Building a Working Team
Teacher Version

Adapted from the Putnam Northern Westchester BOCES Outdoor Education Program Challenge Course

Introduction & Purpose

One of the biggest challenges that teachers face in supporting Mars Rover teams is team dynamics. The team may experience negative strain from frustrations caused by breakdowns in communication between team members and built up emotions that sometimes arise while working through the design and construction process. You can help prepare the students to work through these situations by building a strong team ethic.

Challenges/initiatives are an excellent tool for building a strong sense of team spirit, and can give mentors a basis for leading teams through the process of assessing and improving their group dynamics. Like any lesson, without a structured format and a strong reflection and evaluation component, initiatives can be just an activity without a solid learning outcome. The following is a guide for working through initiatives with your students. This can be applied to any of the initiatives that are part of the Building a Working Team activity.

Objective

Students will determine, develop, and assess qualities that are associated with positive teamwork behavior through guided preparatory discussion, practical challenges and debriefing discussions.

Complete Before Beginning Initiatives

1. **Introduce the team to "The 4 C's"**
   The first exercise in the Student Version of Building a Working Team, is a prompt for students to brainstorm and write down the 4 C's. Students are also asked to think of other words that exemplify good team behavior and to sign the bottom portion of the page as a type of "contract" for the team to follow. **Have the team cut out the contract and place in the Lab Notebook as a daily reminder of the words that will continue to help them be a great team (this is highly encouraged!)**
   - Communication
   - Cooperation
   - Compromise
   - Caring

Steps to Follow for EACH Initiative

1. **Set up the Initiative**
   Use clear, concise instructions. Have students restate all of the tasks of each initiative before they start. It is important that they fully understand the task and any information that is relevant for solving the problem.
   Materials Required:
   - All Initiatives – Idaho TECH Lab Notebook
   - Pulse – A timer or watch with a second hand
   - Rope Knots – 10-foot long rope with one knot on the rope per team member
   - Probe Levitation – Tent Pole
   - Space Walk – Two blindfolds and four 1'x1' pieces of cardboard

2. **Prompt the Students**

   Ask your students what a good plan would be for working through the initiative as a team (but don't devise the plan for them). To get the students off to a good start, ask leading questions.

   Examples of Leading Questions:

   - What are characteristics of a good team member? *(Listening, contributing ideas, being supportive, etc.)*
   - What are characteristics of a good team? *(Cooperation, everyone has a part, strong communication, etc.)*
   - What kind of support do you need from the other team members? *(see the four "C"s to add to this question)*
   - What are you excited about today?
   - What do you think will be difficult for you today?
   - What is your plan for solving this problem? Are you going to try the first idea that comes to mind, or will you brainstorm many ideas before choosing one to try?
   - Is there one right answer to any and/or all problems?

3. **Tell the students to go for it!**

   Let the students begin working through the chosen initiative. This is a time to be watching what is going on and making notes for leading the discussion later on. Look for specific examples of strong teamwork skills. Look for the examples of poor teamwork. Try to think of something positive to comment on for every team member.

When things aren't going so well……

If the group is struggling and experiencing team meltdown (**this does happen!** and it can be a good thing, depending on how you lead the discussion☺), call a **time out**. This is a great opportunity to start the discussion about what is working and what is not working. You can give them a nugget of information to help get them on track.

Some teams may be exhibiting strong team skills, but are not getting anywhere with the problem. In this case, give them a little nudge in order to get them back on track. Highlight and commend them on all the things they are doing right.

4. **Lead the students in debriefing after they have successfully completed the challenge.**

   This is the portion of the activity that lends significantly to lessons learned. Using your observations as a guide, lead the team in assessing how well they worked together. You can usually draw out most of the issues you want to address through the following questions:

   - What did you learn about your team today?
   - What did you or your team do today that you are particularly proud of?
   - What skill do you want to work on improving?
   - What could your team do differently to improve teamwork skills?
   - How can you use what you just went through when you face challenges in building the rover for the Mars Rover Challenge?

   Have the students write overall comments in their Idaho TECH Lab Notebook.

Additional Question Prompts

To address certain skills and abilities that are targeted with each initiative, use the following questions adapted from the Putnam Northern Westchester BOCES Outdoor Education Program's Challenge Course Handbook:

Communication

- Did you have effective communication within your team today?
- How did you know that your communication with the team was understood?
- What could the communicator do next time to make their message more clear?

Listening

- How did it feel to be heard when you made a suggestion?
- How did it feel *not* to be heard when you made a suggestion?
- What interfered with your ability to listen to others?

