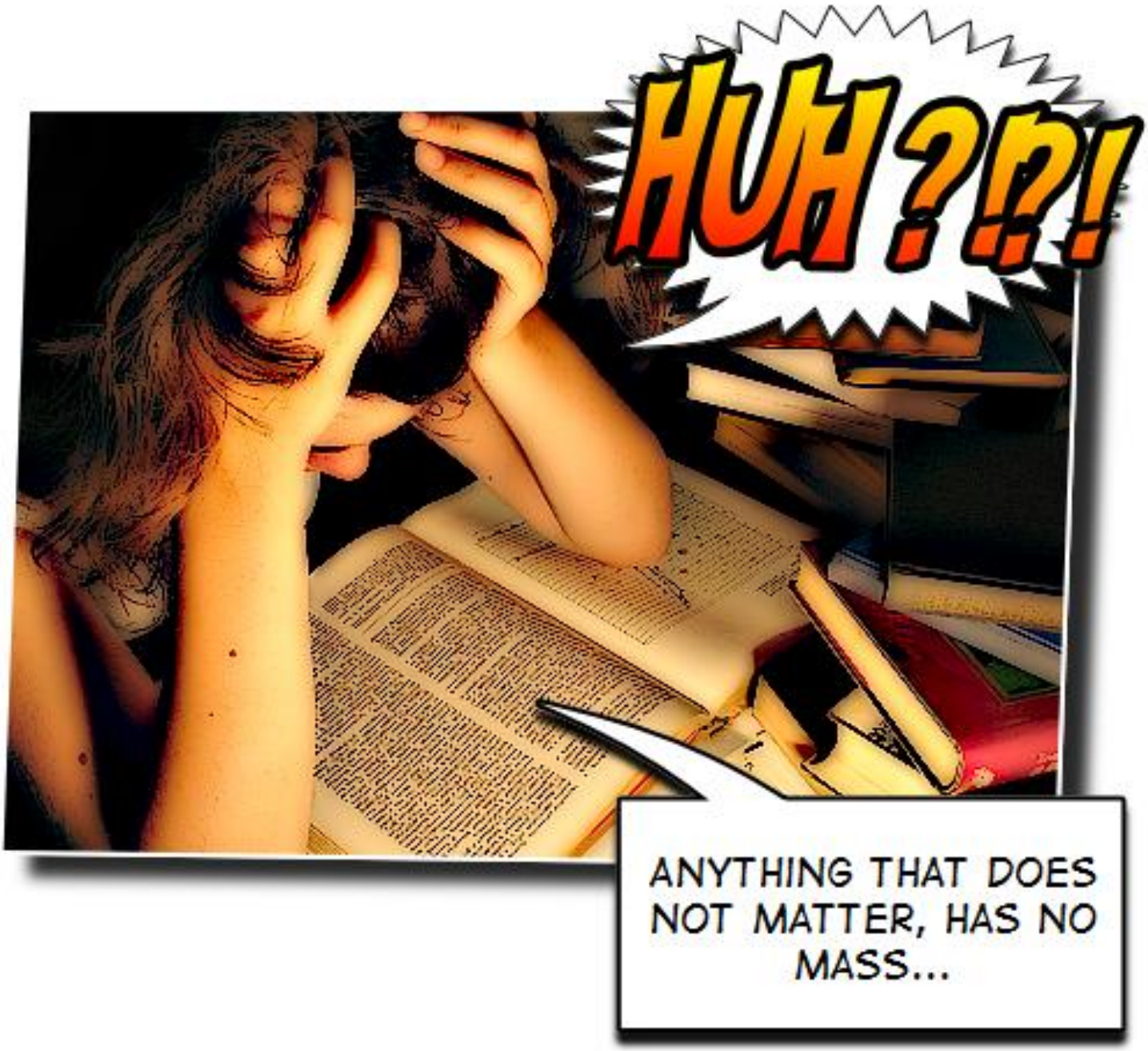
WEEK TWO:

Force and Motion



Day One

Today, you and your child will:

1. Read the text
2. Review the text with your child
3. Complete the student worksheets
4. Find the following materials for Days Two and Three:

10 INCH SQUARE PIECE OF CARDBOARD
FOUR PIECES OF STRING (3 FEET LONG)
SMALL PAPER CUP
CLOCK
PENCIL
TWO OR THREE EGGS
ONE BED SHEET

You and your child(ren) will be covering the following Science Standards this week:

The position of an object can be described by locating it relative to another object or the background.

An object's motion can be described by tracing and measuring its position over time.

The position and motion of objects can be changed by pushing or pulling. The size of the change is related to the strength of the push or pull.

The motion of an object can be described by its position, direction of motion, and speed.

Definitions:

Force	a push or a pull
Motion	("mow-shun"); occurs when the distance between two objects is changing.
Reference point	("reff-fren-sss"); areas used to determine if an object is in motion
Stationary	("stay-shun-air-ee"); objects that do not move on their own
Revolution	("rev-o-loo-shun"); movement of an object around another object
Rotation	("roe-tay-shun"); spinning movement of an object
Relative motion	the motion of an object as seen by a reference point

Sample Questions to ask after your child finishes their reading for Day One:

If you are writing your name on a piece of paper, are you using force?

Yes, the pushing and pulling of a pencil across the paper requires force.

How do you know if something is in motion?

If the distance between two objects is changing, then one or both of the objects are in motion.

What is the importance of a reference point?

A stationary reference point helps to determine if an object is in motion or not.

What is the difference between rotation and revolution?

