

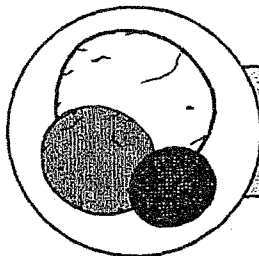
WORLDS IN COMPARISON

BY DENNIS SCHATZ (*Pacific Science Center*)



An Activity for the Whole Family from Project ASTRO™

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390 Ashton Ave., San Francisco, CA 94112 ■ www.astrosociety.org/education.html



Recommended for Ages: 7 and up

Time to Do: 30 minutes

Type of Activity: Station or Group

Set up Time: 10 minutes

WHAT'S THIS ABOUT?

This activity allows families to develop an understanding of the relative sizes (volumes) of the planets in our solar system. Families start with a big ball of Play Dough and divide it up following the steps on the instruction sheet. When they are done, they see how the planets vary in size. By the time they get to tiny Pluto, they are typically quite amazed.

MATERIALS INCLUDED

- Recipe for Kool Aid® Play Dough
- Worlds in Comparison instruction sheet
- Worlds in Comparison sheet with boxes for each planet

MATERIALS YOU'LL NEED TO GET

- Play Dough, minimum of 3 pounds per station *~ 8 5oz tubs*
- Dinner knife – plastic is fine
- Breadboard, butcher paper, wax paper or other appropriate surface for cutting Play Dough

SETTING UP THE ACTIVITY

This activity works best if the instruction sheet and sheet with the planet names are placed side-by-side on a table.* In front of these sheets place the Play Dough and knife on the breadboard. Be sure there is enough room in front of the table for the family to work together. It is crucial to have enough Play Dough for each family or table, or the Pluto piece will be too small to see. We recommend three pounds each and urge you to try the activity for yourself before leading it. If people will be using previously used Play Dough of various colors, you can reassure participants that mixed colors are fine. After all, many planets are multicolored.

*Consider having families line their three sheets with planet boxes in a row to match the order from the Sun.

SUGGESTIONS FOR INTRODUCING THE ACTIVITY

This activity can be done as a station you set up for participants to try on their own or as a facilitated group activity.

If you set this up as a station, no introduction is needed other than the general invitation for the families to try the different station activities around the room.

If you facilitate this activity with a group, begin by asking the families which planet they think is the largest? Which is the smallest? Ask them how they know. Whatever planet they say is the largest – it will most likely be Jupiter – ask them the following question: If we could combine all the planets together into a big ball, what fraction of that ball would the largest planet be? Might it be $1/9$ or $1/5$, for example?

DOING THE ACTIVITY

If done as a facilitated activity, ask families to read the instruction sheet on their table and begin working with the Play Dough. After families divide up the Play Dough, be sure they finish by combining all of the pieces for each planet and roll them around in their hands until each Play Dough planet has a ball shape. If this is a station, have a volunteer nearby to offer this reminder.

Right after a family completes the activity you can use the questions in the next paragraph to debrief what they learned, or you can save the questions until all families finish the activity. If this is a station, once a family is done, ask them to combine the Play Dough again so it is ready for the next family. If you are going to debrief the activity with the entire group, you will want to save the work of the last family to finish so you can use the balls during the debriefing.

Debrief the activity by asking them what were some of the discoveries they made regarding the sizes of the planets. Were there any surprises? Ultimately direct the discussion so that they realize the smaller planets (except Pluto) are the inner planets, while the larger planets are the outer planets. You may also want to note that more than 96% of the combined volume of the planets is in Jupiter and Saturn (approximately 60% in Jupiter and 36% in Saturn). Those giant planets really ARE giants.

Play Dough can be made using the recipe here but is also available in many stores (look for special sales to stock up.) One supplier we found online is:

Bright Ideas 888-883-7422 \$9.95 for 3 pound tubs, a variety of colors: http://www.brightideasweb.com/product.asp?item_id=169075

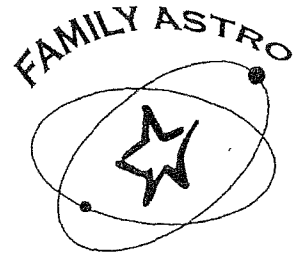
Kool-Aid™ Play Dough Recipe

This is easy to make, smells good, and it won't harm your child if they taste it.

- 2 ½ cups of flour
- ½ cup salt
- 2 packages dry unsweetened Kool-Aid
- 2 cups boiling water
- 3 tablespoons oil

Mix the dry ingredients together in a bowl. Mix the liquids together and pour them over the dry ingredients. Stir the mixture until it forms a ball (this may take a while – keep stirring). As the mixture cools, it will become less sticky. After the mixture has cooled, take it out of the bowl and knead it until it is smooth.

