

EYH “MAPPING THE SOLAR SYSTEM” WORKSHOP, 3/19/05

Sentences in regular font are instructions to us, the workshop leaders.

Sentences in italics are things we will say to the class.

Setup:

- arrange room (need lots of floor/table space)
- write/draw on board
- place flags on planet walk
- distribute handouts and models to “planets”
- check for pencils & paper
- locate nearby bathrooms
- locate hallways and other nearby roomy locations to roll out paper

I. Intro (15 minutes)

1. Sukanya: *welcome, background, interests. Today we’re going to imagine that we’re explorers from an alien world who have discovered Earth’s Solar System. As we approach it, here’s what it looks like. Refer to SS drawing/picture. The first thing we’ll do today is “fly” through this strange solar system and make some measurements of it. To do that, we’ll need to form two teams.*
2. *Everybody stand up. I want you to line up alphabetically by first names. So look at each other’s nametags and arrange yourselves in order.*
3. Holly and Julia help the girls do this. Then Sukanya divides the line into two roughly equal teams (10-13 girls each). Holly and Julia each join a team. Sukanya: *Now introduce yourselves to your teammates and your team leader, and choose a team name.*
4. Holly and Julia start off the process: *name, research, interests. Tell me your names, where you live/go to school, things you like.* They help the girls choose a team name, then hand out folders and data sheets and make sure everyone has a pencil.
5. Sukanya: *In just a few minutes, our spacecraft will arrive at Earth’s Sun. Then we’ll measure the distances to the planets by counting the number of steps it takes us to walk to them. You can leave your things in the room if you want.*
6. Everyone leaves the room. Holly and Julia try to keep their teams reasonably close together; others spread out to their planet locations (Amanda—Mercury, Bonnie—Venus, Sukanya—Earth, Ruth—Jupiter, Jennifer—Neptune).

II. Planet Walk (30 minutes)

1. Holly's team goes first. Cassie: *name, major, research, interest*. She shows them the Sun model and hands out Sun pages. *Sun facts*. Holly points out Mercury, leads team in walking toward it, helps girls count if they need it, makes sure they all have the same number written down at the end. Keep track of whether they're counting from the Sun or between planets. Then the same for Julia's team. Cassie then moves down the walk to become Mars.
2. Same for Amanda with Mercury; she moves down the walk to become Uranus.
3. Same for Bonnie with Venus; she moves down the walk to become Saturn.
4. Same for Sukanya with Earth; she is now done and can walk with a group.
5. Same for Cassie with Mars, except for introducing herself. She is now done.
6. Same for Ruth with Jupiter; she moves down the walk to become Pluto.
7. Same for Bonnie with Saturn, except for introducing herself. She is now done.
8. Same for Amanda with Uranus, except for introducing herself. She is now done.
9. Same for Jennifer with Neptune. She is now done.
10. Unless time is running out (Jennifer will decide), same for Pluto with Ruth, except for introducing herself. She is now done.

III. Break (15 minutes)

1. Holly and Julia round up the teams for the trek back to "home base." Others tag along. Talk to the girls: *did you enjoy the activity? Which planet was your favorite? etc.*
2. One or two people take girls to the bathroom and back; others talk to the girls who stay in the room. Someone erases the board, puts new info on it with Bonnie's supervision. Holly and Julia tell the others their Earth distances (which may differ between the groups).

IV. Scale Model Calculations (15 minutes)

1. As girls get settled, a few of us distribute paper rolls, tape measures, calculators, scratch paper, extra pencils if needed.
2. Bonnie: *Now we're going to make a "map" to take home to our alien friends. Explains scale models, gives "mini-me" example. If we convert the Earth distance into 1 meter, the whole SS will fit on this roll. First we have to figure out where all the other planets go. Explains how to fill out remaining columns of the data sheet.*
3. Girls make calculations; we circulate to help out if necessary. Watch out for too many significant figures, or people being confused about measurements from the Sun vs. between planets. People who finish early can assemble their planet notebooks. Collect calculators as they finish.

V. Scale Model Construction (20 minutes)

1. Bonnie: *Now it's time to make our maps! Gives brief demo with unused roll, points out planets are all just specks on this scale, so they should be well labeled. Reminds them about meters and centimeters: $0.8 \text{ m} = 80 \text{ cm}$, $1.3 \text{ m} = 130 \text{ cm}$. Reminds them to use the metric side of the tape measures. *Get a partner or two from your group and find a spot to spread out.**
2. Girls spread out to make the models; we circulate to help out if necessary. Suggest ways they can help each other; resolve any numerical problems. Remind them they can roll the other end up as they go. They should finish the map first; then if there's time, they can go back to draw, add stickers, assemble and decorate their folders, etc. Circulate tape to attach Pluto end to the core of the roll.

VI. Cleanup and Evaluations (10 minutes)

1. Bonnie circulates to announce that time is almost up and the girls should roll up their maps and come back in the room. The rest of us help anyone who's not finished.
2. All of us help the girls roll up their maps and secure them with rubber bands (or stuff them into bags if necessary).
3. A couple of us hand out evaluations. Bonnie: *Thanks for coming; we had a great time! Please fill out these forms to tell the conference leaders how you liked this workshop. When you're done, you can go!*

Before lunch:

Get things organized for afternoon session

At end of lunch:

Check that planet flags are still in place

Erase board and rewrite/draw for next intro

After second session:

Clean up

Return EYH materials

Load supplies back into cars

Decide who will stay for reception

SOLAR SYSTEM SCALES

	Diameter (mm)	Distance (m)	Distance (ft)	Distance (miles)	Distance (~steps)	Distance (AU, m)	Diameter (mm)
Sun	139	0	0	0	0	0	9.4
Mercury	0.5	5.8	19.0		7	0.39	0.04
Venus	1.2	10.8	35.5		13	0.72	0.08
Earth	1.3	14.9	49.1		18	1.00	0.08
Mars	0.7	22.8	74.8		27	1.52	0.04
Jupiter	13.9	77.8	255.3		94	5.20	1.0
Saturn	11.6	142.7		0.09	172	9.54	0.8
Uranus	4.7	287.0		0.18	345	19.19	0.4
Neptune	4.5	450.0		0.28	541	30.06	0.4
Pluto	0.2	591.3		0.37	711	39.53	0.02