Student Teaming Tips

STEM by Design

A student teaming guide designed to help STEM teams function effectively

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Student Teaming Tips and Tools

Introduction

Students will work together in teams during each STEM lesson. To be productive, team members will need to understand the value and purpose of working in teams, and develop a sense of being part of a team. They should begin building the skills needed to collaborate successfully and be responsible and accountable for their work.

Setting your students up for successful teaming will help the activities go smoother and increase the learning value for students. Consider three initial tips to get your STEM teaming venture off to a smooth start:

- Make teaming an ongoing part of your classroom practice. This gives students multiple opportunities to develop needed behaviors and skills.

- Set students up in teams ahead of time. On the day of the STEM lesson they should be ready to get in teams and begin work when class begins.

- Provide teaming tips as needed throughout the lesson. Give students an opportunity to self-assess their teamwork regularly.

As you go about the task of establishing productive student teams in your classroom you will encounter both obstacles and successes. Be persistent and committed to making teams work and your students will reap valuable rewards in subject matter, social skills, and preparation for both life and work.

Step 1: Organize and plan for teamwork

Use these tips to help you prepare for successful student teaming.

- *Decide on team sizes that will maximize project success*. Suggested team sizes generally vary in number from two to six, depending on the nature of the activity. When deciding on the size of the team, take a look at the number of tasks that teams should accomplish and how many students will be required to accomplish these tasks. Assign enough team members so that all tasks can be accomplished in the allotted time and each team member will have a necessary job.

   Determine which students will be on each team. Each STEM lesson generally calls for a team of "student engineers" to complete a particular task. Before each lesson, notice what student skills will be needed to complete the tasks. Place students on each team who you think can successfully fill those roles. In some cases you may let the team members determine the tasks they need to do to successfully tackle a particular problem or design challenge.

- *Be sure students have needed skills for doing the required tasks*. During the STEM lesson activities team members may be measuring, weighing, constructing, recording data, and so on. See that students are able to accomplish what they need to do. If, for example, they will be weighing items using triple beam balances, or correctly measuring liquids using a graduated cylinder, these skills should be taught prior to the lesson.

- *Be sure students have the content knowledge needed to solve the challenge.* Students should work from an overflow of knowledge and understand how to apply appropriate science and math content (and other subjects as needed) as they work together to solve the STEM challenge.

- *Be sure the needed materials teams will work with are available, organized, and set up for easy access*. Preparing the room and materials in advance will keep teams moving more smoothly throughout the lesson or activity. Explain to team members what procedures they will use to gather, return, and/or dispose of materials as they work.

Step 2: Introduce a teamwork rationale (*Why* are we working in teams?)

- *Help students consider the value in working together*. The more information you can share with students about the value of teamwork, the better. To help them with this concept, ask them to think of some examples of people working in teams. (Athletes, lawyers, medical staff, NASA, and engineers, for example.) Ask students think about what might happen if football players practiced individually but never practiced as a team before a game. How would the game turn out?

Step 3: Establish a purpose for the teams' work (*What* should we accomplish?)

- *Clarify the function of the student STEM teams*. Professional engineers work together develop solutions because they each bring a different set of skills and expertise to a project. Student engineers will also need each other's expertise to make decisions and complete the projects in the STEM lessons. Keep in mind that any student teams you form during the school year will need a clearly defined identity and purpose.

- *Define the goal and outcomes for the teamwork*. Students work together more successfully and learn more when they have a clear goal and outcomes for their teamwork. Each STEM lesson defines the purpose for the teams' work and what problem the teams will be solving. Plan an engaging method of introducing these to the team members.

  To verify that students understand the team's purpose ask them to explain to you what challenge or problem they will be solving. Allow time for team members to ask questions and clarify expected outcomes.

Step 4: Establish teamwork procedures (*How* will we do the work?)

- *Provide clear directions for the team's work*. Make it clear to students what they should work on as a team, what they should do individually, how long to their work should take, and what specific procedures they should use to accomplish that. STEM lessons likely a set of instructions written specifically for students to help them stay on task and focused on what they need to accomplish. Be thoroughly familiar with the procedures before explaining them to the students.

