

INTRODUCTION TO THE SCIENTIFIC METHOD

Teacher:

Grade Level: 3rd-6th

Time: 1.5 hours (can be broken into 2 activities)

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Next Generation Science Standards:	3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
Enduring Understandings:	In order for scientists to collaborate, share ideas, and discuss results, they need to use a standard way of performing research. The scientific method is a standardized way of performing and recording research.
Content Objective:	Students will identify why it is important to work in teams and collaborate with other scientists. Students will work in small groups to perform each step of the scientific method in a rapid-fire experimentation.

Vocabulary	Materials
Standardized Scientific Method Hypothesis	Scientific Journals Rapid Fire Experimentation Worksheet Speakers and Projector (for video) Scientific Method Cards

Seasonality: This lesson will work well during the beginning of the school year (July-September) to set the scientific standards and journal requirements for students' research projects.				
Monsoon July-Sept.	Autumn Oct.-Nov.	Winter Dec.-Feb.	Spring Mar.-Apr.	Dry Summer May-June

Engage: Guiding Questions: Imagine you have lost your phone. What are the steps you would take to find it? Record what you would do, step by step (1, 2, 3,...), in your journal. Share out with the class.

Explore: We are going to watch a short video. YouTube Video: *The Scientific Method* <https://www.youtube.com/watch?v=SMGRe824kak>. This video uses the example of losing your phone to explain the scientific method in a clear and concise way. After the video, review any unfamiliar terms, such as hypothesis, with the students. Guiding Question: What was the main subject of this video? Watch the video a second time once new terms have been reviewed. Guiding Question: Now that you have seen this video twice, do you see any similarities or differences in the steps you recorded to finding your phone? This is the scientific method!

Explain: Guiding Questions: Why is it important to have a standardized way of conducting scientific research? Could the steps to the scientific method be performed out of order? Discuss.

Print a copy of the scientific method cards (below) for each table group. Have students work together to place them in the correct order.

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Elaborate: Use the **Rapid-Fire Experimentation: Introduction to the Scientific Method** worksheet (found on this website) to have small groups of students work through each step of the scientific process. *Teacher Note: This worksheet is meant to be completed in 1 hour and is a way for students and teachers to see a project through, from start to finish, before beginning a long-term project. Long-term data collection can be very confusing (especially keeping track of data and staying focused on your research question!). I have found it very helpful to complete this worksheet before letting students create their own research projects.*

Evaluate: Review the rapid-fire worksheets with each team of students as they are working. With any remaining time, have students go back to their journal and review the steps they originally recorded to finding a lost phone. Have students try to identify and label these steps using scientific method terminology (i.e., question, hypothesis, method, etc.).

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make an observation



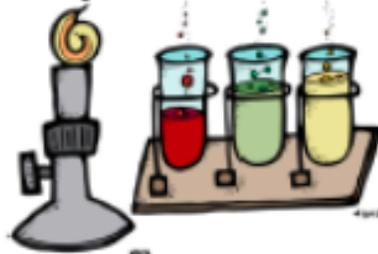
ask a question



make a hypothesis



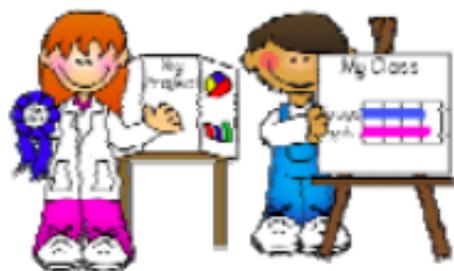
conduct your experiment



draw conclusions



report your results



RAPID FIRE EXPERIMENTATION: INTRODUCTION TO THE SCIENTIFIC METHOD

USE THIS ACTIVITY SHEET TO WORK THROUGH EACH STEP OF THE SCIENTIFIC METHOD IN A 1-HOUR CLASSROOM PERIOD

RESEARCH QUESTION (pick one and place a ✓ next to it)

_____ How many plant species are in the garden?

_____ How many animal species are in the garden?

_____ Where do you see the most pollinators in the garden?

_____ Where do students mostly go in the garden?

TEST IT!

WHAT QUESTION DO YOU WANT TO ANSWER?

LEARN AND REFLECT!

WHAT INSIGHTS DID YOUR EXPERIMENT REVEAL?

HYPOTHESIS

WE PREDICT THAT _____ WILL BE THE ANSWER TO _____ BECAUSE _____.

RESULTS

WHAT DID YOU LEARN? WAS YOUR HYPOTHESIS SUPPORTED?

EXPERIMENT

WHAT EXPERIMENT WILL TEST YOUR HYPOTHESIS?

WHY?

(WHY OR WHY NOT) WAS YOUR HYPOTHESIS SUPPORTED?

METHODS

HOW WILL YOUR EXPERIMENT WORK?

INSIGHT

WHAT NEW OBSERVATIONS OR IDEAS DID YOU DISCOVER?

TARGET METRIC

HOW WILL YOU KNOW YOU HAVE BEEN SUCCESSFUL?

DECISION

WHAT COULD YOU DO NEXT TO IMPROVE YOUR EXPERIMENT?