

Gravity & Free Fall

Name: _____ Date: _____

LEARNING OBJECTIVE

The student will drop objects of different mass from the same height to test whether mass affects the rate of free fall due to gravity.

MATERIALS NEEDED

- Two objects of different mass but similar size/shape (e.g., a golf ball and a tennis ball, or two same-size books), a stopwatch or phone slow-motion camera
- a measured height (stairs, chair, balcony -- with adult supervision)
- paper
- pencil

HANDS-ON ACTIVITY

1. Choose two objects of different weight but roughly similar size and air resistance (e.g., a full water bottle and an empty one, or two balls of different mass).
2. Standing at a safe, consistent height (like the top of stairs or a chair, with adult permission and supervision), hold both objects at the exact same height.
3. Drop both objects at exactly the same moment and observe (or record in slow motion) which one lands first, or if they land together.
4. Repeat the drop three times to confirm your observation is consistent.
5. Now repeat the test comparing a flat sheet of paper (crumpled into a ball first, then flat/uncrumpled) to see how air resistance changes the result.

QUESTIONS

1. **When you dropped the two different-mass objects from the same height at the same time, which landed first?**
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2. **Why did the flat, uncrumpled paper fall differently (slower) than the crumpled paper ball, even though they have the same mass?**
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3. **Based on your results, does a heavier object fall faster than a lighter object in real life? Explain any factors that might cause exceptions.**

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- 4. How does this experiment relate to the famous story of Galileo dropping objects from the Leaning Tower of Pisa?**
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