

# 12 Ways to Boost Social-Emotional Learning with STEM

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Vivify  
STEM

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Equipping students with the skills to succeed inside and outside the classroom has always been our goal as educators. As we go back to school in the fall or continue with distance learning, it has become increasingly necessary to address social-emotional learning (SEL). Read on for strategies on how to utilize STEM to invest in SEL and nurture a positive school culture.



\*\* This post contains affiliate links

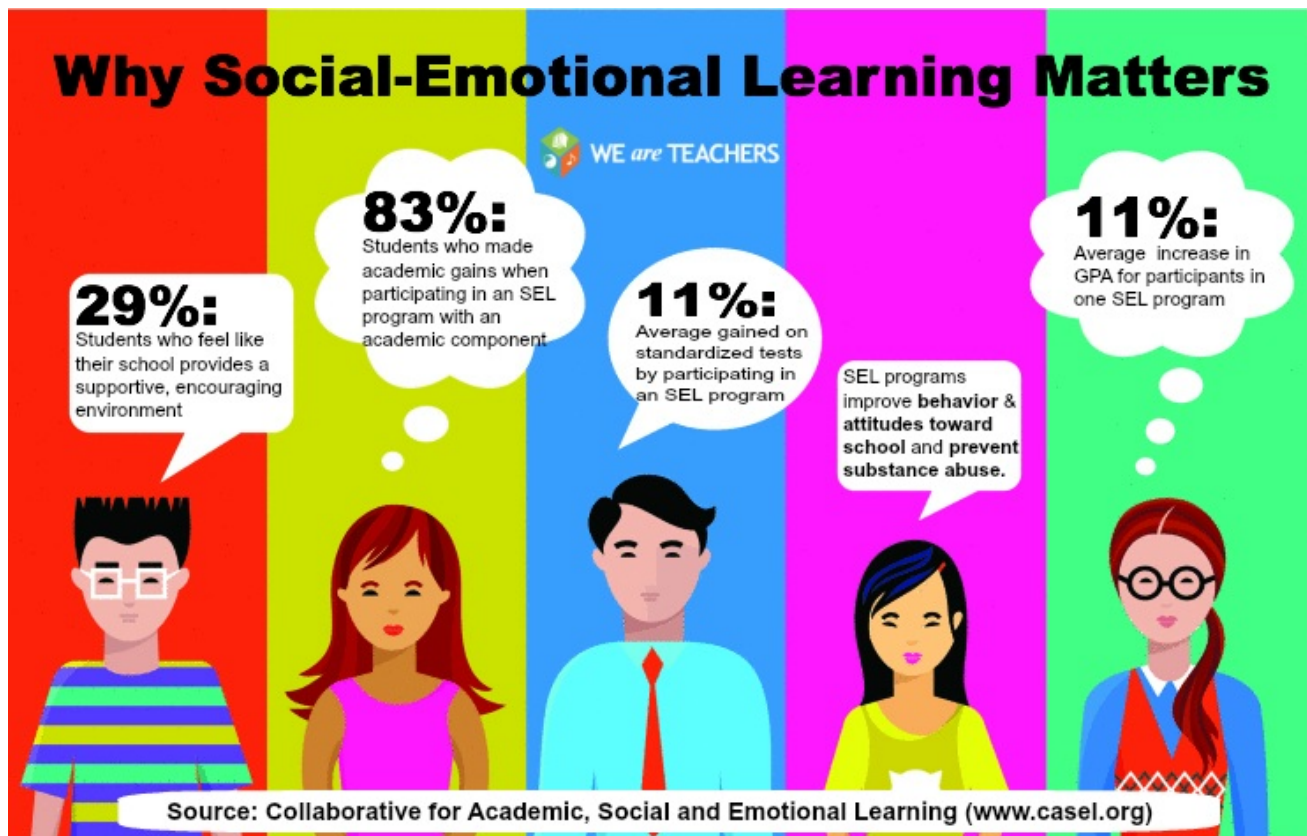
## What is Social-Emotional Learning?

