

Scientific Method in Ashkelon

Standards Covered

NGSS:

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

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-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

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.

Common Core:

ELA/Literacy –

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

WHST.6-8.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.

SL.8.5 Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

Mathematics –

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

7.SP Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

Guiding Question

How can the scientific method be used to answer questions on an archaeological dig?

Procedure

Video - Watch as Dr. Hoffman explains how she used the scientific method to determine where to dig in Ashkelon

Junior Archaeologist Assignment

Interactive Homework

Steps of the Scientific Method

Come up with a question – What are you trying to answer? What will be the focus of your experiment?

Research – Use a variety of resources to determine as much information about the subject as you can beforehand.

Create a hypothesis - Using information you learned in your research, determine what you think the answer is. Your hypothesis should be something you can test in your experiment to determine the answer to your question.

Experiment – Carry out the experiment in a safe and controlled environment.

Read the results – Look at the qualitative and quantitative data that you received by conducting your experiment. Were there any inconsistencies or errors? Did you conduct enough of the experiment to gain reliable information from it?

State a conclusion – What is the answer to your question? What data do you have to support this answer?

Wonderings – What are you still wondering? What experiment can you do next based on your results?

Junior Archaeologist Assignment

What are you curious about? Design your own experiment to answer a question! It doesn't have to be a major question, just something that you have always wanted to know. Use the log book to help you keep track of your thoughts as you go through the process.

Interactive homework

Perform a lab using the scientific method at your house as a family!

Determine which brand of paper towel works the best so you know you are getting the best “bang for your buck” when you go to the store. Using the same size paper towel (you may have to cut them), determine which paper towel absorbs the most liquid. First, measure the same amount of liquid in a graduated cylinder or other measuring cup for every paper towel you are testing, then dip the paper towel in the liquid for the same amount of time. When you are done, measure how much liquid is left over! Let your family know which paper towel they should be using based on the paper towel that absorbed the most liquid.