



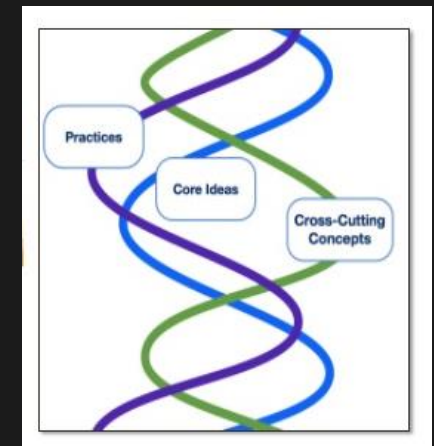
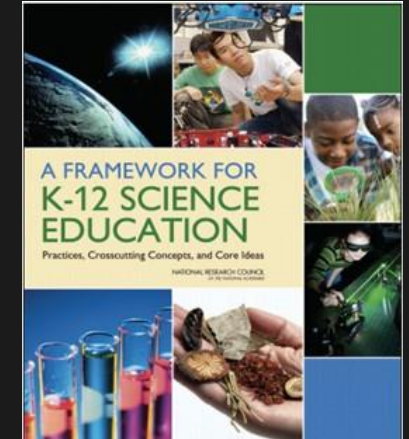
Middle School Science Update

January 23, 2017

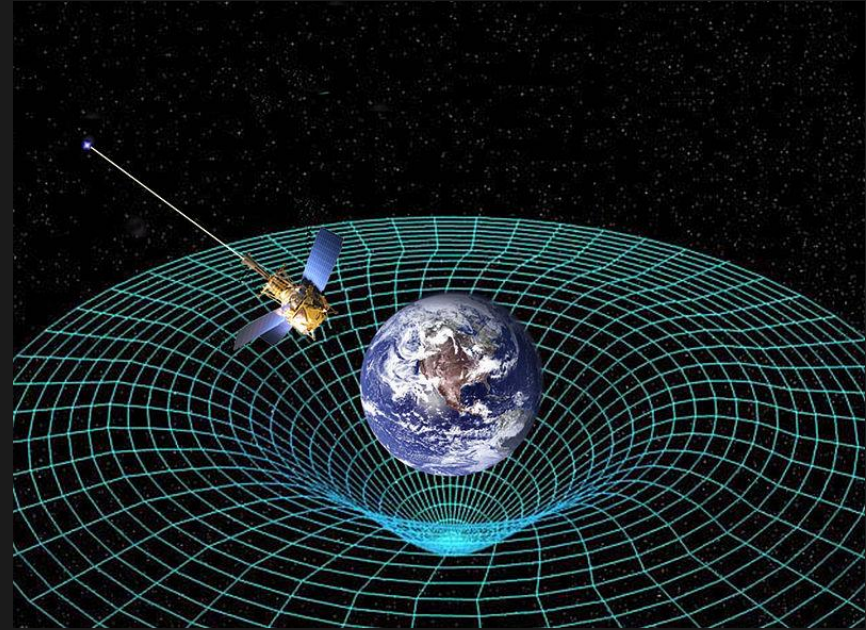
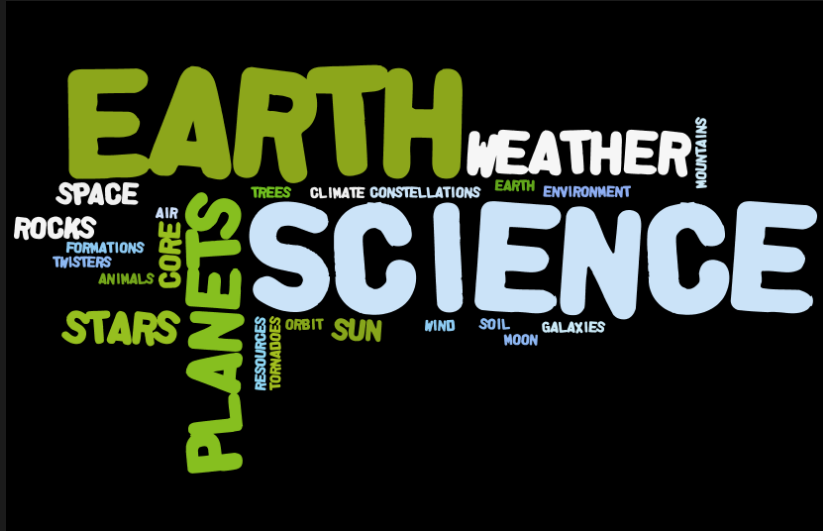
Last Time.....



