Prep Notes	
Materials	2 sheets of paper compass, pencil, ruler, scissors, tape
Teacher Background	Earth's gravity is a force that accelerates a mass toward the Earth at a rate of 9.81 meters per second squared. This means that a falling object will "speed up" in its fall by 9.81 m/s every second it falls. I.e., it will speed up to 9.81 meters/second by the end of the first second, then it will speed up to 19.6 meters/second by the end of the second second. This is only really true in a vaccuum, where no air currents are present to slow the fall. So gravity is a force, and we know that F = ma. For gravity (on Earth), a = 9.81 m/s/s. The acceleration is always constant, regardless of the mass, but the force is increased if the mass is increased. i.e., a bowling ball will make a bigger hole in the floor than a marble, but, if there are no air currents, the two will fall at the same rate. **But**, if you add air molecules into the equation, as in this project, and as we're accustomed to (since we don't live in a vacuum), the air can have a frictional, slowing "counter-force" effect on certain shapes. Aerodynamic shapes like rockets will be less affected by this air friction; flat, non-aerodynamic shapes will be more affected by air friction.
Opener Ideas	Talk about gravity, dropping things on the floor, etc. Consider talking about aerodynamics, rockets, etc.
Grammar	• **Gravity**: The force of attraction of a large mass, like a planet, that accelerates an object toward it. *Earth's gravity accelerates objects at 9.81 meters per second per second.* • **Atmosphere**: Air; gasses that can trap heat, move as "wind", etc., and can create frictional resistance to falling, flying, or moving objects.
Scientific Method	
Observations	What happens when you drop something? (It falls to the ground.) Have you ever wondered, or observed, how quickly or slowly different shapes fall?
Question	How does shape effect falling speed? (option: does weight have anything to do with speed?)
Hypotheses	Shape "does" (or "does not") effect falling speed. Various hypotheses about "how". *Optional:* Weight (mass) "does" (or "does not") have an effect on falling speed
Experiment (Procedure)	• Cut two 8"-diameter circles from the two sheets of paper • Cut a slit from the outside to the center of one circle • Form a cone from the cut circle, taping the overlap to hold the cone's shape *(It doesn't matter how "skinny" the cone is for now, though another experiment might compare cones of different dimensions to see the effects of aerodynamics.)* • Put an equal-sized piece of tape in the center of the flat circle paper, to equalize their masses • Drop the paper and the cone (point-down) at the same time • Observe their differing falling speeds
Results	The cone falls faster. (A very "broad" cone will fall more slowly than a "narrow"cone.)
Conclusions	An aerodynamic shape will fall faster than a shape that is not aerodynamic (even though acceleration due to the force of gravity is a constant at 9.81m/s/s).
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