



Creation Lens

Exploring the World, Discovering God

Grade Level: Grade 8

Title:

Forces Acting on an Object & God's Presence in Our Life

Denomination: Catholic

Lesson ID: PS-G8-02-CA

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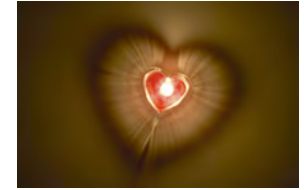
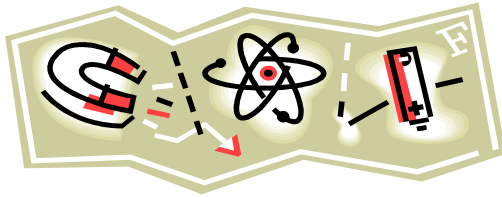
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Note: Web sites referenced in this lesson were valid at time of publication.

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PHYSICAL SCIENCE – GRADE 8 - CATHOLIC

LESSON TITLE: Forces Acting on an Object & God's Presence in Our Life

GENERAL CONCEPT: Forces

SCIENCE LESSON CONCEPT

- Seen and unseen forces acting on an object

GOAL OF SCIENCE LESSON

- Students will understand that forces are always acting on matter.
- Students will understand that a force has a direction.

OUTCOME EXPECTED

- Students will be able to describe forces acting on an object and how those forces combine.

RELIGION LESSON CONCEPT

- Presence of God: Unseen but always there

GOAL OF RELIGION LESSON

- Students will learn about the constant presence of God in our lives.
- Students will learn that God is always with us, in good times and in bad times.

OUTCOME EXPECTED

- Students will be more aware of God's love for us.
- Students will be more aware that God wants us to know Him.

MATERIALS NEEDED

- Science Journal page: Forces Acting on an Object
- Ring magnets (2 per group)
- Spring scale or elastic(1 per group)
- Brick (1 per group)
- String (some for each group)
- Plastic ruler
- Posts for magnets (sometimes a pencil will do)

SCIENCE METHODOLOGY

Preferable method is that the experiments are done by students in small groups, but demonstration is acceptable.

- **SAY:** There are forces which are acting on matter. For example, if I push down on this plastic ruler it bends. But there are invisible forces that act on an object too. We are going to work in small groups and do two experiments. You will be expected to participate in your group's work and to record the experiments on your Science Journal page: Forces Acting on an Object.
- **ASSIGN** the students to particular groups and work areas.

MATERIALS NEEDED

- Internet access
- Religion Notebook/Journal
- Access to PowerPoint Program

RELIGION METHODOLOGY

- **ASK:** How do you recognize the presence of God in your life?
- **TODAY** for class we will divide into groups to create PowerPoint presentations that will visually show the wonder and awe of God for the following topics (option: teacher could create a PowerPoint as an example or use one already created see Religion Links section):
 - ~ nature
 - ~ the Old Testament
 - ~ the New Testament
 - ~ the world of science
 - ~ people in our world today

EXPERIMENT #1: FLOATING MAGNETS

- **SAY:** Manipulate 2 or more ring magnets on and off a post: Observe and record the attraction and repulsion.
- **HAVE** the students make a drawing on the Science Journal page of the configuration they see.
- **HAVE** the students draw in arrows to show which way the magnetic forces are pushing.
- **SAY:** An interesting thing to note is when two opposing magnets are on the post and they are repelling each other, they are positioned a little way apart. Try pushing one of the magnets closer to the other, and watch what happens. Try it now.
- **ASK:** What happened? (the magnet moved back the instant you let go)
- **SAY:** The force was completely unseen, but it was there. The separation of the two magnets at equilibrium (when you are not touching or pushing one of them) is determined by the balance between the gravity pulling everything down and the repulsive force pushing the magnets apart.
- **HAVE** the students write the term “equilibrium” on the Science Journal page.

EXPERIMENT # 2: BRICK AND SPRING SCALE

- **SAY:** Wrap string around the brick securely.