Cooperation

- Give examples of how your team cooperated during the activity.
- Give examples of how your team was uncooperative during the activity.
- How is cooperation important in other areas of your life (i.e. building a rover)?

Patience

- How does it feel when people are impatient with you?
- How can you tell when someone is being impatient?
- Why do people become impatient?

Group Decision-Making

- How were group decisions made when completing the various initiatives?
- Were you satisfied with the way decisions were made? Explain why or why not.
- Did everyone have input in making overall group decisions?
- What is the best way for a group to make a decision?

Individual Differences

- In what ways are your team members similar? In what ways are they different?
- How did the differences within your team prove to be a strength for your team?
- How did differences within the team prove to be a hindrance?
- How could the group learn and benefit from individual differences?

Team Initiatives

Concepts learned from these initiatives can be used as a reference point and/or a team pickup for when frustrations arise during the Mars Rover design and construction process.

Notes for Success:

- Refer to the "Steps to Follow for Each Initiative" listed above
- Initiatives are ordered according to difficulty
- Most initiatives work best with groups of six
- Older student mentors may participate with the team, but remind them to hold back from dominating the process or being too quick to offer a solution
- Ask spectators (parents, teachers, etc.) to assist with observing and commenting during the debrief

1. COLORS

Adapted from the Putnam Northern Westchester BOCES Outdoor Education Program's Challenge Course

★ Teamwork Skills – listening, verbal communication

Steps:

a. Tell each team member to think of a color but not say it aloud.
b. Ask each team member to shout out their color when you count to three.
c. After the chaos, ask a few teams members to tell you what color someone else said.

Discussion:

a. Why are most students not able to repeat the color another student stated aloud?
b. What could the group do to make sure everyone knows everyone's color?
c. Does an effective team all speak at the same time?
d. Can you understand everyone in the group when they all speak at the same time? Why not?

2. BIRTHDAY LINE-UP

Adapted from the Putnam Northern Westchester BOCES Outdoor Education Program's Challenge Course

★ Teamwork Skills – non-verbal communication, cooperation, patience, taking on roles

★ This initiative address a different and CRITICAL form of communication – non-verbal

Steps:

a. Explain to the team that this is a non-verbal activity (no talking!)
b. Have the team form a single line according to their birthdays WITHOUT SPEAKING
    - For example, the students with January birthdays will be at the beginning of the line, earliest January birthdays first, followed in order by later dates/months. People with the same birthday share the same place in line.
    - The students must communicate non-verbally; **no lip-reading, squeaking, or other noises are allowed**.
c. When the line is complete, have each student state his/her birthday one at a time.

Discussion:

a. After the activity is complete, ask each team member to give you one adjective to describe what the experience was like for him or her.
    - The usual answers will include hard, difficult, and frustrating.

b. Ask the team members to tell you, ***other than the fact that they couldn't talk***, why it was so hard, difficult, or frustrating to complete the activity.
   - Usually someone will state "because the other person didn't understand what I was trying to say!" This is exactly the response you are seeking.
   - **70% of all communication results in communication breakdown.**

c. Ask the team to suggest some strategies they can use to prevent communication breakdown *(e.g. asking questions, repeat what you heard the other person say, have the person say it a second time in a different way, etc.)*

Variations:

a. Blindfold team members
b. Don't allow team members to use their hands during the activity
c. Line up in alphabetical order using middle names

3. PULSE

Adapted from the Putnam Northern Westchester BOCES Outdoor Education Program's Challenge Course

★ Teamwork Skills – non-verbal communication, cooperation, decision-making, patience

★ This is a wonderful activity to facilitate bringing a nonfunctional group back together.

Materials:

timer or a watch with a second hand

Steps:

a. State the goal to pass a pulse as fast as possible around the circle.
b. Have the students form a circle holding hands.
c. Pick one student to start the pulse, and on the count of three, have them squeeze the hand of the person on their right *or* left.
d. The student receiving the hand squeeze should pass the squeeze, or "pulse," on to the next student in the circle, continuing this from student to student.
e. Warn the students not to "pulse" until they receive it, and *not to crush each other's hands*.
f. Try to see how fast the group can move the pulse around the circle.

Discussion:

a. What did you do to move the pulse faster?
b. How did you know when you received the pulse?
c. How did you know when to give a pulse?
d. Did the pulse ever slow down?
e. Were you ever unsure if you received a pulse? Why?

