

Scientific method

Research

- 1.Scientists encounter problems or observe unusual phenomena, prompting them to formulate the question.
- 2.They gather information, read scientific papers, and then formulate testable hypothesis. (For example, “Fairies stole my flowers” is not a valid hypothesis).
- 3.Look on the Internet and find some testable hypothesis. They do not necessarily have to be in the field of physics.**
- 4.Experiments are conducted to gather data for testing the hypothesis. The experiments are repeated multiple times, and each observation is documented with the data.
- 5.Subsequently, data analysis is performed to either confirm or reject the hypothesis.
- 6.If the hypothesis is found to be false, scientists usually repeat the procedure to ensure there were no errors in conducting the experiment or recording and processing the data.
- 7.If the hypothesis is confirmed to be true, it is advisable to repeat the procedure to validate the results and ensure they are error - free.
- 8.After reaching conclusions regarding the hypothesis, scientists communicate their finding to others, enabling them to replicate the experiment and test the hypothesis independently.
- 9.If the scientific community reaches a consensus on the results, it signifies a significant advancement in the field of science.

Task

1. Observe the behavior of water and other liquids of your choice. Determine how many drops of water, dispensed using an eyedropper, can be accommodated eyedropper on the surfaces of various coins before the water overflows from the coin. (This experiment has been frequently replicated, so you can find existing results on the Internet and compare them with your own.)

Materials needed:

Eyedropper,
water and other liquids,
different coins.

Procedure:

- 1.Begin with the smallest coin. Apply a single drop of liquid onto its surface and observe its behavior.
- 2.Make a prediction about how many drops can fit on the coin's surface.

3. Record the actual number of drops that the coin can hold.
4. Compare your prediction with the recorded results.
5. Repeat the procedure with other coins and different liquids
6. Record your findings in the table provided below.

Number of drops			
Liquid	20 pence	50 pence	1 Euro
Water			
Oil			
Detergent			
Alcohol			

7. Based on your observations and the data you have collected, consider what factors influence the amount of water that can be held on the coins?

(Note that the science related to this activity may be somewhat advanced but with the guidance of a teacher, you can draw certain conclusions.)

For the teacher:

The objective of this activity is to familiarize students with the fundamental steps of the scientific method.

SI units.

Research:

Explore and discover intriguing names associated with the measurement of time, length and mass from the history of your country. Document your findings, and feel free to include images in your presentation.

Strategy and modelling:

1. Devise your unique instrument for measuring time, length, or mass.
2. Document the materials you employ and outline the procedure. Utilize images to illustrate the steps.
3. Contemplate methods to validate your results. Seek guidance from your parents or a teacher if needed.

Results:

1. Document, analyze and test your findings.
2. Consider improvements of your measurement device. If feasible, make necessary adjustments.
3. Conduct additional measurements and compile key points for sharing your outcomes with your classmates.

For the teacher:

Materials students may need:

Plastic bottles of varying sizes, plastic, paper, and Styrofoam caps, strings, springs, ruler, yardstick, tape, rubber bands, plastic, wooden, and metal clothes hangers, an electronic balance, timer, assorted types of paper clips, objects to measure, paper, wooden sticks of various lengths and thicknesses, chocolate bars, sweets of known - mass for testing the device.

During discussion, emphasize the significance of measurement accuracy and provide real-life examples. There is a distinction between weighing, for instance, flour and individual components of medications.

Scientists on banknotes.

Task:

1. Search for images of scientists featured on banknotes.
2. Select one that interests you and gather fascinating information about their life, particularly their contribution to physics or their work on inventions.
3. Present the most significant facts to your classmates and explain how this scientist has influenced the fields of science or engineering.