STEM Superstars

Scientific inquiry is propelled by a distinct interest in studying diversity in our world and making sense of the findings. Not only is there diversity in all areas of science: physical, earth, and life, but also among the scientists who have made discoveries and advancements that benefit society at large. This series explores the lives of science, technology, engineering, and math all stars who not only made scientific breakthroughs, but also broke barriers in helping others honor diversity among people.

Next Generation Science Standards (NGSS)

One of the aims of the NGSS is for students to learn the disciplinary core ideas within a context of science and engineering practices and through crosscutting concepts that unify the study of science and engineering through common application.

Science and Engineering Practices	Crosscutting Concepts
1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	1. Patterns 2. Cause and Effect 3. Scale, Proportion, and Quantity 4. Systems and System Models 5. Energy and Matter 6. Structure and Function 7. Stability and Change

As students read the Stem Superstars books, encourage them to identify the ways in which each scientist engaged in science and engineering practices or utilize crosscutting concepts. Doing so will help students see the real-world

application and " recognize that the work of scientists and engineers is a creative endeavor—one that has deeply affected the world they live in. Students may then recognize that science and engineering can contribute to meeting many of the major challenges that confront society today, such as generating sufficient energy, preventing and treating disease, maintaining supplies of fresh water and food, and addressing climate change." (NRC Framework 2012, pp. 42-43)

Inviting Inquiry

Scientists are curious. They are observant. They see things in the world, ask questions and ask questions about them. Prior to reading the STEM Superstars books, invite students to inquire using images (preferably projected) that are related to each scientist. Encourage them to discuss what they notice in the images, what they wonder about the images, what the images make them think about or connect to, and the ideas that come to mind as they ponder the content of the images. Inviting inquiry prior to reading the text helps students set a purpose for their reading. Below are images to support the first STEM Superstar titles. When selecting images of your own, aim to find those that may not provide an immediately obvious connection, or are familiar to students—thus, offering an invitation to engage in inquiry.

 **Temple Grandin**	 **Mae Jemison**
 **Lonnie Johnson**	 **Shigeru Miyamoto**

Meet the Superstars of Science

It can be exciting for children to learn that, at one time, scientists were kids just like they are now. They liked to play and had interests just like children do today. After reading about STEM Superstars, students can make connections between the scientists' early interests and their ultimate careers and contributions. The graphic organizer below can help guide a biographical study of how early experiences can shape who one becomes later in life.

Scientist	Childhood Interest/ Inspiration	Area of Scientific Study	Scientific Contribution

Showcasing the STEM Superstar in Each Student

Just like the STEM Superstars, your students have interests that are linked to science, technology, engineering, and math. Even children's open-ended play abounds with these practices. Building with blocks and, pushing cars up ramps and releasing them, going down the slide all inherently involve science and engineering concepts that children can relate to and use as prior knowledge to help them explore new ones.

By helping children see that their own interests involve STEM, they begin to see themselves as budding scientists and engineers. To facilitate this, you can begin by taking inventory (either through observation or eliciting responses) of your students free-choice interests. Next, you can help students apply STEM academic language and practices to showcase the ways in which they are engaged in STEM during their own free choice activities. The list of Science and Engineering Practices, and Crosscutting Concepts can be used as schema for guiding these discussions. Once you and your students have insights about how their own interests connect to STEM, you can encourage them reach further to consider ways in which they can answer questions (science) or solve problems (engineering) using these interests as springboards.

Examples:

Activity	S & E Practices	C-C Concepts	Academic Language	STEM Challenge
Building with Blocks	1, 2, 3, 5	1, 2, 3, 4, 6	structure, model, function, construct	Construct the tallest building possible, using a given set of blocks. Test the stability of different designs.
Playing with Cars	1, 2, 3, 5	2, 5, 6	parallel, perpendicular, requirement, constraint	Build a parking structure that holds the most cars while taking up the least amount of space. Cars must be able to maneuver in and out of the spaces when all are full.
Riding a Skateboard	1, 3, 4, 5	2, 5, 6	motion, force, incline, balance, push, pull, design	Design a ramp that will result in the furthest distance traveled. Collect and analyze data to test different designs.