The scenario

Subject	**Fluid Mechanics / Torricelli´s Law**
Length	3:28
Main objectives	Liquid flow rate.
Detailed objectives	
Structure and description of experiments	
1. Introduction	Description: Demonstration suitable for describing the outflow velocity of liquids, horizontal throw, Bernoulli's equation.
2. Main subject	Description: Explanation of the terms discharge velocity, atmospheric pressure, law of conservation of energy of flowing liquid.
Part 1	
(0:39)	**Tools:** Plastic bottle, large bowl, stand or pedestal, length measure, ruler, water, dye. **Description:** We will make a circular hole with a diameter of 1-2 mm in the plastic bottle.
Experiment 1 (0:52)	Place the bottle on a stand above the drain bowl. Pour water into the bottle.
(1:05)	We open the hole on the bottle. The water level in the bottle gradually decreases, which reduces the size of the outflow velocity of the liquid, i.e. the initial velocity of the water flowing out of the hole in the bottle. We observe that the water flows into the bowl gradually to a smaller distance.
	We will make two circular holes with a diameter of about 1.5 mm in the plastic bottle, so that they are on one vertical line. One hole will be about half the height of the bottle and the other two thirds of the height of the bottle. So the holes will be approximately 5 cm apart.
	Fill the bottle with water to the brim so that its level above the upper opening is as far as the bottom of the bottle from the lower opening.
Experiment 2 (1:44)	We open the holes on the bottle. The water flowing out of the upper opening has a lower outflow velocity (the initial velocity of the horizontal throw). Water flowing out of a lower opening has a higher flow velocity than water flowing out of a higher opening.
(1:58)	As the liquid level in the bottle decreases, the size of the outflow velocity from both openings also changes, i.e. j. the distances to which the water sprays also change depending on the height of the liquid level in the bottle. **Questions:** Why does the size of the outflow velocity change? What does the size of the outflow velocity of the liquid depend on?

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	Conclusions: The length of the horizontal throw of the water jet depends on the initial speed of the thrown body. The experiment shows that the length of the horizontal throw is greater, the greater the speed with which the body was thrown. We observe different trajectories of horizontal throws with different initial velocities and at different heights from which the bodies were "thrown" using the water jet. If we observe the length of individual horizontal throws in the plane of the bottle, we see. That the longest length belongs to the throw from the lower hole and the length of the throw from the upper hole is smaller.
3. Summary, evaluation and notes	**Application:** outflow velocity of liquids, horizontal throw of bodies **Notes:** Torricelli's law is a formula for calculating the flow rate of an ideal liquid. The formula can be derived from Bernoulli's equation (the law of conservation of energy of a flowing liquid) when the area of the container is assumed to be much larger than the opening through which the liquid flows, as in our experiment. Atmospheric pressure acting on the water in the container can also be considered constant with a small height difference. If the area of the container is much larger than the opening, the drop in the liquid level can also be considered negligible. Torricelli's law can only be used when the viscosity of the liquid can be neglected, which is the case of water flowing through holes in containers. **Level:** high school (1st year)

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