# STEM Practices

SciGirls Want to Know: STEM Practices

The SciGirls approach is rooted in research about how to engage girls in STEM (science, technology, engineering, and math). In order to see themselves as people who can succeed in STEM, youth must engage in the practices used by science, engineering, math, and computer science professionals. These practices help youth understand how scientific knowledge develops, the way in which engineers design and create, the processes and proficiencies of mathematics, and computational behaviors and ways of thinking. By creating hands-on inquiry-based STEM experiences incorporating practices used by STEM professionals, educators help build STEM identities. Below you will learn five different STEM practices and how using these practices creates authentic STEM experiences for youth.
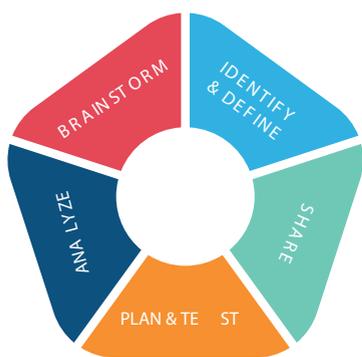
Identify/Define. The SciGirls Challenge describes a general question or states the problem for the activity. Youth should continue to ask alternative questions throughout the process, avoiding simple yes/no questions. Youth then define the problem and break it down into parts to identify constraints and understand the criteria for success.

Brainstorm. Youth will generate ideas to answer questions or solve problems by looking at existing models, researching online, identifying patterns, talking with one another, or consulting experts. Creating models (mental or visual) and simulations to help develop explanations and analyze existing solutions help youth generate better predictions.

Plan & Test. Youth will plan a scientific investigation or an engineering task. When planning, youth should identify what will need to be recorded and (if needed) how the variables will be controlled (if needed). In engineering and computer science, after building their design, it should be systematically tested and redesigned as needed.

Analyze. Youth will use math and computer science to analyze the data collected in an experiment. Make calculations, organize the data into a chart or table to look for patterns, and develop an explanation for the results. Youth should ask the question: does this result match my prediction? Or does this design solve my problem? If not, why not? The analysis can raise new questions and problems that starts the entire process over again. Remember: failed tests can lead to important results.

Share. Youth will learn from others by sharing their results and observations with each other. Encourage youth to be creative when sharing their results. Have them use visual aids to tell an effective story. Remind groups to defend their explanations with evidence and allow time for feedback and discussion to work collaboratively in searching for the best solution or explanation.

* The SciGirls STEM practices are based on the Common Core State Standards for Math, A Framework for K-12 Science Education, and the K12 Computer Science Framework.