Title of Lesson: What is Gravity?
Theme: Physical Science
Unit Number: I   **Unit Title: Motion, Movement, & Gravity**
Performance Standard(s) Covered (enter code):
SKP3. Students will observe and communicate effects of gravity on objects.

a. Recognize that some things, such as airplanes and birds, are in the sky, but return to earth.

b. Recognize that the sun, moon, and stars are in the sky, but don't come down.

c. Explain why a book does not fall down if it is placed on a table, but will fall down if it is dropped.

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Enduring Standards (objectives of activity):
    Habits of Mind
       [X] **Asks questions**
       ☐ **Uses numbers to quantify**
       [X] **Works in a group**
  [X] **Uses tools to measure and view**
  ☐ **Looks at how parts of things are needed**
  [X] **Describes and compares using physical attributes**
  [X] **Observes using senses**
  ☐ **Draws and describes observations**

Content (key terms and topics covered):
Key terms: gravity, air resistance
Key topics: gravity applied to airplanes, birds, the sun, the moon, stars, and common objects and occurrences

Learning Activity (description in steps):
Introduction: We will start out by talking about what gravity is. I will define it as a force that draws objects to the center of the Earth, below our feet.

Hands-on Activity:

    1) Let the students roll the balls down the ramp. Talk about why balls roll down ramps, towards

    the center of the Earth. Set the balls on the table and explain how the table is preventing them

    from falling.

2) Have two students drop a ball with a sheet of paper. Talk about how the paper falls last because air is being trapped under the paper and holding it up a little longer. Talk about how this is air resistance.

3) Have two more students drop a ball with a crumpled up sheet of paper. Talk about how the crumpled paper falls faster than the flat sheet of paper because less air is getting trapped under it to hold it up. Talk about how the crumpled paper and the ball fall at the same time because gravity works the same on all objects, but sometimes air gets in the way like the regular sheet of paper.

4) Talk about how some objects, like leaves, birds, and parachutes, fall more slowly because air is fighting gravity (explain air resistance).

5) Tie open rubber bands to both heavy and light shoe, hold both rubber bands at the same level and help the students measure the rubber band lengths with a ruler. We will then talk about how the shoes stretch based off of their weights. Heavier objects make the rubber band stretch longer than lighter objects because they weigh more.

Summary: Ask the following questions and facilitate group discussion:

1) What is gravity? What does it do?

2) When have you seen the effect of gravity? (Share a "gravity story")

3) What is air resistance? What does it do? What are some objects that fall slow because of air resistance?

4) Why did the heavy shoe pull the rubber band longer than the light shoe?

5) Discuss why the moon, sun, and stars stay in the sky and do not fall towards Earth.

Abstract (limit 100 characters): Students will learn about gravity and that it is the reason why objects fall.
Details: This lesson works best in groups of about 4-6 students.

Materials Needed (type and quantity): one ramp (I used a 3 inch binder), tennis balls (one for each student), white paper, ruler, and two rubber bands- one each tied to one heavy shoe and one light shoe

Notes and Tips (general changes, alternative methods, cautions): Safety: 1) Hold the rubber bands that have the shoes hanging from them for the students. This is to prevent any rubber bands snapping on them. 2) Make sure the tennis balls are being handled safely and that students are not throwing them at each other. Alternative methods/ changes: It would have been a good idea to pass the ramp to each student so everyone had only one turn, one by one, to roll their tennis balls. This could have prevented them throwing tennis balls at each other.

Sources/References:
None