When an object rotates, it spins like a top. When an object revolves, it moves around another object.

What is the definition of relative motion?

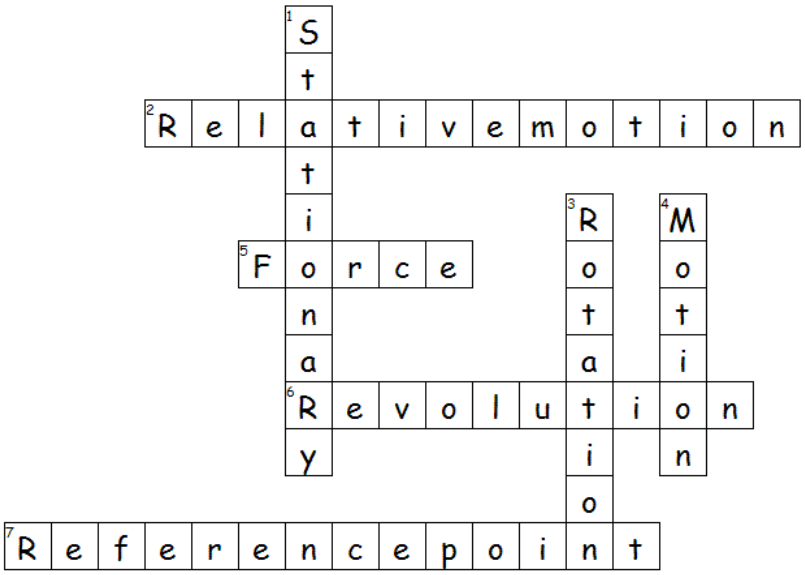
The motion of an object as seen by a reference point is called relative motion.

Answers to worksheet questions for Week Two:

Page 1:

Answers will vary. However, they should include the use of a stationary reference point to identify that they are, in fact, moving around the house.

Page 2:



Page 3:

1. Reference point
2. Motion
3. Relative motion
4. Stationary
5. Force
6. Rotation
7. Revolution

Day Two

Today, you and your child will:

1. Review Day One with the information found below.
2. Run the activity "ESP: Centrifugal Water"

When an object rotates, it spins like a top. When an object revolves, it moves around another object. A revolving object experiences a force called centrifugal force which keeps the object traveling in a circular path.

ESP: Centrifugal Water

How do you keep water upside down without pouring onto your head?

Materials:

10 inch square piece of cardboard
Four pieces of string (3 feet long)
Small paper cup
Clock
Pencil

Activity:

1. Use the pencil to punch four holes through each corner of the cardboard square. To each hole, one of the pieces of string will be attached. The strings are to come together and will need to be tied about 12 inches from the square. The remaining string will contain knots at approximately 24 inches and 36 inches from the square.
2. Place the paper cup onto the square and fill it, halfway, with water. Carefully begin to swing the tray in circular fashion. The water will not be spilled!
3. Ask the child to practice swinging the water-filled cup.
4. The instructor will need to be a timekeeper and will be responsible to count out loud for the child. The child will be responsible for swinging the tray in one circular rotation per second.
5. At this time, the child will need to hold onto the knot that is 12 inches away from the tray. (You may allow the children to practice this activity for a short period of time before placing the water-filled cup on the tray!)
6. The children will record whether or not the centrifugal force is strong enough to keep gravity from spilling the water.
7. For experimentation, change the distance of the swinging tray by holding onto the different knots.

Explanation:

As the tray rotates, the water-filled cup does not spill because of centrifugal force. Centrifugal force can be seen within a washing machine. A force pushes the clothing to the outer walls of the washing machine as it goes through its spin cycle. All objects traveling in a circle experience this force, which is known as the centrifugal force. The strength of this force depends on several factors, including its distance from the center of the rotational orbit. Children may have difficulty keeping the water in the cup as this distance is increased as the amount of centrifugal force is decreased the farther the knot is held from the tray.

It is important to note that although it is quite easy to keep the water from spilling while in motion, the children may have difficulty in stopping the tray as the centrifugal motion will be quickly reduced.

Independent Variable: Length of the string
Dependent Variable: Amount of spilled water

Hypothesis:

If the LENGTH OF THE STRING is (increased/decreased), then the AMOUNT OF SPILLED WATER will (increase/decrease).

Day Three

Today, you and your child will:

1. Review Day One with the information found below.
2. Run the activity "Egg-ing your Bed"

When an object is put into motion it stays in motion until an outside force acts against it. This outside force is commonly the force of gravity. However, anything that slows down or changes the direction of a moving object provides the "outside force" acting against this motion.

Egg-ing your Bed

Children will predict what will happen when an egg is thrown into a sheet.

Materials:

Two or three eggs
One bed sheet
Two helpers

Activity:

Have both helpers hold the sheet at each corner. Let one side of the sheet hang down, then curve up the bottom to make it j-shaped. If they hold onto all four corners in this way, the egg will have a soft channel to fall into.

Predict what will happen when a raw egg is thrown into the sheet.

From a distance of 15 feet (or further) hurl the egg towards the center of sheet. Make sure you hit the sheet!

Did your data support your prediction?

Explanation:

When an object is put into motion it stays in motion until an outside force acts against it. The egg is put into motion. It wants to stay in motion but the sheet acts as an outside force to stop it. The key question is how "quickly" is the egg stopped? The sheet, unlike a brick wall, has some give to it. So the egg is cushioned as it hits the sheet. The sheet actually is put into motion and energy is transferred from the eggs motion to the motion of the sheet. This actually spreads the force out over a long time.