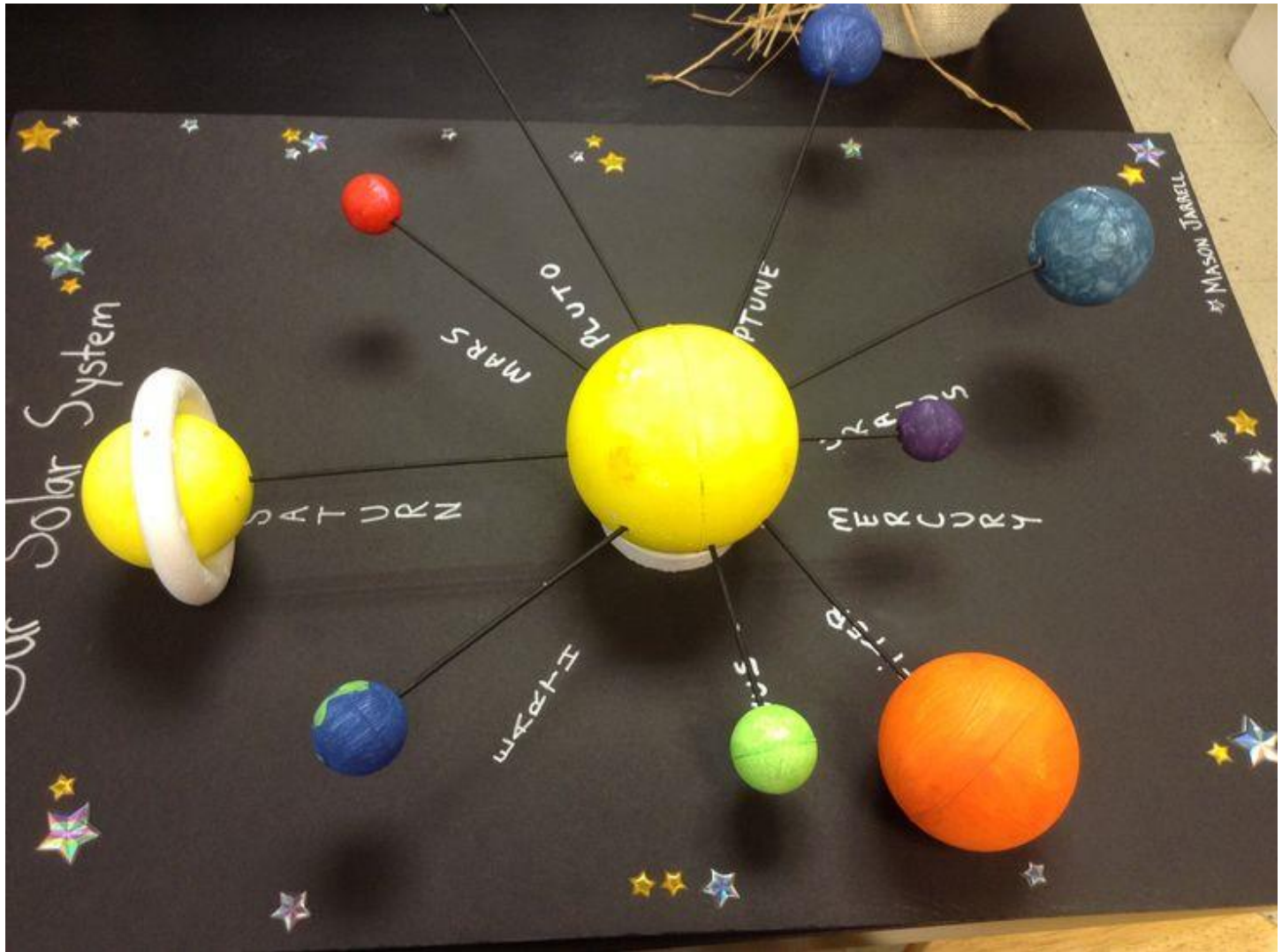


6. The scale of this image (picture) has likely been modified (photoshopped). In your opinion which part has been scaled up and which has been scaled down.