Social and emotional abilities are critical in a child not only finding academic success but happiness and success in life. The **Collaborative for Academic, Social, and Emotional Learning**(2003), set the goal of an SEL program as developing five cognitive and behavioral competencies that are: **self-awareness, self-management, social awareness, relationship skills, and**

**responsible decision-making.** Nurturing these skills through intentional activities in the classroom helps children take responsibility for their actions and make good choices in academia and beyond.

## Why does Social-Emotional Learning Matter?

Addressing SEL abilities is a continuous process that is an investment in becoming positive contributors to your own life and the lives of those around you. Research shows that a child's SEL development directly correlates to success and happiness as an adult. School should be a safe place where children are encouraged and instructed in SEL skills before becoming active members of society and the consequences that exist in that role. Aside from the personal development gains in social-emotional learning infused lessons, including SEL strategies in your teaching creates highly engaging experiences that empower students to contribute more and learn more academically!



But how should teachers address these skills and abilities within their classrooms while addressing students' academic needs? Our answer: **STEM!**

STEM challenges are already an integrated approach with real-world applications. What better way to teach the skills needed for success in the real world than collaborative environments like these? The key here is that during STEM challenges, educators should implement naming, addressing, and providing strategies to overcome obstacles in students' self-management. Below are ideas to address each SEL competency with your students.

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## Self-Awareness

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Self-awareness is the ability to recognize and name one's emotions, including emotional needs, strengths, and limitations.

**Highlight Skills-** Address emotions when they happen. STEM challenges are usually conducted in a team environment, and this allows for many opportunities to address both positive and negative emotions. Highlight and encourage your students when you catch them with good behavior. For example, you may pull a student aside and say, "I noticed you were frustrated when you couldn't be on the same team as your friend but you did amazing at using your self-control and flexibility to work well in the team you were assigned!" Help them notice their own emotions and learn through experience where their strengths are.

**Reflect-** Make it a point after STEM challenges to include time for reflection! It is so important for students to look back and think about what was difficult or even what they enjoyed most about the challenge. They can look at the strengths they brought to the team as well as things that they need to work on improving.

**Emotions + Robotics-** Talking about emotions may seem out of place in a STEM program, but they provide the perfect opportunity! Here is an idea by using a Sphero Mini robot.

1. Talk about different emotions with your students and have an open discussion about how to deal with those emotions and how the students can encourage each other in your class.



2. Use the Sphero Mini Face Drive function to drive the miniature robots through a maze! The Face Drive function allows the user to open the app on their smart device and then smile to move the robot forward, frown to go backward, then tilt their head side to side to turn. They can even make an angry face to make the Mini roll away, or a surprised face for it to do a little dance! This is sure to be a memorable and impactful SEL lesson for your students!
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## Self-Management

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Self-management is the ability to regulate emotions and behaviors so that goals are achieved.

**Set Rules-** Working well in teams is challenging for most students. Guide your students in developing rules that they must agree to at the beginning of every class. These rules can address how they should manage their own emotions and sets the tone for beginning each challenge. Read more about how we use an “oath” here to start each session.

**Fail Forward-** Perseverance is a key skill in self-management. Provide students with challenges that test perseverance along with giving students strategies in moving past feelings of frustration or inadequacy. To accomplish this, I make sure there is plenty of opportunity for failure in engineering design challenges. Design challenges require that students build something that solves the given problem and then test it. This testing phase can be very frustrating for students who are unable to succeed right away. Teach your students how to *fail forward*! This means that students need to know how to learn from their mistakes. Students should apply what they learned to make improvements and eventually succeed. Failure is part of the engineering process!

One of my favorite ways to practice this is by making failure a requirement! For example, in the Space Lander Challenge students must design a device that prevents astronauts (ping pong balls) from popping out of a cup when dropped from a given height. After a successful test, I throw in a curve ball! I tell students that what we thought were friendly astronauts are actually dangerous aliens, and we must now sabotage the landing! Students use what they learned from

previous failures to force the ping pong balls to pop out of the cup when dropped. In this way, they are forced to fail forward by learning from and implementing knowledge from previous trials.