- As you form student teams, plan on providing team members with written procedures either on the board or other display, or in handouts. Often, a handout with a checklist of procedures will keep teams on track.

Step 5: Develop teamwork skills (*How* will we work together?)

- *Guide teams in setting norms*. Teams work better when students on a team have a common understanding of what they value in one another as team members. If teams do not intentionally define helpful norms, then unhelpful norms will emerge by default. Setting good norms can generate positive interaction among students and help to regulate behavior during meetings.

  To generate more buy-in, norms should be specific to each team and set by that team's members. Use the "Whatt Matters to Our Team?" handout at the end of this document to help teams set meaningful norms to ensure that their teams run smoothly. Following the norm-setting activity, be sure teams have included norms on how they will talk to one another and share responsibilities.

- *Build interaction skills.* Students won't necessarily enter your class with the skills needed to engage productively in teams, so planning to provide guidance and structure for team dynamics can also increase team effectiveness. The *"Productive Conversations"* strategy at the end of this document can help to structure conversations and positive interactions among team members. You may choose to use some of these strategies during regular lessons in your class as well as during the implementation of a STEM lesson. Giving students experience with holding productive conversations will build success for teamwork during STEM lesson activities.

- Some ideal interaction skills for effective teamwork include those listed in the "Super Smart Team Skills" handout. You might use this as a checklist to keep track of what your students seem to do well and areas where they need guidance. Or, teams may use this to analyze their own social skills as a team. This will keep them aware of what successful team members do.

- *Use self-assessments to help students improve teamwork skills*. Self-assessments can help students understand how team members should ideally work together. STEM lessons will should some time for team self-assessments. The *"Super Smart Team Skills"* serves as a team self-evaluation. The *"Self Evaluation and "Team Evaluation"* handouts may also be used as team self-assessments. Students could do these as individuals or as a whole team. Remember that the

purpose of these assessments is to help students to identify areas where their personal skills should improve and their team should run more smoothly, and to decide on ways to address these. To ensure honesty and transparency, avoid using the self-assessments for grading.

Step 6: Monitor teamwork

- *Regularly monitor teams and provide productive feedback.* 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 you to spend more time with them, 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 to that team and help them with the next step. If you find that several teams are struggling with the same problem, pull the teams together for a few minutes to clarify the issue before returning to their teamwork. The *"Super Smart Team Skills"* handout can help you identify behaviors you are seeing in teams as well as behaviors you would like to see.

## Step 7: Check teamwork progress

- *Regularly collect student feedback on how effectively teams are working.* When walking around you might make a note of such things as
    - What kinds of team member interactions went well today?
    - What skills have team members mastered well?
    - How engaged are team members in doing the work?

- *Leave enough time at the end of class to debrief.* Give team members the opportunity to reflect on the quality of their contributions to the team, address their team strengths, and identify opportunities for improvement. As much as possible, give team members individual feedback on the quality of their contributions to the team.

Above all, do not underestimate the importance of the teamwork component of STEM. Perhaps the greatest advantage that teamwork brings is the quality of the finished product. A team brings together the combined skills, talent and experience of all team members. The team experience inspires members to greater achievement and generates ideas that otherwise would not happen. Teamwork encourages creativity and the development of new ideas.

What Matters to Our Team?

Directions: Use this process to decide on some useful team norms that will help you work together smoothly during your STEM project.

1. Think of times when you have been on a team or worked in groups. On separate sticky notes, list the behaviors you value in other team members during team meetings.
2. Share the behaviors you listed as you place your sticky notes so others can see them. If you listed the same behavior as someone else, place your sticky note on top of the one it matches.
3. When everyone has finished sharing, talk about all of the behaviors listed.
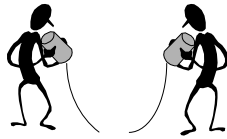4. Agree as a team on around 6 behaviors you all want to see happen on your team. List those below.
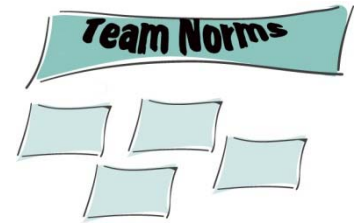
Six productive behaviors we want to see on our team.

