



# Forget Measuring – Just Fold!

Become aware of the spacing of our solar system and the vast distances between objects!

## Materials

- Solar System Trading Cards Jr  
[http://amazing-space.stsci.edu/resources/print/activities/solsyst\\_tradecards\\_jr.pdf](http://amazing-space.stsci.edu/resources/print/activities/solsyst_tradecards_jr.pdf)
- 2 meters of adding machine tape
- Colored pencils or crayons
- Pencil

## Directions:

Make a scale model of the solar system on calculator tape by placing the planets at the correct distance from the Sun without using a ruler to measure the distances.

1. Collect a set of Solar System Trading Cards Jr, a set of colored pencils or crayons, a pencil, and 2 meters of calculator tape.
2. Use the Solar System Trading Cards Jr to help you arrange your planets in order, based on their distance from the Sun.
3. Your tape represents 40 times the distance from the Sun to Earth. Astronomers call the distance between the Earth and the Sun an AU. It happens that the dwarf planet, Pluto, is 40 AU from the Sun. So if Pluto is 40 times Earth's distance from the Sun, it is 40 AU from the Sun. With this in mind, where should you draw the Sun and Pluto on this tape?
4. Draw the half Sun on the very edge of the tape on the left side and Pluto on the end of the tape on the right side. Label the Sun and Pluto. The chart at right shows the distance, in AUs, between the Sun and the planets. Look at the chart and find a planet that is about half of Pluto's distance from the Sun – about 20 AUs. Now think about how you can find the middle of the tape.
5. Fold the tape in half by lining up the ends and crease the tape. The crease represents 20 AUs (Write 20 AUs on this line. Label all other creases as you make your model.). But Uranus is not quite that far from the Sun. So draw Uranus to the left of this crease and label it. Now fold the tape back

Planet	AU
Mercury	.4
Venus	.7
Earth	1.0
Mars	1.5
Asteroids	~2.5
Jupiter	5.2
Saturn	10
Uranus	19.
Neptune	30.
Pluto	40



## Forget Measuring – Just Fold!

---

in half again and then fold it in half a second time. Crease it to make new folds. Open up the tape. You now have two new creases: one between the Sun and Uranus and one between Uranus and Pluto. What distances do these creases represent?

6. The crease between the Sun and Uranus is at 10 AU; the other one is at 30 AU. (Remember to label these distances.) Now look at the chart again. Are there any planets near 10 and 30 AU from the Sun?
7. Saturn is 10 AU from the Sun. Draw it on the left side of the fold that is half way between Uranus and the Sun. Neptune is at 30 AU from the Sun. Draw it on the fold that is half way between Uranus and Pluto. Now compare the tape with the chart. Are all the planets beyond the orbit of Saturn on the tape? Next fold the tape so the end with the Sun drawn on it meets the fold at 10 AU and crease it. What distance marks the crease? Is there a planet at that point?
8. All the planets from Saturn outward are on the tape. The crease made in the previous step is at 5 AUs. (Write this on your tape.) Jupiter is at about 5 AU. Draw Jupiter on the fold at 5 AUs and label it, half way between the Sun and Saturn. Fold the tape so that the end with the Sun is at 5 AUs where you just drew Jupiter and crease the tape. What distance marks this crease? Is there a planet at this distance?
9. The new fold line marks 2.5 AUs. The asteroids are found here. Write "asteroid belt" on the fold, half way between Jupiter and the Sun. Draw some dots to represent the asteroids. Fold the tape so that the Sun is at 2.5 AUs and crease the tape. What distance marks this crease? Is there a planet at this distance?
10. The crease marks 1.25 AUs. There is not a planet at this point, but Mars is a little farther (1.5 AUs), and the Earth is a little closer (1 AU). Draw Mars on the right side of the fold and Earth on the left side. These planets should not be on the fold, but they should be about the same distance from it. Fold the tape so that the end with the Sun is at 1.25 AUs and crease the tape. What distance marks this crease? Is there a planet at this distance?
11. The crease marks 0.62 AU, and Venus is just a bit farther. Place Venus just to the right of this new fold. Fold the tape so that the end with the Sun is on the fold at 0.62 AU and crease the tape. What distance marks this crease? Is there a planet at this distance?