To learn more about the importance of failure and tools in teaching it, read our post [here](#).



# Fail Forward

*with the Space Lander Challenge*

**STEM**  
**Space Lander**  
**Challenge**

Using the Engineering Design Process Includes Resources, Worksheets, and Math Extension Problems

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Social Awareness



Social awareness is the ability to understand what others are feeling and put themselves in their shoes. This helps us relate to others and empathize with them.

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STEM Explorers

Ancient China

Printer

STEM Challenge

Includes Resources & Worksheets To Guide your Students

STEM EDUCATION

**Social Awareness**  
*empathizing with inventors*

Explorers

Australia Safety Capsule

STEM Challenge

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**Empathize with Inventors-** Share stories from history where people invented or created solutions to problems that people were facing. Did you know that Alexander Graham Bell did more than just invent the telephone? He invented the metal detector to help locate a bullet inside of assassinated President James A. Garfield! He also devoted his life to helping those who were deaf, in part due to his personal interest in that both his mother and wife were deaf. In

sharing these stories, you can help foster empathy and see how our surroundings can facilitate creativity to solve issues and help others. Have your students learn about historical figures such as Bell and then learn to relate to them by recreating inventions in history. One example is creating a movable type printer that was the precursor to the printing press in ancient China ([Find our activity for this here](#)). Or, recreate the invention of the infant safety capsule (car seat) from Australia to keep babies safe in vehicles ([Find this activity here](#)).

Read books about past inventions and the stories behind them before doing an engineering design challenge to recreate them. Here are some historical invention books we recommend:

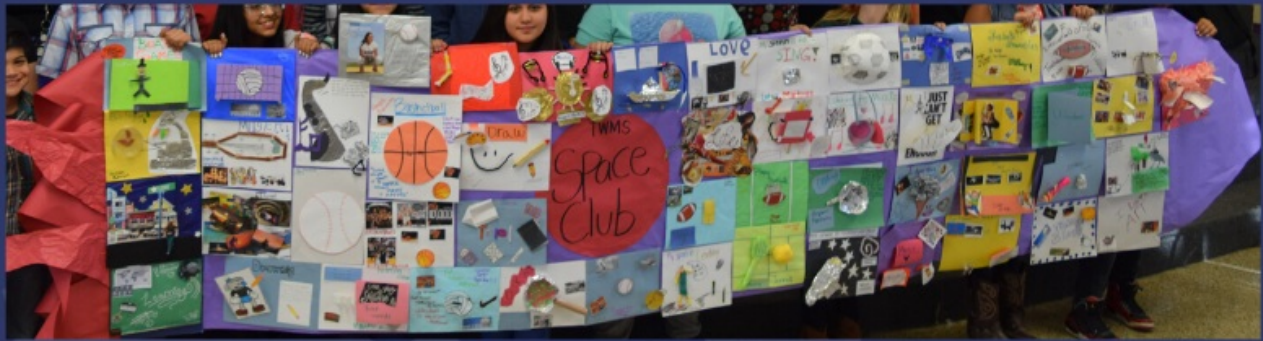
- [Mr. Ferris and His Wheel](#) (Kathryn Gibbs Davis)
- [The Boo-Boos That Changed the World](#) (Barry Wittenstein)
- [Gary and the Great Inventors](#) (Akura Marshall)
- [The Crayon Man](#) (Natascha Biebow)
- [Woosh!: Lonnie Johnson's Super-Soaking stream of Inventions](#) (Chris Barton)

Want more STEM books? Go [here](#).

**Create a vision board-** I like to say that not everything *is* STEM, but everything does relate to STEM. Build relationships with students while also helping them connect their passions with STEM careers that help make our world a better place. This can be accomplished by using [sparks](#)! A spark is an activity or interest that fully engages students. It can be their hobby, favorite subject, or past time. For example, student sparks can be cooking, space exploration, reading, video games, and more! Have your students research more about their spark and then create a 3D model of how their spark can lead to a career that solves a local or global issue. Display all of these projects as a vision board for your students' futures!

