

Lesson Plan: Gravity, Angles, and Digital Precision

Focus: Physics-Based Problem Solving & Mouse Mastery **Lab:** [Drip Drop](#)

Learning Objectives

- **Predictive Physics:** Students will predict the path of falling water based on gravity and surface angles.
- **Digital Precision:** Students will demonstrate fine motor control by drawing steady, deliberate lines using a mouse or trackpad.
- **Engineering Design:** Students will use the iterative process (trial and error) to adjust failed designs and achieve a successful outcome.

The Challenge: "The Digital Aqueduct"

1. Visualize the Flow (Spatial Reasoning)

Before drawing, students must look at the "Water Source" (cloud) and the "Target" (flower).

- **The Task:** Use the background grid to map out a path.
- **Discussion Point:** "If I draw a steep line, will the water move faster or slower? If the line is flat, where will the water stop?"

2. The Precision Draw (Motor Skills)

Students must use a **Click and Drag** motion to create ramps.

- **The Technique:** Instead of "scribbling," students are encouraged to draw single, solid lines.
- **Real-World Connection:** Explain that this same steady-hand coordination is used by architects and engineers using CAD (Computer-Aided Design) software.

3. Test, Shake, and Redesign (Iterative Design)

Most first attempts will fail—and that is the point.

- **The Process:** Students press "Play" to test their physics. If the water misses, they must analyze the "break" in the path.
- **The Tool:** Use the "Shake" or "Restart" function to clear the board and apply what was learned to a new design. This reinforces a **Growth Mindset**.

Success Criteria

- **Level Completion:** Student successfully grows the flower by routing the water.
- **Efficiency:** Student uses the fewest number of lines possible to reach the goal (demonstrating better prediction).

- **Stability:** Lines are drawn smoothly without "gaps" that let water leak through.

🎓 Teacher Pro-Tip:

This lab is an excellent "Bridge Activity." Use it to transition students from basic mouse clicking to more complex navigation. If a student is struggling with the "Click and Drag" motion, have them practice drawing a simple straight ramp before attempting the more complex "curved" physics of the later levels.

Common Core State Standards (CCSS) Alignment

- **CCSS.MATH.PRACTICE.MP1: Make sense of problems and persevere in solving them.**
 - *Lab Application:* Students use iterative design. When the water path fails, they must analyze the break in the line, clear the board, and redesign their approach without giving up.
- **CCSS.MATH.PRACTICE.MP4: Model with mathematics.**
 - *Lab Application:* Students use spatial reasoning to draw lines (angles and geometric paths) that act as physical models to bridge the gap between the water source and the target.
- **CCSS.MATH.CONTENT.K.G.A.1: Describe the relative positions of objects.**
 - *Lab Application:* Students must visually assess the spatial relationship between the cloud (above) and the flower (below/diagonal) to strategically plan where their ramps need to be placed.