

An Apple a Day: A Novel Way to Introduce Students to the Scientific Method

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How does a scientist form a hypothesis? What are the important steps in the process? Can you change your hypothesis? These questions are not well understood by students. In this mini, we explored how a very simple hypothesis can be improved based on a pilot experiment and literature review. The activity started with the question “Does a red apple have more seeds than a green apple?” We progressed through the common steps used to design a hypothesis, test our initial hypothesis in a pilot experiment, compare our results to what is known in the literature and finally to modify our hypothesis. Along the way, the activity pointed out the importance of observational skills when collecting data as well as the importance of understanding the limitations of an experimental design. Participants determined how many seeds they have in a real apple. The results were discussed with respect to how the procedure might be modified and what equipment and skills facilitated the collection of the data. The group's results were then compared to another group's results (results from undergraduate courses). We then performed a simple background search to learn more about apple seeds and how seeds develop. We ended by modifying our hypothesis and determining the scientific merit of the new hypothesis compared the original question. The Seeds in an Apple activity has been tested in class sizes of 30 to 400 students, from 6th grade to juniors in college. The activity is appropriate for both science and non-science majors.

Keywords: hypothesis testing, experimental design, scientific method

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