Worlds in Comparison



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What's This About?

This activity demonstrates the different sizes of the planets. Follow the steps outlined below to see the relative size (volume) of each planet. Start with a big (2-3 lb.) ball of Play Dough. The entire ball represents the volume of all the planets combined.

① Divide the Entire Ball of Play Dough into 10 Equal Parts

You may find it easiest to start by rolling the ball into one big hot dog shape.

- ☞ Put 6 parts into the Jupiter box.
- ☞ Put 3 parts into the Saturn box.

② Cut the Remaining Part Into 10 Equal Parts

- ☞ Put 5 parts into the Saturn box.
- ☞ Put 2 parts into the Neptune box.
- ☞ Put 2 parts into the Uranus box.

③ Cut the Remaining Part Into 10 Equal Parts

- ☞ Put 9 parts into the Saturn box.

④ Cut the Remaining Part Into 2 Equal Parts

- ☞ Put 1 part into the Earth box.

⑤ Cut the Remaining Part Into 10 Equal Parts

- ☞ Put 9 parts into the Venus box.

⑥ Cut the Remaining Part Into 10 Equal Parts

- ☞ Put 9 parts into the Mars box.

⑦ Cut the Remaining Part Into 10 Equal Parts

- ☞ Put 9 parts into the Mercury box.
- ☞ Put 1 part into the Pluto box.

