



Building Teamwork in STEM Classes

By Anne Jolly

Do you work with STEM initiatives? Congratulations on being on the cutting edge of one of the most important programs taking place in schools today! STEM currently occupies center stage in efforts to integrate these disciplines and teach students to solve real-problems using engineering practices.

The best STEM classes feature collaboration and teamwork—21st-century skills all students need, no matter what their career paths; therefore, preparing kids to work together successfully in teams plays a critical role in today's STEM classes. Here is a starter set of ideas teachers may find useful for priming kids to work creatively and productively in STEM teams.

Prepare for Teams in Advance

Keep in mind: STEM teams should foster a sense of purpose, creativity, accomplishment, and a spirit that team members need one another to solve problems. Planning ahead helps to set teams up for success as they begin their journey.

Begin by deciding on team sizes that work best for the engineering challenge students will tackle. STEM team sizes generally vary in number from two to six, depending on how many students are needed to complete the activity successfully. When deciding on the size of the team, look at the number and kinds of tasks each team will need to accomplish. Assign enough team members so that all tasks can be accomplished in the allotted time, making sure each team member will have a necessary job. Try to establish these teams ahead of time so that on the first day of the STEM lesson, kids can go directly to their teams and be ready to work.

Be sure students have the skills needed to complete the required tasks. During STEM lesson activities, team members may be measuring, weighing, constructing, or recording data on an electronic spreadsheet. If, for example,

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The advertisement features the SAS logo (a blue 'S' followed by 'sas' in lowercase) and the tagline 'THE POWER TO KNOW.' in a bold, sans-serif font. Below this, the text 'Engage them.' is written in a large, clean font, followed by 'Free resources, tools and apps to enhance teaching & learning.' in a smaller font. At the bottom, there is an orange button with the text 'Discover SAS® Curriculum Pathways®'. The background of the ad shows a teacher and four diverse students (two boys and two girls) sitting around a table, looking at a laptop screen. The setting appears to be a classroom with educational posters and a globe visible in the background.

they will be weighing items using triple beam balances or electronic balances, teach them how to do this prior to the lesson. Students should also have background understandings of the math and science content they will need to apply to this challenge.

Help Students Understand the Value of Teamwork

Students become good team members when they value working together. Explain that engineers work in teams to develop solutions because they each bring a different set of skills and expertise to a project. Students will also need each other's expertise to make decisions and complete projects in the STEM lessons. Consider letting students on each team share their personal strengths as team members with one another.

Make Clear Goals

Team members are more successful when they have a clear goal and outcome for their teamwork. At the beginning of your lesson, use an engaging method to clearly define the purpose for the teams' work and the challenge they will tackle. Allow time for team members to ask questions and clarify expected outcomes.


Establish Procedures for Teams to Follow

Make it clear to team members what they should work on as a team, what they should do individually, how long their work should take, and what specific procedures they should follow. Clear instructions can help them stay on task and focused on what they need to accomplish. You will need to do this with every lesson, since each lesson will likely require a different set of procedures.

Help Students Develop Successful Teamwork Skills

Work on this area over time during lessons. You might focus each STEM lesson on helping students develop a different teamwork skill. Some skills you might focus on include showing respect, accepting differences, listening actively, staying on task, accepting responsibility, and maintaining positive attitudes. A couple of other ideas:

- Guide teams in setting norms. It sets the stage for positive interaction. Students will be more likely to buy into the procedures if each team sets its own norms, and if these norms help them learn what behaviors they value in one another.
- Give students guidance and experience in holding productive conversations. Team conversations should be civil and focused. You may need to provide conversation guidelines occasionally to keep teams on track, help team members reach a consensus, and assist in decision-making.



The image is a promotional graphic for SAS. At the top left is the SAS logo, consisting of a blue 'S' followed by 'sas' in lowercase. To its right is the slogan 'THE POWER TO KNOW.' in a bold, sans-serif font. Below the logo and slogan, the text 'Engage them.' is written in a large, clean, sans-serif font. Underneath that, in a smaller font, is the text 'Free resources, tools and apps to enhance teaching & learning.' At the bottom of the graphic is an orange rectangular button with the white text 'Discover SAS® Curriculum Pathways®'. The background of the entire graphic is a photograph of a classroom. A female teacher with dark hair is leaning over a desk, looking at a laptop screen. She is surrounded by four diverse students: a boy with glasses and a blue shirt, a boy with red hair in a yellow shirt, a girl with blonde hair in a yellow shirt, and a girl with glasses and a green patterned shirt. They are all looking at the laptop screen with interest. The classroom background shows a globe and some educational posters on the wall.

- Ask team members to assess their teamwork. Regular self-assessments help team members identify specific areas for improvement. You might use a rating scale and include constructive remarks like everyone feel accepted or we are organized. To ensure honesty and transparency, avoid using the self-assessments for grading.

Monitor Teamwork Regularly

Walk around the room to check on each team's progress. Limit the time you spend with each team so that you can observe and assist all teams. If a team needs a little more of your time, try to get them to a point where they can work alone for a few minutes while you check in with other teams. Then return and help them with the next step.

Evaluate Team Progress

Regularly collect student feedback on how effectively teams are working. When walking around you might make a note of such things as beneficial team interactions, newly mastered skills, and progress in solving the challenge.

Leave Time at the End of Class to Debrief

Give team members a chance to think and talk together about the quality of their work, their team strengths, and the opportunities they have for improvement. As much as possible, give team members individual feedback on the quality of their contributions to the team.

As you go about the task of establishing productive student STEM teams, you will face some daunting obstacles as well as successes. Be persistent and committed to making those teams successful. It's worth your time to help students engage in focused, systematic teamwork to find solutions. In return, your students will gain valuable abilities in learning, social skills, and preparation for life and the workforce.

Anne Jolly (@ajollygal) blogs about STEM regularly on [MiddleWeb](#). She is a Virtual Community Organizer for the [CTQ Collaboratory](#) and a member of the CTQ Thought Leaders Circle. Anne taught middle school science for 16 years in Mobile County, Ala., and is a former Alabama State Teacher of the Year. She is a published author and her new book, [STEM by Design: Strategies and Activities for Grades 4-8](#), comes out in 2016.

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