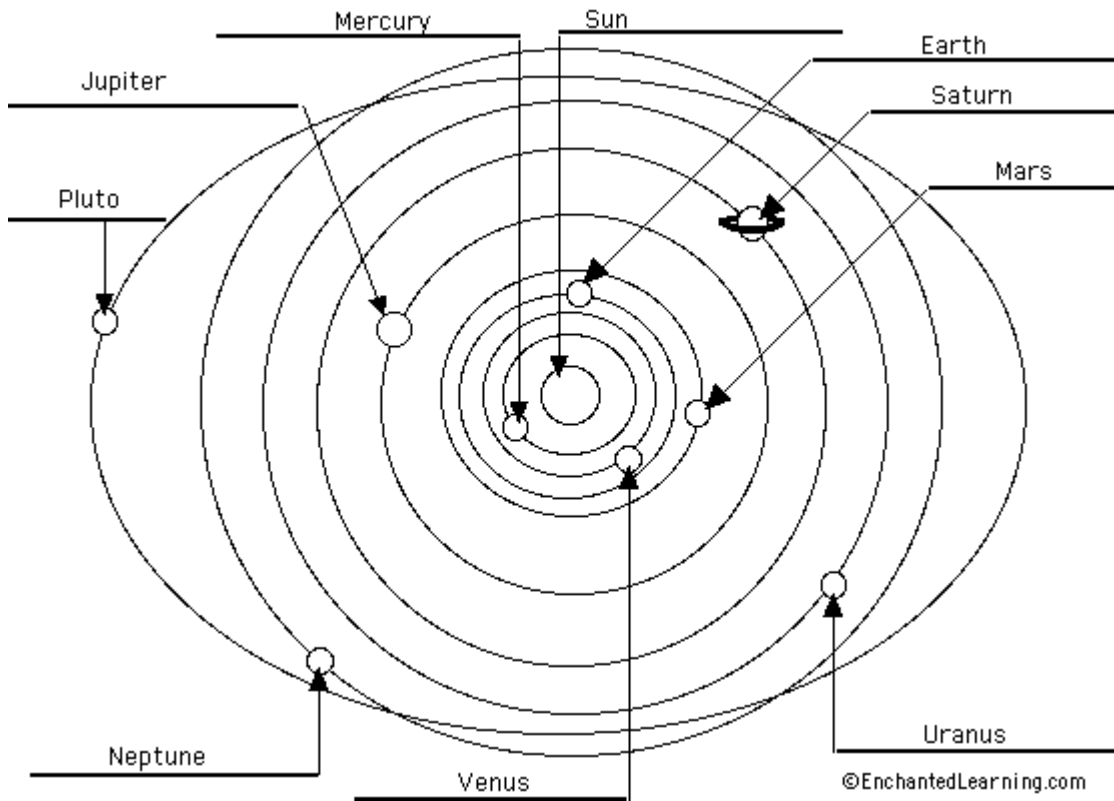
7. Based on your present knowledge of the solar system does this image appear to be to scale.

Yes or no, explain.



