



WEEK OF MARCH 14

PHYSICS

OBJECTIVE: This week offers 3 different experiments that you can do all at once or spread out during the week, as well as a daily exercise. However many of the 3 experiments you choose to do, please try to do the daily exercise.

By means of the 3 experiments, we hope to demonstrate that the laws of nature and physics are a constant, producing the same results given the same circumstances. As in past experiments, we hope to draw a parallel to the constancy of the power and effects of God's love as it is received and shared.

HYPOTHESIS: In the same way that there is order and predictability in the natural world, God's love given to us and shared by us offers some predictable outcomes as well.

MATERIALS NEEDED:

- 2 CLEAR 2 LITER SODA BOTTLES WITH LABELS REMOVED**
- A WASHER** (*included in this Lent Kit*)
- DUCT TAPE**
- FOOD COLORING**
- A CLEAR JAR WITH A LEAKPROOF LID** (*such as an olive jar.*)
- COOKING OIL**
- ALKA-SELTZER TABLET** (*optional*)
- CLEAR, SMOOTH, CYLINDRICAL DRINKING GLASS**
- PIECE OF PAPER**
- WATER**
- YOUR LIFE LAB JOURNAL**

EXPERIMENT #1: HOME GROWN TORNADO!

DIRECTIONS:

1. Fill one of the 2 liter bottles 2/3 full with water. Add a few drops of any food coloring.
2. Place the washer on top of the bottle with water. Turn the empty bottle upside down and align the openings of the 2 bottles.
3. Connect them by wrapping them tightly with duct tape.



Figure P.1

4. Quickly turn the bottle over and set it on a table or desk so it's standing vertically. A few drops of water might fall into the lower bottle, but not much. Start moving the Twister Tube in a circle, as if you were stirring something on the stove. At some point, a twister (called a vortex) will form and water will start spiraling into the lower bottle. It looks just like a tornado! (see figure P.1)
5. Talk about and/ or write in your *LIFE LAB JOURNAL* your impressions. The water in the bottle is responding to centripetal force, a force that acts on a body moving in a circular motion. Even though you gently started the motion, gravity took over from there. Where else have you seen a similar vortex in nature? (...as well as in your bathroom!)

EXPERIMENT #2: HOME GROWN RAINBOW!

DIRECTIONS:

1. Take a piece of paper and cut a slot into the middle of it. Tape this onto the side of a smooth/clear drinking glass so that the sun's rays can pass through the opening onto the SURFACE of the water in the glass. (see figure P.2)
2. Make sure that the glass of water is VERY FULL. Place the glass on a white floor or white piece of paper, making sure the sun's rays are shining through the slot in your paper and hitting the surface of the water. (You will need to do this on a very sunny day.) You should see a mini-rainbow appear below the glass!
3. Talk about and/or write in you *LIFE LAB JOURNAL* your impressions. Notice the order of colors in the rainbow. A rainbow appears when the light gets split up into its 7 different colors: red, orange, yellow, green, blue, indigo and violet. Usually – the reason the light gets split up is because it is passing through a substance that bends the light. The different colored wavelengths bend in different amounts. Where have you seen other rainbows? Are the colors always in the same order?

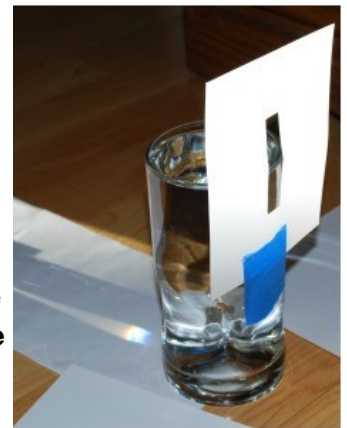


Figure P.2

EXPERIMENT #3: OIL AND WATER DON'T MIX!