1.

2.

3.

4.

5.

6.

Let these behaviors become your norms. As you work together you may realize that you need to change them, or add to them. Please do that.

Productive Conversation.

This strategy can help team members discuss an issue efficiently and reach a decision. This works particularly well when students have some degree of emotional engagement with the issue. In each team, one person is selected as the leader. After the issue is explained or clarified (or after students read about the issue), the leader asks four questions.

1. **What are the facts about this issue?** Team members can share only facts at this point. They do not get into how they feel about the issue or what their suggestions are at this point.

2. **How do you feel about this issue?** At this time team members can share their feelings about the issue.

3. **What implications does this issue have for** . . . us as a team, our project, the class, our invention, etc.? Students discuss only the impact the issue has on their engineering problem at some level.

4. **What decision can we make, if any?** Team members discuss what they might be able to do about the issue and make a decision. At the conclusion of the activity team members share their decisions with the whole group.

Super Smart Team Skills

Directions to students: Below you will see some ways that super smart team members work together with one another. Use this as a checklist to keep track of what you, as a team, seem to do well and areas where your team may need more guidance.

Directions: Discuss these skills as a team. How well does your team do these? Beside each skill, place a checkmark in the appropriate box.

Super Smart Team Skills	We do this well now	We need to do this better
1. We follow the directions.		
2. We ask for clarification when needed.		
3. We stay on task.		
4. We remain with our team at all times.		
5. We all participate in discussions and activities.		
6. We listen carefully to what others say		
7. We accept responsibility and each of us does our job.		
8. We share responsibilities equally.		
9. We share materials and supplies.		
10. We keep our voices down and speak quietly.		
11. We call each other by name.		
12. We accept differences in one another.		
13. We maintain positive attitudes.		
14. We each show respect for other team members.		
15. We cooperate with one another.		
16. We praise and support one another		
17. We are good sports.		
18. We ignore distractions.		
19. We all interact with everyone on the team.		
20. We use self-control while working on the project.		

Team Member Self-Evaluation

To the student: Think about yourself as a "team player." Look back at your role on the team and fill out answers for this form.

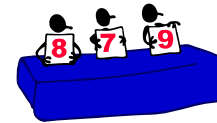**What was your task as a team member?** _____

_____
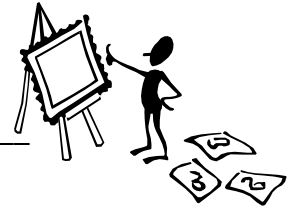
What did you do well? ?_____

_____

_____

What would you do differently if you had the chance to do the activity again?

_____

_____

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Team Evaluation

To team members: Discuss these answers together and write down what team members decide as a group. Use another page or the back of this page if needed.

1. How would you describe your group's teamwork?

2. What do you like best about the way your team worked?

3. What do you like least about the way your team worked?

4. How do you think your team can improve?

Teacher's Teamwork Skills Assessment

To the teacher: Use this list to observe how well a team is working together You might then share your findings with students to see if they agree, and to plan with them how to make needed changes.
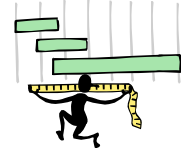
Team_____

Skill	Indicators	Comments
1. Listening:	The students in this team listen to each other's ideas. You will observe the students "piggy-backing" (or building) off each other's ideas.	
2. Questioning:	The students in this team question each other. You will observe the students interacting, discussing, and posing questions to all members of the team.	
3. Persuading:	The students in this team use persuasion. You will observe the students exchanging, defending, and rethinking ideas.	
4. Respecting:	The students in this team respect the opinions of others. You will observe the students encouraging and supporting the ideas and efforts of others.	
5. Helping:	The students in this team help each other. You will observe the students offering assistance to each other.	
6. Sharing:	The students in this team share. You will observe the students offering ideas and reporting their findings to each other.	
7. Participating	The students in this team participate. You will observe each student contributing to the project.	