

# The Larger It Is the Harder It Falls

## Summary

These activities help students understand the concept of force and the effect it has on the motion of objects.

## Group Size

Large Groups

## Materials

Pocket Folder

3x5 cards

Pencil, pens, markers

Heavy paper

Straight-edge

Ruler

Paper clips

Paper punch

Raffia, string or ribbon

- *Physical Science for Children*

## Additional Resources

### Media

*All About Forces & Gravity*, The Schlessinger Science Library; *Physical Science for Children*; introduces all the vocabulary and has many demonstrations that cannot be duplicated in the classroom. About 23 minutes long.

### Articles

*Do you know Your Child's Learning Style?* Education Articles/Differentiated Learning, By Jane Saeman, March 4,

## Background for Teachers

These activities can be done outside, in the gym or in the classroom -- just move the desks. Children will be using large muscle groups to find out about gravity's power/force!

## Intended Learning Outcomes

1. Use science process and thinking skills.
3. Understand science concepts and principles.

## Instructional Procedures

### Invitation to Learn

Drop a stone (this stone should weigh about 15 pounds), plastic ball, rubber ball and a large paper clip into a container of sand (the container is about 24x16x8 with 3 inches of play sand in the bottom). Examine the craters. Ask "why are some of the craters larger and deeper than others?" "What made the objects fall toward Earth?" "What would happen if we didn't have gravity?"

Then have the children partner measure from the floor to their partner's knees (the average is approximately 17 inches). Show this on a yard stick -- "it doesn't seem to be very far." "If it isn't very far then why does it hurt so much when you fall down?"

### Instructional Procedures

Science Pocket Folder

Read *If*, by Sarah Perry.

Using the heavy paper, take the paper clip and straight-edge and use them to score a line 2 inches up from each of the longer sides, all the way across the paper. Scoring makes folding easier.

Fold both the edges toward the center of the paper and crease.

On this same side, using the ruler (it is smaller) and paper clip score a line every 4 inches. The score lines start at the top fold and run all the way through to the second fold.

Fold the paper, accordion style and crease.

Punch a small hole (hole punch) in the middle of each of the vertical edges about 3/4 inch in and half way down the vertical edge; this will be used to thread and hold the book together.

The 3x5 cards are used to list the vocabulary definitions:

Science	distance, force, gravity, weight, motion, speed,
language	direction, simple machine

Each definition belongs in one of the pockets of the Science Pocket Folder with room for the activity items seen later on.

When the child does an experiment, at school or at home, they can describe, in pictures or words, how this experiment worked and place it behind the definition that they believe their experiment describes.

The Science Pocket Folder has enough pockets that the tools and instructions used in these experiments can be kept in the pocket folder as well.

The folder, cards with definitions, participation, drawings and explanations are the final assessment. They are a fine item to take home to parent(s) as well, and with the simple implements intact, the children will be able to demonstrate the experiments at home.

#### Gravity Specific Exercise

Leg lifts; Have the children lay flat, cross their arms across their chest (these cannot move) and raise their legs to a 45 degree angle. This is not difficult, as the leg is in line with the hip and rests or *balances* (forces are equal) there. Now have them try a 30 degree angle. It can't be held for long because of gravity.

Balance; Have the children sit on the floor/ground and again cross their hands across their chest (these cannot move). Next, have them bend their knees and lift their feet off the floor. They are trying to find a balance point on their pockets where they can resist gravity and remain stable. Use a timer to see how long people can remain balanced. Chart it!

Human dominos; Children sit next to each other in one long line; again the arms are across the chest (they cannot move). Their shoulders should be touching their partner's shoulders. Their knees are bent. Have the children raise their feet off the ground and have one person tip to the right or left. Everyone will fall like a group of dominos!

Ant crawl; for two minutes have the girls then the boys ant crawl. Their stomachs are towards the ceiling and they are using their arms and legs to crawl around the area like an ant. No one can do this for 2 minutes because gravity is pulling them down. The only ones to make it were the ones who held still and placed themselves in balance with the gravitational pull of Earth.

#### Extensions

##### Curriculum Extensions/Adaptations/ Integration

Tug of war; demonstrates balance of force and the force of pulling. During the game, incline planes become obvious when children brace themselves. Include ideas for integration for other curricular areas (use appropriate subject area headings).

##### Family Connections

The Science Pocket Folder will contain multiple options for experimentation at home.

### Assessment Plan

This is where the 3x5 cards come into play. Give the children 4 cards (extras should be available, if necessary) and have them draw or describe what happened in each of the above activities. Then they place their cards behind the definition card in the pocket folder. If the explanations are accurate; points are awarded.

### Bibliography

#### Research Basis

Linksman M.Ed., Ricki, National Reading Diagnostics Institute, 2007. The Fine Line between ADHD and Kinesthetic Learners. Association for Comprehensive Neuro Therapy

This was a comparison and contrast between children who have been diagnosed with ADHD and children who require large muscle involvement in their learning. Because of the required movement they may well be kinesthetic learners not ADHD children. However, our classrooms are usually geared to the children who learn via their hearing (auditory) and eyesight (visual). It is sometimes very difficult to incorporate the kinesthetic learner into the classroom, hence, the following activities.

#### Authors

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