DIRECTIONS:

1. Fill 2/3 of your jar with water. Place in the water a few drops of food coloring.
2. Pour some cooking oil into your jar...slightly less than the remaining third, leaving a little gap of air at the top. Tightly place on the lid.
3. Notice how the two different liquids remain separate from one another, even if you swirl it around. Feel free to even shake it a bit.
4. (optional) Remove the lid and place in a crumbled Alka-seltzer tablet. Now it should look like a mini lava-lamp! (see figure P.3)



Figure P.3

5. Talk about and/ or write in your *LIFE LAB JOURNAL* your impressions. Because oil and water have different densities, when you mix them together, the water sinks to the bottom. When you crumble in an alka-seltzer tablet, it reacts with the water, causing colored droplets of water to rise to the top where they then pop, release air, and sink back to the bottom.

DAILY EXPERIMENT: GIVING & RECEIVING LOVE

1. Every day this week, make it a goal to intentionally do one loving act /act of kindness for another person. It can be as grand or as small as you like.
2. At the end of the day, think of at least one loving act / act of kindness you *received* from someone else that day. Record each day's loving acts, both given and received in your *LIFE LAB JOURNAL*. If you are with other people, consider going around and sharing, ie., at the dinner table, your given and received acts of love. Record and / or talk about how that felt to give and receive love.

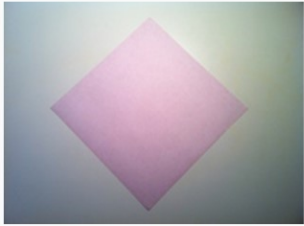
REFLECTION: *Use the following questions to talk about with others and/or record your thoughts in your LIFE LAB JOURNAL.*

1. What was it like to intentionally offer an act of love each day as well as to think of one offered to you? As you reflected on each day and thought of acts of love you received, did more and more come to mind? How do acts of love *FEEL* to give? ...to receive? What would you say is the *effect* of love?
2. In the same way that gravity and centripetal force created the vortex in the first experiment, and the glass of water broke down the sunlight into colors and the density of a liquid affects how it mixes with another liquid, what would you say are the constants when it comes to the laws of love?
3. Like many of these experiments, the more you add, or the bigger the container, or the larger the effort made, the greater the resulting effect. Would the same hold true for love? Think about the various acts of love you made and received this week. Which ones packed a more powerful effect? Consider the sacrifice Jesus made on the cross and the effect that has had and continues to have on the world.
4. Jesus said *"I give you a new commandment, that you love one another just as I have loved you."* How might receiving Jesus' love move us or encourage us to offer love to our neighbor? Could giving away love be one of the constant effects of receiving love?

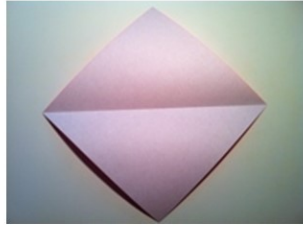
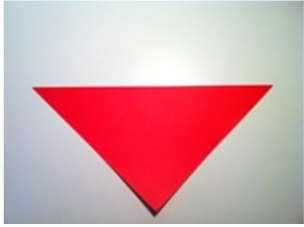
How about creating this nice little reminder of the force of love?

Included in the Lent Kit are two squares of paper for you to create an origami heart. Practice with the regular paper and then create your heart with the origami paper.

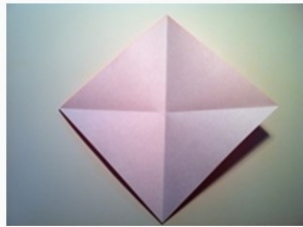




Step 1: Start with a square piece of origami paper with white side up. If you only have regular 8.5x11 paper, follow these instructions to make it into a square sheet.



Step 2: Fold the paper in half by folding the top corner to the bottom corner, then unfold.



Step 3: Fold the left corner to the right corner, then unfold.



Step 4: Fold the top corner to the center.



Step 5: Fold the bottom corner to the top edge.



Step 6: Fold the bottom left and right edges to the center crease.

Step 7: Fold the top and side corners back.

Now you know how to make an origami heart!
Easy wasn't it?