Circling the Sun – Teacher Notes

FASCINATING FACT: Just as planets orbit the Sun, our solar system orbits the centre of the Milky Way Galaxy. It takes about 225 million years to go round.

This simple (fun) outdoor activity allows students to physically experience that the farther a planet is from the Sun, the greater time and distance it take to complete one orbit. The experiment is deliberately flawed to encourage students to think about how it could be improved to make their results more accurate and scientific.

3 2 1(SUN)

Materials

- Space for up to 9 students to hold hands and wheel/orbit round one central student who represents the Sun, which is the centre of our solar system. Each additional student represents a planet orbiting the Sun. It is a good idea to choose the largest student in the group for the Sun position. If your students are excitable I recommend that the Sun student anchor himself or herself with one arm round a veranda or goal post.
- A large clock visible *OR* explain to students that it takes approximately 1 second to say "one Mississippi". This ensures students don't run and upset others' balance.

Method

1. Split class into groups of six or more students
2. The first student (The Sun) stays on the same spot and swivels all the way round.
3. The second student holds hands with the Sun and takes one step per second (or one - Mississippi) and counts how many steps they needed to complete one orbit of the Sun and return to where they started. These results are entered in the table provided
4. The third student holds the second student's hand and repeats the process. The first two students simply adjust their step to move in time with the third.
5. This is repeated until all students in the group have orbited their Sun
6. The groups share and compare their results in the table provided

Results

	Number of seconds taken to complete an orbit			
	Group1	**Group2**	**Group 3**	**Group 4**
Student 1				
Student 2				
Student 3				
Student 4				
Student 5				
Student 6				
Student 7				
Student 8				
Student 9				

Circling the Sun – Teacher Notes

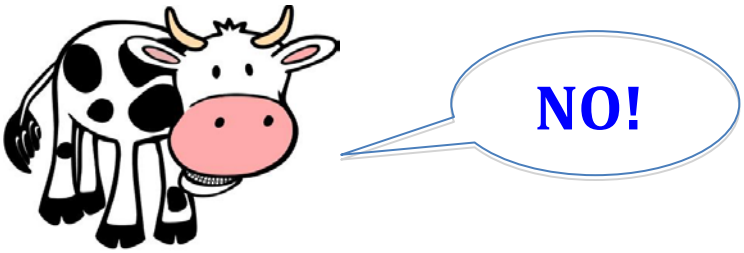
Conclusion

Could you see a pattern forming as more and more students/planets joined hands to circle the Sun?
Yes
Describe this pattern.
The farther the planet's orbit was away from the Sun the longer the orbit path took.

Discussion

Why did we use nine students in this activity? To represent eight planets and the Sun

Did the cow moo softly?



In primary schools many students use the mnemonic (memory help) **"COWS MOO SOFTLY"** to ensure a fair test is carried out.

C reminds us to **C**hange only one thing. In this case the distance from the "Sun".
What was the one thing we changed? Distance from the Sun

M reminds us to **M**easure one thing.
What was the one thing we measured? The number of one-second steps.

S reminds us that everything else has to **S**tay the **S**ame
What things did we keep the same? Students from the same year, same place, steps at the same pace.

Did the cow moo softly? Explain your answer
No. We changed only one thing and we measured one thing. These were correct. However people of different sizes have different paces. A tall person would move further than a small person in one second. Tall people would have shorter orbit times and fewer paces than a small person.
What could you do to correct this mistake?
Select nine people who are about the same height and repeat the experiment.
What else was flawed about the position of the planets around the Sun?
The planets are not equally spaced away from the Sun

Using the information we gained from this activity, would the planet Mercury, which is closest to the Sun, take more or less time to complete one orbit than Neptune, which is farthest away? Less time.
What do we call one orbit of the Sun by Earth? One year
Mercury takes 88 Earth days to orbit the Sun once, Earth takes about 365 Earth days to orbit the Sun and Neptune takes 60,189 Earth days. Which planet would give you the most birthday parties in one Earth year? Mercury

Do you think that you would age faster and die younger if you could live on Mercury?
Any reasoned answer. Probably not. If there were no other factors influencing the aging process, although you would go round the Sun four times faster and therefore be numerically four times older in mercury years you would still last the same time as you would have done on Earth. In local (Mercury) terms you would age faster and die older.