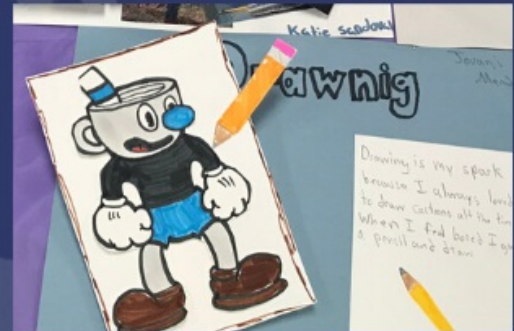
Read more about student sparks and other activities to do with them in our post [here](#).





# Social Awareness

## Create a Vision Board with Sparks



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## Relationship Skills

Relationship skills refer to the ability to work well together in teams, handle conflict well, and generally have positive relationships with others. Modeling these behaviors can be crucial in students gaining mastery over these social skills.

**Use Classroom Management Techniques-** Implement classroom management techniques that carry into your STEM challenges. For example, in my STEM class, I have an “awesome points” jar. When I overhear a student

providing vocal encouragement to their teammates or using positive self-talk



during an activity, I hand them an “awesome point” (pom-pom) to add to the jar. When the jar fills up, we have a class celebration. They can also lose awesome points when I hear negative words between each other or towards themselves. I model this by telling students that I love their effort, can see that they have great focus, or by telling them to “kiss their brain” for working well in their teams.



**Practice teamwork-** STEM challenges offer focused practice on relationship skills while working in teams. Before diving into big design challenges, have students work specifically on their teamwork skills as well as communication and critical thinking. These targeted exercises are what we call Stage 1 STEM skills (read about the [3 Stages of STEM here](#)). These activities typically last around 15 minutes and introduce a simple challenge that requires students to talk effectively in their teams and physically work together to solve the problem. For example, they build the tallest tower out of pipe cleaners ([click here for full instructions](#)), or lower a pole of straws to the floor using only their index fingers. [Find more of these team-building activities here.](#)

## Relationship Skills *with Icebreaker Challenges*



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STEM Education

## Responsible Decision-Making

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Responsible decision-making is marked by students effectively using problem-solving skills when making positive choices about their personal and social behavior.

**Give Responsibilities-** It may seem obvious, but it is important to give kids responsibilities to empower them to be responsible. This builds their sense of self-worth and helps them experience being a part of a larger community. In a STEM challenge, give kids roles like team manager, test engineer who runs the test, or materials scientist to be in charge of the supplies.