- **HAVE** the groups create their PowerPoint presentation.
- **HAVE** the groups present their presentation.
- **DISCUSS** in different groups: How does experiencing the joy of nature, family and friends help you to realize the presence of God in your life?
- **SAY:** In our Science class on forces acting on objects we saw invisible forces. This is similar to the invisible God always near us and urging us to draw closer to Him and to do the right thing.
- **ASK:** How are the science experiments like the invisible power of God?
- **HAVE** the students write in their journal their personal experiences of God working in their life.
- **HAVE** some students share their journal writings.
- **POSIT:** God is an ever-present, but unseen power and force in our life. We can't see Him, but He is real.

- **ALLOW** time for this to be done.
- **SAY:** Attach the string to a spring scale. If a spring scale is not available, a piece of elastic can be looped through to attach it to the string. The length that the elastic stretches can be measured.
- **SAY:** Keep the brick on the table or surface. Pull on the spring scale or elastic to drag the brick. Record the force needed to move the brick at first (inertia). Record and compare the force needed to move the brick at a steady pace.
- **HAVE** the students place a sheet of waxed paper between the brick and the table to make it easier to slide.
- **SAY:** You can see the differences in the frictional force – low, intermediate, or high friction. This is an example of a force that you can sort of “see”. A rougher surface has more friction force.

Optional: EXPERIMENT # 3 – Combining Forces

Materials: fairly smooth sand paper attached to a small ramp

- **SAY:** Put the sand paper ramp on the table. Place the brick on the ramp. Pull the brick down the ramp.
- **ASK:** How difficult was it? How much friction force?
- **SAY:** Now pull the brick up the same ramp.

- **ASK:** What happened? Was it more difficult, the same, or easier? (more difficult)
- **SAY:** You don't exactly "see" the force of gravity, but everyone knows gravity exists.
- **SAY:** We are going to talk about a new term, direction.
- **HAVE** the students write the new term on the Science Journal page.
- **SAY:** Gravity always points downward and friction force always points opposite to where you're trying to go. The forces between the magnets may pull together or may push apart, depending on their orientation. The fact that a force has direction is a key concept in physics.

FURTHER EXPERIMENTATION could be conducted to determine if the width/length of the elastic affects the results, could also include changing the surface, for example, sandpaper and measuring friction and/or flat vs. inclined surface.

- **HAVE** the groups report their findings to the entire class. Account for any differences. Stress that exact duplication of an experiment would be needed for accurate results.

POSIT: Seen and unseen forces are acting on matter.

SCIENCE LINKS

www.edzone.net/~djhsrock/2001-2002/index.htm

Rocket club 2001-2002 An object at rest remains at rest. An object in motion continues along a straight line...an unbalanced force acts on an object, the change in motion of that...Great lesson for students.

www.resources.scienceworld.ca/.../forces-and.../920-magnets.html

Activities by Type. Demonstration; Exploration; game; Make & Take...The forces of a magnet are strongest at the poles. This is because of the magnetic field...Site also has a lesson on forces. Can be upgraded for Grade 8 students.

www.learner.org/resources/series136.html

NOTE: Site can easily be upgraded for 8th grade lessons. Site has several really good experiments on force.

RELIGION LINKS

www.everystudent.com/wires/Godreal.html

Is God Real – DNA – DNA Structure Why the DNA structure answers, Is God Real? Just as he has engineered DNA to instruct the cell, he offers to instruct us to make our lives function well, for his glory and...This short article could be read and understood by the students.

www.authorstream.com/Presentation/rupi-8744-Nature-Beauty-nature-ppt-powerpoint...

Nature's beauty – A PowerPoint presentation. Recommend no sound or substitute more 8th grade appropriate music. This music is too calm for them.

KEY WORDS

- FORCE
- DIRECTION
- EQUILIBRIUM
- REPULSE
- ATTRACT
- GRAVITY
- FRICTION
- FRICTION FORCE
- INERTIA
- BRICK SCALE
- SPRING SCALE
- VISIBLE
- INVISIBLE

KEY WORDS

- PRESENCE OF GOD
- INVISIBLE
- FORCE
- EVER-PRESENT
- AWE