



GRACE Education Curriculum Gravity	
Teachers	Grades K-2
<b>Math &amp; Science</b>	

## May the Force Be With You

**Background Information:** Gravity is the invisible force between two objects that makes them attracted to each other. This attraction is called gravity. The more massive the object, the stronger the gravitational pull will be. Magnets have a magnetic field which is made up of invisible lines of force. These lines of force attract each other and certain metals. This is called magnetism. The force of magnetism decreases with distance. An example of this would be a simple magnet on the refrigerator. It will stick to the refrigerator but the further away you get, the less the attraction. It can no longer leap across space and attach itself to the refrigerator. Magnetism depends on the type of metals involved – try wood and metal. Gravity does not depend on the type of material. Examine the universal law of gravity to notice that there is absolutely no dependence on the type of matter involved (solid, liquid, gas), nor on its shape nor composition. The key is simply how much matter is involved; a kilogram of lead, a kilogram of water, and a kilogram of air would all generate and respond to the same gravitational force. The magnetic invisible attraction is an easy way to demonstrate the gravitational pull or the invisible force of gravity.

- Objectives:** At the end of the lesson, students will be able to:
- Define gravity and magnetism and compare the two.
  - Describe attraction forces by using magnets.

**Standards:** Science: unifying concepts and processes; earth and space science; science as inquiry and physical science.  
Math: number & number relationships

**Vocabulary:**

Gravity	Magnetism	Magnet
Invisible	Force	Attraction

---

**Materials:** Large magnets (enough for entire class)  
Lab Sheet  
Objects: aluminum foil, penny, scissors, iron filings, thumbtack, plastic toy, wood ruler, eraser, pencil, staple, pen, tissue, magnet, paper clip, iron ball etc.

**Directions to the Teacher:**

1. Review background information and show examples of magnetism.
  2. Break students into lab groups of 2 to 4 students and hand out supplies.
  3. Have students discover what objects a magnet will pull. Hold the magnet to each object and see if the object is attracted to the magnet. Complete the lab sheet chart. Make note of items that had the largest and smallest attraction.
  4. Discuss everyone's findings.
  5. Will a magnet pick up a paper clip or a feather? The answer is, just the paper clip. Magnets only pick up things that contain bits of iron.
  6. Explain the difference between gravity and magnetism. Gravity is the force of attraction between matter. Gravity holds us on Earth and keeps the planets orbiting around the Sun. Magnetism is an invisible force that can make some things move towards each other, move away from each other, or stay in one place. We can't actually see magnetism, but we can look at magnets and see what happens to certain things that are put near them. Magnetism is the ability to attract such as iron to a magnet.
  7. Explain how gravity is working right now. We would be floating and so would all of our supplies. If we had no gravity, our milk would not stay in our cup and our feet would not stay on the ground. Show a video about gravity if available. A good example is
  8. Conduct Gravity Experiments:
    - a) Have students go outside to the playground. Safety is an issue, so please use caution when conducting experiment. Depending on your school's equipment, you may wish to bring a chair or wooden box to place in the sandbox. Hold the chair or box sturdy and have a student stand on the chair or box. Jump down into the sand. Easy?
    - b) Is the same student able to jump from the floor to the chair? Probably not... Explain that gravity is a force that pulls us down.
    - c) Make a paper airplane. The students will throw the paper airplane. What happens? (It falls to the ground.) What would happen if there was no gravity? (Explain that without gravity it would continue to fly for a long time.)
-

---

**Extensions:**

- Read [Mickey's Magnet](#) by F.M. Branley and E.K. Vaughan. Mickey's adventures in magnetism are a delight. The words are simple and the pictures amusing.
- Read [What Makes a Magnet](#) by F.M. Branley. This book describes how magnets work and includes a couple of nearly foolproof experiments for making a magnet and a compass.
- Conduct an experiment on "What Direction Do Seeds Grow"?  
<http://www.canteach.ca/elementary/life12.html>

**References / Resources:**

<http://astro.clpccd.cc.ca.us/astrdept/magans.html>

<http://gravity.ontheinter.net/>

---

---

## Is the Force with You?

**Directions:** Let's find out if the force is with us. Hold the magnet to each object listed below. Fill in the chart to show whether the magnet was or was not attracted to the object.

Object	Yes, it was attracted.	No, it was not attracted.
Aluminum foil		
Iron filings		
Penny		
Scissors		
Thumbtack		
Pencil		
Paperclip		
Tissue		
Eraser		
Magnet		
Staple		
Plastic toy		
Ruler		
Candy		

Which of the above items had the **strongest** attraction? \_\_\_\_\_

Why do you think it was stronger than the others? \_\_\_\_\_

\_\_\_\_\_

Which of the above items had the **weakest** attraction? \_\_\_\_\_

Why do you think it was weaker than the others? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_