- Vision & Purpose of NGSS
- Shifts/changes required from both students & teachers
 - Teachers as “facilitators”
 - “Figuring Out” Phenomena
 - Students thinking & working like scientists & engineers.



Tonight



STEMscopes™

K-12

Phase 1 of Instruction --- “The Experience”

- Prior to this lesson:
 - Gravitational Forces – Mass, Distance, & Gravity
 - Patterns of Motion
- Attraction Tango – from the *Solar System Scope*
 - Students' first experience with the balance between gravity & inertia.



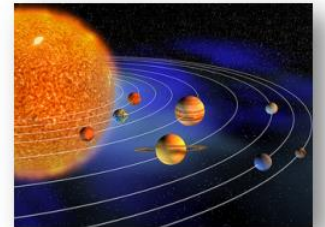
Do

The Solar System
Earth and the Solar System

The Attraction Tango

Activity

Gravity is a force of attraction between two or more masses. Our solar system resides in the Milky Way galaxy and is made up of the Sun, eight planets, many moons, asteroids, meteoroids, and comets, which are all affected by gravity. All of the celestial bodies in the solar system move in predictable patterns known as orbits, and this motion is controlled by gravity. Every celestial body (including Earth) is surrounded by its own gravitational field, which exerts an attractive force on all objects. The Sun's massive gravitational field attracts the entire solar system to orbit around it. Earth's gravitational field attracts the Moon in orbit. The Moon's gravitational field has attracted numerous meteorites, which created the impact craters we can see on the Moon's surface from Earth.



Procedure

1. Put on a pair of goggles.
2. Take a table tennis ball and roll the ball across the floor of the classroom.
3. Take the table tennis ball with the string attached and hold the end of the string.
4. While only holding the end of the string, swing the ball around in a circle over your head like a lasso.
5. Stop moving your arm or hand.

Answer the following questions.