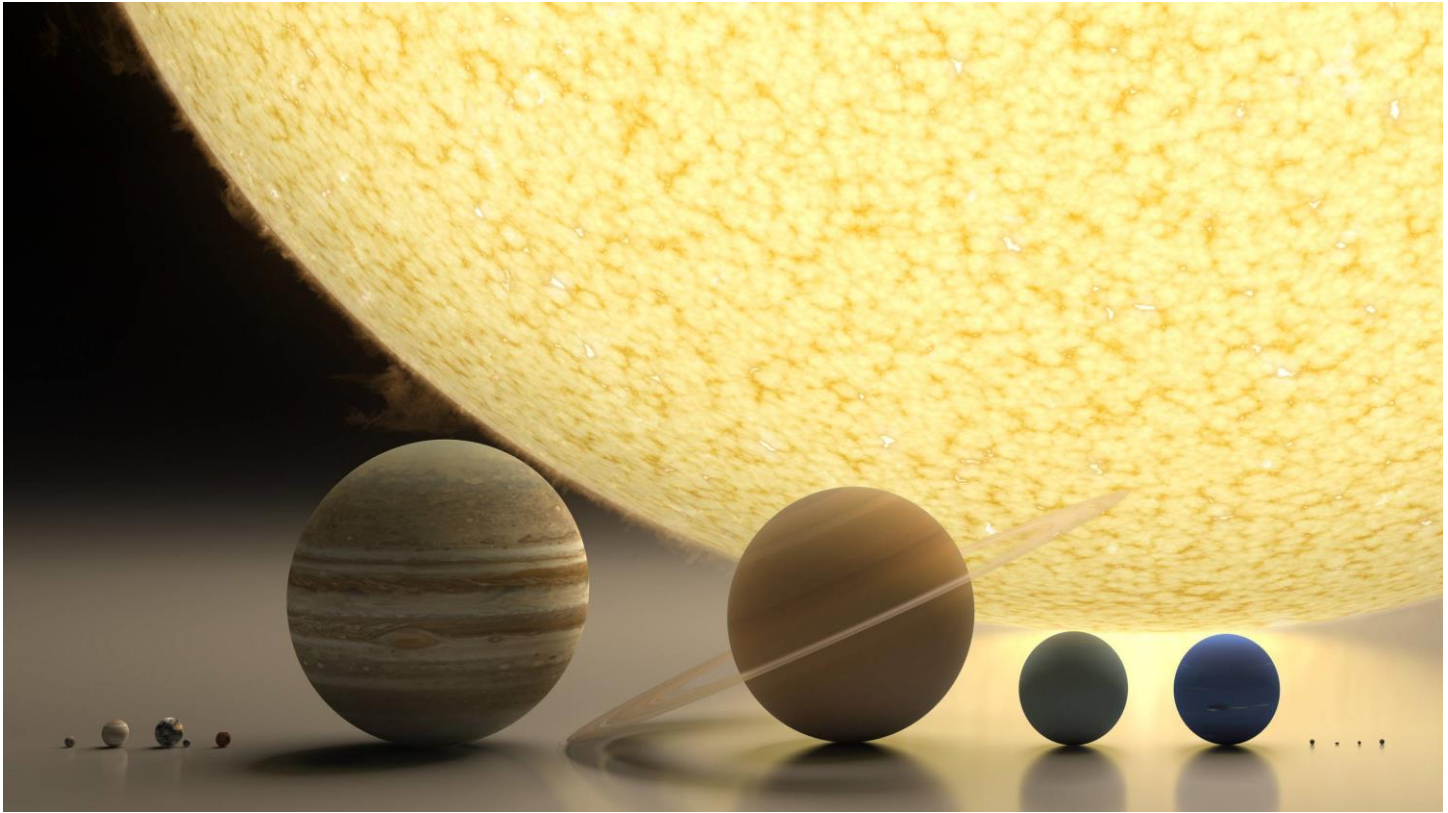
8. This is a beautifully done classroom mobile of a solar system. Does it appear to be to scale?

Yes or no, explain.



9. This is a solar system diagram. Does it appear to be to scale?

Yes or no, explain.



10. This is a graphic artists computer generated image of our solar system. Does it appear to be to scale in regard to planet size ?
Yes or no, explain.

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1. Describe the scale of this camera.
2. Which object appears to be a model? Has the object been scaled up or scaled down?
3. The scale of this image (picture) has likely been modified (photoshopped). In your opinion which part has been scaled up and which has been scaled down.
4. Assume this image has been altered (changed). The scale of which part has been photoshopped. Has it been scaled up or scaled down?
5. Assume this image has been altered. The scale of which part has been photoshopped. Has it been scaled up or scaled down?
6. Does this object appear to be to scale (proportionally speaking)? Yes or no, **explain**.
7. Based on your present knowledge of the solar system does this image appear to be to scale. Yes or no, **explain**.
8. This is a beautifully done classroom mobile of a solar system. Does it appear to be to scale? Yes or no, **explain**.
9. This is a solar system diagram. Does it appear to be to scale? Yes or no, **explain**.
10. This is a graphic artists computer generated image of our solar system. Does it appear to be to scale in regard to planet size? Yes or no, **explain**.