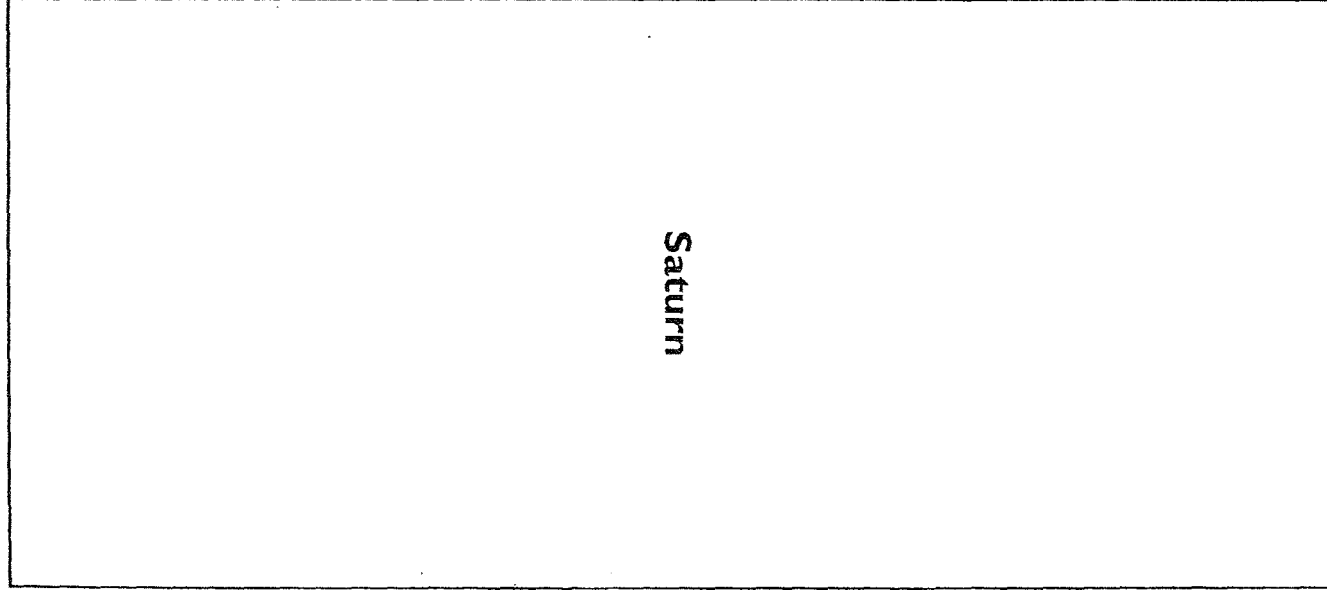
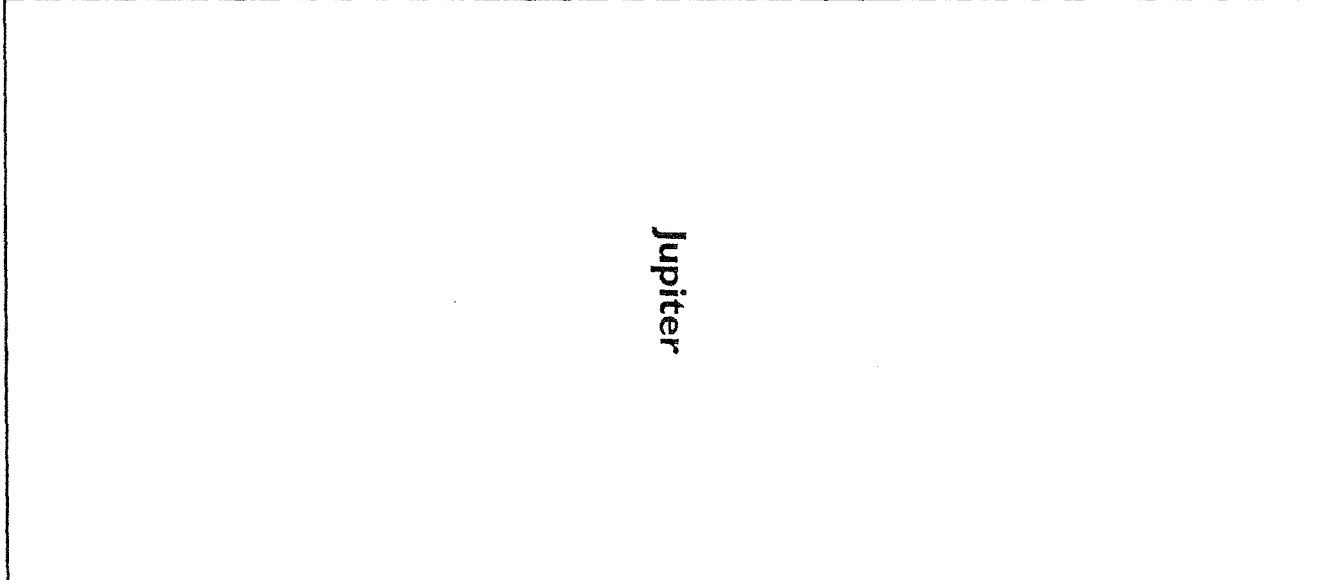
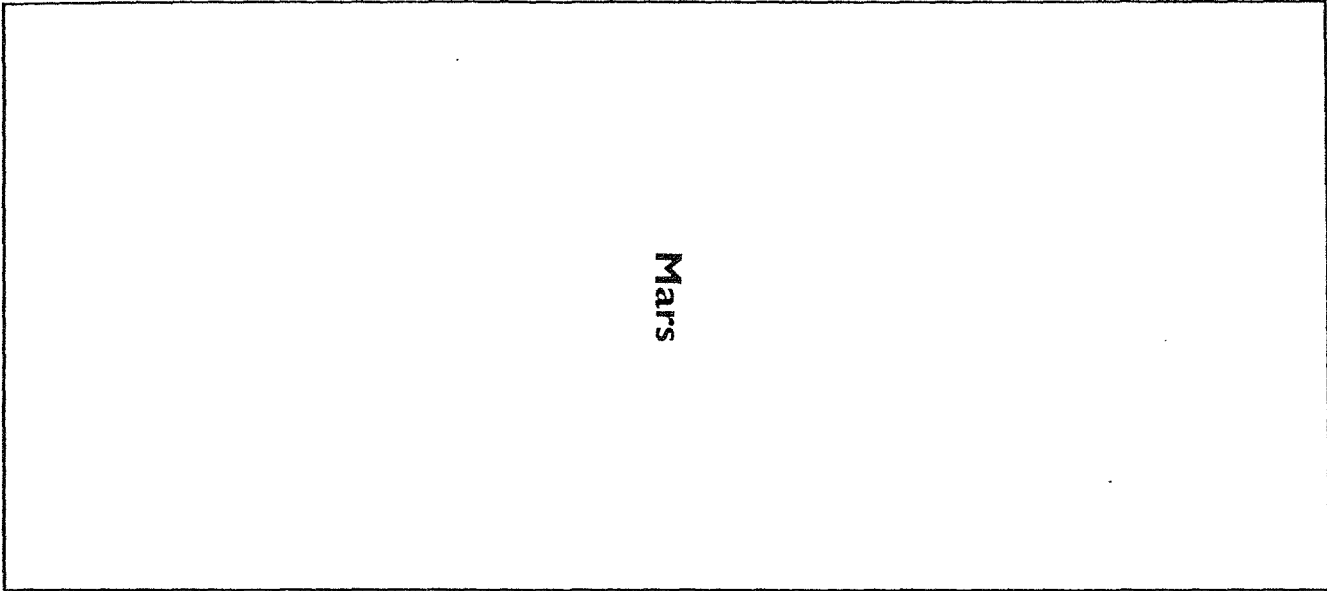
And Now...

Now that you have divided the Play Dough by volume, roll the pieces in each planet's box into balls to best represent the shapes of the planets.

Earth

Venus

Mercury



Pluto

Neptune

Uranus