

Project FOCUS  
Best Lessons  
FOURTH GRADE

**Title of Lesson: Falling Masses**

**Theme: Gravity** Choose an item.

**Unit Number:** Click here to enter text.

**Unit Title: Physical Science** Choose an item.

**Performance Standard(s) Covered (enter code):**

**S4P3d**

Click here to enter text.

**Enduring Standards (objectives of activity):**

**Habits of Mind**

- Asks questions**
- Uses Numbers to Quantify**
- Works in a group**
- Uses tools to measure and view**
- Looks at how parts of things are needed**
- Describes and compares using physical attributes**
- Observes using senses**
- Draws and describes observations**

**Content (key terms and topics covered):**

Gravity, Weight, Mass, Matter, Friction, Air Resistance

**Learning Activity (description in steps)**

**Abstract (limit 100 characters):** Students will understand that objects of different masses fall at the same rate yet hit the ground with varying forces, and how frictional forces can alter this.

**Details:**

Divide the class into groups of four or five and prepare them to go outside. Once outside assign each group to a pre-prepared station. Introduce the vocabulary; being sure the students are able to distinguish between weight and mass. Mass is how much matter an object has, whereas weight is the gravitational force acting on it. Gravity is the force that pulls things towards Earth.

Ask the students to write down predictions in their science journals of what will happen when they drop two water bottles—one empty and one full—into a tray of sand from the same height. After all the students have made their predictions, let the students take turns holding the empty water bottle up in the air with one hand and the full one with the other hand at the same height, then dropping them simultaneously. Ask the students to make observations.

Discuss the results. Most students would have predicted that the full water bottle would fall faster, yet they should have found that the two bottles fell at the same rate, despite having different masses. However, the students should have also observed (although might have needed some prodding) that the full water bottle makes a bigger dent in the sand. Explain that gravity pulls the two objects to the ground at the same rate, but

**pulls the one with more mass down with more force, thus the higher mass water bottle has more weight. Ask the students to brainstorm similar examples.**

**Now ask the students to predict whether a balled up piece of lined paper or a flat piece of paper will hit the ground first. After dropping a wad of paper and a paper that has not been crinkled up, the students will be confused to find that the ball of paper hits the ground first. Introduce air resistance as a form of friction, pushing up on the flat paper and slowing it down as gravity pulls it down towards Earth. Before ending the lesson, make sure students have written conclusions in science journal.**

#### **Materials Needed (type and quantity):**

**Sand**

**Containers (1 per group) wide enough to drop things into from above (I used Tupperware)  
Empty plastic water bottles and full plastic water bottles (preferably of similar dimensions)  
Pieces of paper to crumple into wads.**

**Materials should be set up in stations either before science if possible or as the students are settling outside.**

**Notes and Tips (general changes, alternative methods, cautions):** [Click here to enter text.](#)

**-I used wood shavings (as in pet bedding) because that's what I had available at the time instead of sand, but sand is still the best option**

**-It's not crucial to be outside, just prevents messes with sand.**

**-I actually took one group out at a time alone while my teacher did another unit inside. I personally would try to not do that again because I had a hard time keeping the students inline as they were excited to be outside.**

**-Brush up on gravity! This topic was way more difficult for the students to grasp than I had expected and I was unprepared for the questions that ensued.**

**-Safety concerns: If you choose to do the lesson outside, keep the activity out of the danger of cars and out of the way of other faculty members. I struggled to keep the students under control, it's as if they have entirely new personalities outside the building.**

#### **Sources/References:**

**1)** [Click here to enter text.](#)

**2)** [Click here to enter text.](#)

**3)** [Click here to enter text.](#)