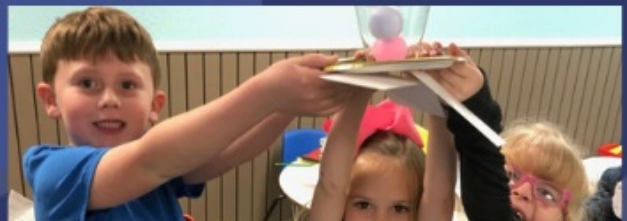
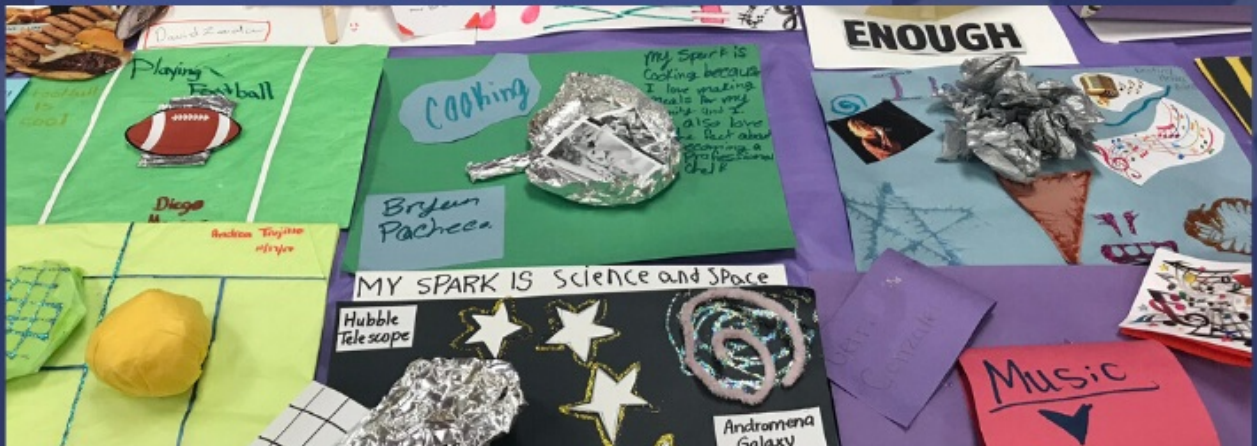
**Have a 10-minute policy-** STEM challenges are fantastic in helping your students flex their critical thinking muscles. The struggle of not immediately knowing what to do is what helps them grow in their problem solving skills and reveals negative behaviors when left unguided. For example, some students (typically those that seem to always have the answers) will become extremely frustrated if they are unsure how to proceed with a problem and feel that if they don't get it immediately, they will never get it. They tend to lash out at their teammates or give up and refuse to participate. I have a 10-minute policy where students must try their best to think about the problem and work on a solution in their teams before I will help them. Often, seeing that their "peril" is only temporary allows them to figure out a solution on their own in a lower stress environment. This also allows time for students to check their emotions as I remind them that I am here to help after they try their best first.

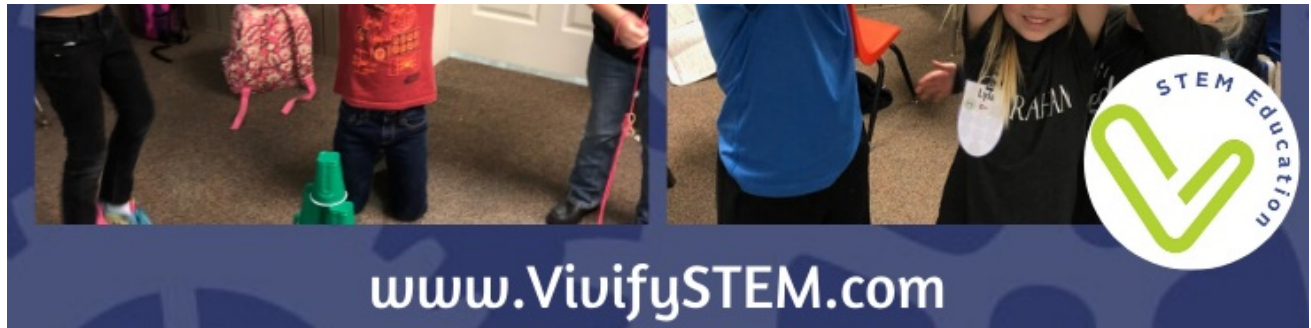
**Teach Focus-** In engineering, failure is a part of the design process. When something fails, real-world engineers do not often completely start over or scrap their progress, they focus on one thing at a time to find a better solution. I teach this to my class while guiding them through the engineering design process. During the brainstorming phase, we look at the different aspects of a challenge separately. For example, when designing a sailboat ([activity here](#)), they look at their materials for what will be water-proof as well as what will support the sail. Then when they test their boat, if it sinks because their materials fell apart, they can focus on choosing something that is water-proof but perhaps keep their sail design. Focusing on one thing at a time is a mindfulness activity that can greatly reduce stress during challenges and helps students beyond the STEM classroom.



Do you address social emotional learning in your classroom?  
Comment with other ideas you may have to help students  
sharpen these life skills!

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