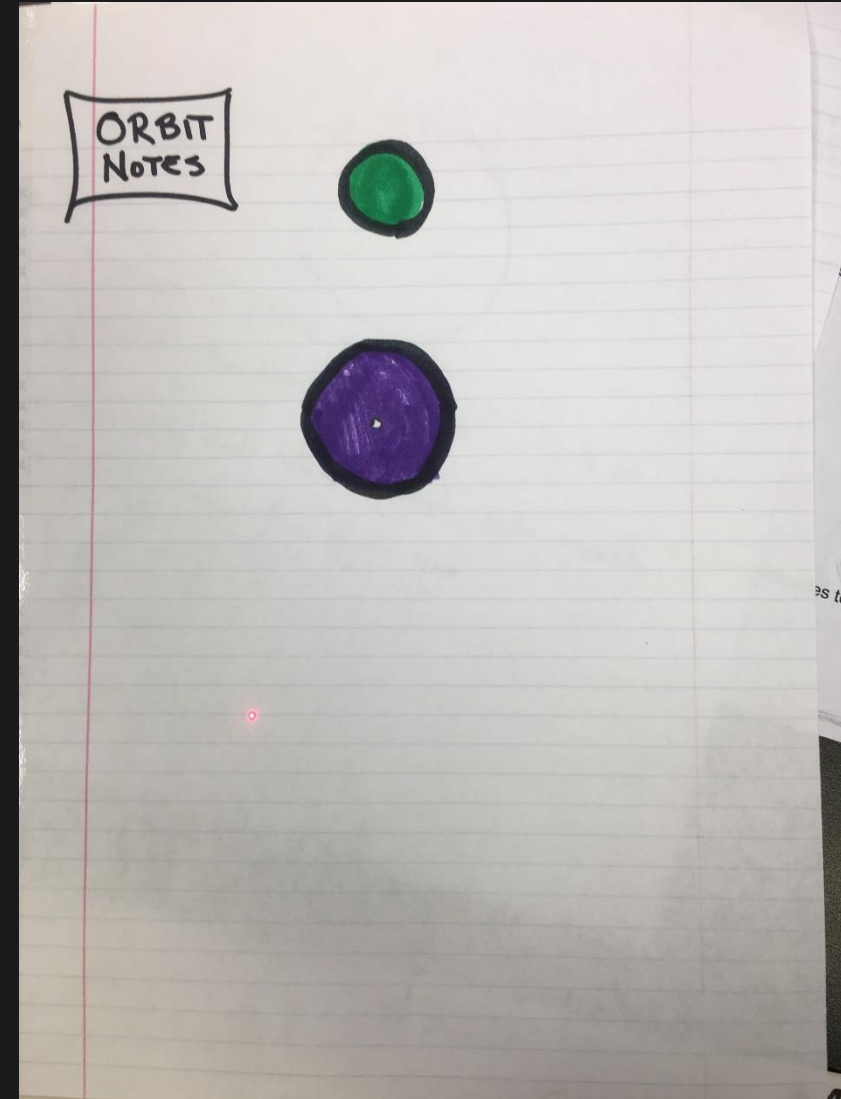
1. What happened to the ball that you rolled across the classroom?

2. What forces were acting on the ball?

3. What caused the ball to stop?

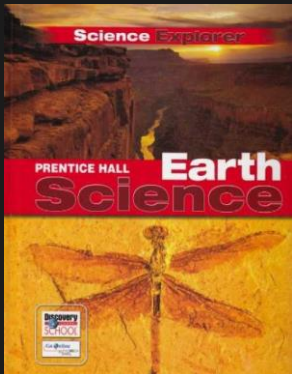
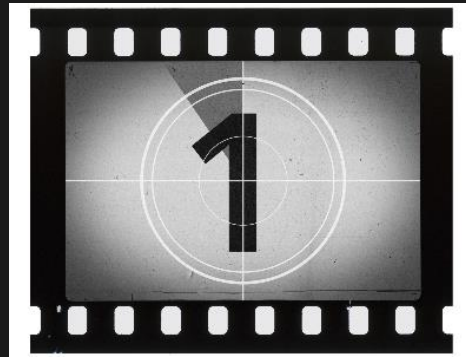
Phase 2 of Instruction – “The Conversation”

- [Solar System Builder Website](#)



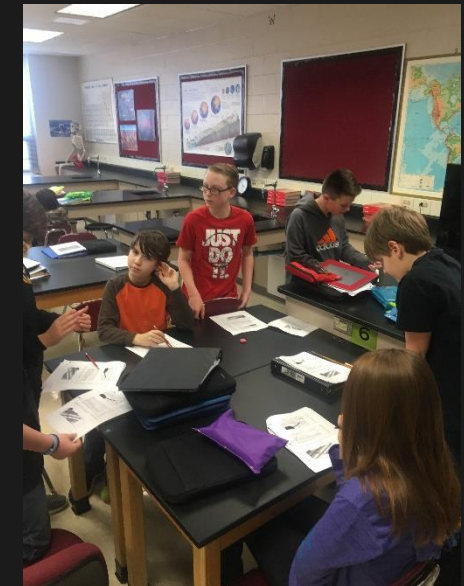
How is this lesson *different* from how it has traditionally been taught?

Traditional Science Classroom



Content Upfront &
then application to
prove what I just
showed them

NGSS Science Classroom



Experience first – students are in the driver's seat
to try to figure the “why” – scientific principle – do
this through scientific discourse.

[illegible]