

# Science and Engineering Practices



How are geodes formed?



Scientists

Science helps us explain phenomena.

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Engineers

Engineering helps us solve problems.



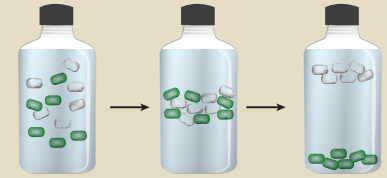
How do I re-create this density bottle?

## Asking Questions



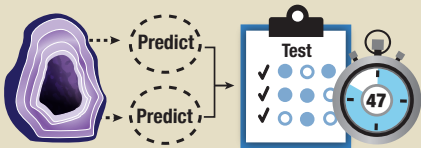
Ask an answerable question about phenomena—those naturally occurring events.

## Defining Problems



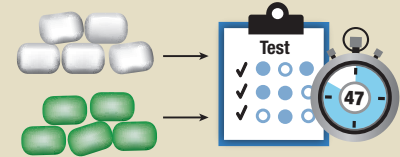
Describe a problem's criteria and constraints.

## Developing and Using Models

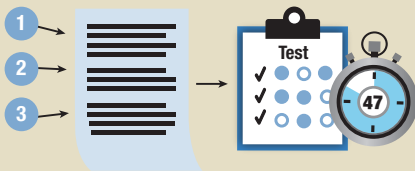


Models help predict and explain.

Models help test and optimize solutions.

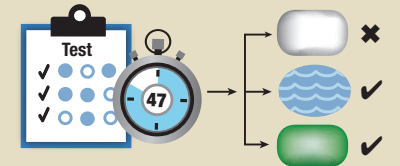


## Planning and Carrying Out Investigations

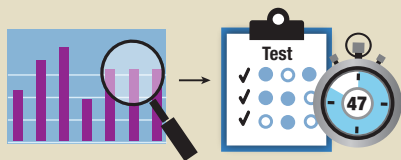


Plan and carry out procedures for collecting data to test explanations.

Test proposed design solutions to determine effectiveness in solving the problem.

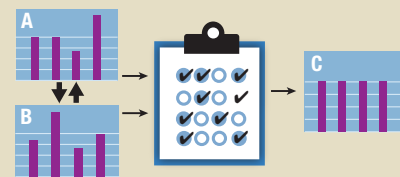


## Analyzing and Interpreting Data

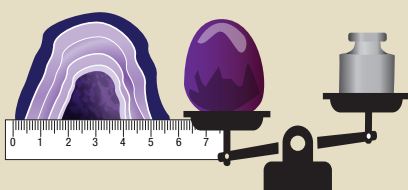


Analyze and interpret data to provide evidence for phenomena.

Compare results of tests for different design solutions.



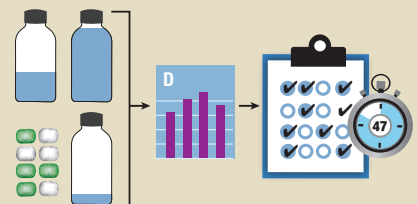
## Using Mathematics and Computational Thinking



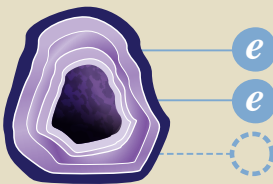
Use digital tools...

To analyze data sets and mathematical representations to describe and support scientific conclusions.

And mathematical concepts and arguments to test and compare proposed solutions.

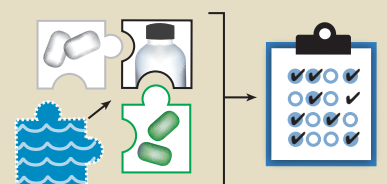


## Constructing Explanations

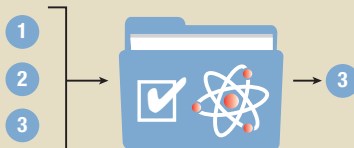


Apply scientific ideas and evidence to construct an explanation for real-world phenomena.

Develop and optimize solutions to problems. Do solutions meet criteria under given constraints?



## Engaging in Argument from Evidence

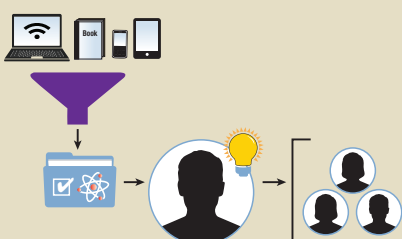


Determine and refine the best explanation for a phenomenon. Base it on evidence and scientific reasoning.

Select and optimize the best solution to a problem. Base it on evidence from tests and criteria.



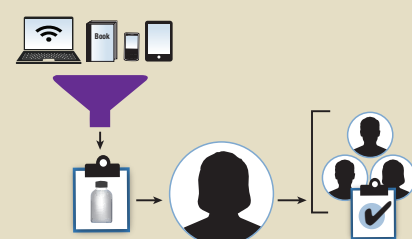
## Obtaining, Evaluating, and Communicating Information



Learn through texts and other media.

Evaluate relevancy and quality of sources. Communicate ideas to others.

Communicate with others about criteria for design projects. Criteria must be clarified and agreed on by stakeholders.



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