MONDAY MORNING SCIENCE BLAST
Going in Circles - Earth Science - Solar System

Pluto was discovered in 1930. Because of its size and distance from Earth, astronomers had no idea of its composition or other characteristics at the time. But having no reason to think that many other similar bodies would eventually be found in the outer reaches of the solar system--or that a new type of body even existed in the region--they assumed that designating the new discovery as the ninth planet was a scientifically accurate decision. Then in 2003, astronomers at the California Institute of Technology, the Gemini Observatory and at Yale University working together discovered a new “planet,” informally called “Xena,” that was 1.5 times larger than Pluto.

On August 25, 2006, the International Astronomical Union (IAU) downgraded the status of Pluto to that of a "dwarf planet," a designation that was also applied to the newly discovered “Xena.” This controversial decision means that only the rocky worlds of the inner solar system and the gas giants of the outer system will be now designated as planets. “Xena” received the formal name *Eris* and is considered to be the largest of the dwarf planets. Pluto is currently the second largest dwarf planet. In this lab, students will compare planetary orbits.

To begin, have your students mount their Planetary Orbit patterns onto foam core board using tape. They are to draw a circle in the center of their pattern sheet to represent the Sun, then color this circle yellow or orange. Instruct your students to use the colored pencils to color each planetary orbit as indicated. Now they are to look at the table to see how many Earth months are needed for each planet to make one complete orbit around the Sun.

Students will next make flags for each of their planets. Instruct them to cut triangles from white paper and color these triangles the same colors as the planets’ orbits, taping the triangles to toothpicks. They are then to place the flag of each planet at the top dot of its orbit. Starting with the planet Mercury, have them move Mercury’s flag in its orbit one dot counter-clockwise (to the left), the repeat this step with each of the other planets, moving each flag one dot to the left. Instruct your students to look at the flags to see the distance each planet has moved in one Earth month. Now they are to move each of their flags to the second dot in each planet’s orbit and observe how far each planet has moved in its orbit in 2 Earth months. Students are to continue to move each flag along dot-by-dot until the flag has traveled to dot 12. Finally, they are to observe how far each planet has moved, then complete the data table in the Data section.

The study of the Solar System is of interest to most students. Building a scale model of the Solar System is a project that can generate a high level of excitement if students are allowed to work in groups and encouraged to use their creativity in making their models. In the process they can gain a solid understanding of our place in space. You can find a variety of the scale models by searching the internet using the phrase “make a model of the Solar System.” Have fun!

Going in Circles

QUESTION: How do the orbits of the planets compare?

MATERIALS:

colored pencils
colored toothpicks - 5
foam core board
scissors
transparent tape
Planetary Orbit pattern

PROCEDURE:

1. Mount the Planetary Orbit pattern on the foam core board using tape.
2. Draw a circle in the center of the pattern sheet to represent the Sun, then color it yellow or orange.
3. Use colored pencils to color each planetary orbit as follows:
   Circle 1 (closest to the Sun) - green = Mercury
   Circle 2 - orange = Venus
   Circle 3 - blue = Earth
   Circle 4 - red = Mars
   Circle 5 - purple = Jupiter
4. Look at the table below to see how many Earth months are needed for each planet to make one complete orbit around the Sun.

MERCURY	**3 months**
VENUS	**7 months**
EARTH	**12 months**
MARS	**23 months**
JUPITER	**142 months**

5. Make a planet flag for each planet. Cut a triangle from the white paper. Color it the same color as the planet's orbit. Tape the triangle to a toothpick.
6. Place the flag of each planet at the top dot of its orbit.
7. Start with the planet Mercury. Move Mercury's flag in its orbit one dot counter-clockwise (to the left). Repeat this step with each of the other planets, moving each flag one dot to the left.
8. Look at the flags to see the distance each planet has moved in one Earth month.
9. Now move each flag to the second dot in its orbit and observe how far each planet has moved in its orbit in 2 Earth months. Continue to move each flag along dot-by-dot until it has traveled to dot 12.
10. Observe how far each planet has moved and complete the data table in the Data section.

DATA:

Planets that made more than 1 orbit	
Planets that made exactly 1 orbit	
Plants that made less than 1 orbit	

QUESTIONS:

1. How are the orbits in your model similar to the actual orbits of the planets?

2. How are the orbits in your model different from the actual orbits of the planets?

3. Neptune takes 1,964 months to orbit the Sun. How fast do you think it appears to move?

4. Why do you think Neptune was one of the last planets to be discovered?

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