Variations:

a. After a couple of rounds, start the pulse in both directions so that it will have to pass itself somewhere in the circle
b. Have the group close their eyes during the activity
c. Have the group cross their hands and see if their time changes

4. ROPE KNOTS

Adapted from the Putnam Northern Westchester BOCES Outdoor Education Program's Challenge Course

★ Teamwork Skills – verbal communication, listening, patience, decision-making, taking on roles

Materials:
10-foot piece of rope with one know per person

Steps:

a. Set the rope on the ground in a straight line
b. Have students line up along the rope (students may be on either side of the rope, but must face the same direction and must be spaced out evenly along the rope from beginning to end)
c. Have the students bend down to pick up the rope using either their right **or** left hand **without touching any of the knots.**
d. OOPS! You forgot to mention that you put crazy glue on the rope and now they are stuck! Challenge the students to untie all of the knots without sliding or taking their "glued" hand off the rope (students may use their other hand in the process)

Discussion:

a. Did you begin by planning and working as a whole team or in smaller groups? *(Often the team will unconsciously break into three groups, the two ends and the middle)*
b. What is the best way for a group to make a decision? *(Remind students that they will need the minds of everyone in the group to accomplish the task of building the Mars Rover)*

5. ASTRO-KNOT

★ Teamwork Skills – verbal communication, listening, cooperation, patience, decision-making, taking on roles

★ This is a wonderful challenge as it takes a relatively short period of time!

Steps:

a. Have the students get in a circle and extend their right hand into the middle of the circle.
b. Then, tell the students to grasp hands with a person who is NOT to their immediate right or left.
c. Then, have the students extend their left arms and grasp hands with a DIFFERENT person who is NOT to their immediate right or left.
d. Challenge the students to untangle themselves and to make a complete circle WITHOUT breaking hands during the process
e. Students should end up facing the middle of the circle and have all kinks worked out so that they create a complete circle of individuals holding hands

Notes:

a. **This puzzle is not always solvable.** The important things is that the students put forth the effort to completing the challenge. If students have exhausted their options, have them break and start again**.**
b. Use this initiative to have students reflect on the process of trial and error. These concepts will be helpful when working through trial and error while building the Mars Rover.
c. Choose a key word that when stated, the students freeze. You can use this word if someone is getting pulled on or if you need to stop the process to discuss group dynamic issues.

6. LIFT-OFF

★ Teamwork Skills – verbal communication, listening, cooperation, patience, taking on roles

★ In order to propel the team into the outer limits of space, they will need to achieve lift-off. Have the students complete test funs between two group members, but the final goal is to launch all of the "crewmembers" into space via the group lift-off.

Steps for Paired Lift-Off:

a. Have students pair off with someone who is relatively close to their size.
b. Tell the students sit back to back, with their legs out in front (knees bent with feet on the floor).
c. Have the students link by locking arms at the elbow.
d. Challenge the students to move from this position to a standing position using good communication skills and cooperation (students need to remain back to back and linked during the process).
e. Once the students stand up, they have achieved lift-off!

Steps for Group Lift-Off:

a. Have the students sit back to back in a row, with their legs out in front (knees bent with feet on the floor).
b. Students need to lock elbows with the two people on either side of them. (This may mean that not everyone will have the same flat surface of someone else's back to push off of – this is okay.)
c. Challenge the students to achieve a balance of force between all members of the group so that they can push themselves up into lift-off.
d. Have them try this activity in differing group sizes.

Discussion:

a. Which size of group was easiest? Hardest? Why?
b. Discuss group dynamics

7. PROBE LEVITATION

- ★ Teamwork Skills – verbal communication, listening, cooperation, patience, taking on roles
- ★ Astronauts are not only physically fit and healthy, but they are also capable of performing tasks that require control and a gentle touch. This challenge tests the teams' ability to put mind over matter, and to put the powers of concentration and teamwork to the test.

Materials:
A tent pole *(do not substitute another type of pole for the tent pole. It is important to use a lightweight pole in this exercise – a heavier pole will not function properly.)*

Scenario:
Your team is transporting a delicate instrument (the tent pole) to the space ship. You have done a wonderful job thus far, but the most difficult part of transporting this particular piece of equipment is setting it down. You must work as a team to gently place the equipment into a secure container on the floor (*the container is imaginary unless you have something that will work as a container*).

Steps:
a. Have the students split into two lines that are facing one another and hold only their index fingers pointing straight out.
b. Students should line their fingers up in an alternating pattern (like a zipper).
c. Lay the rod on top of their fingers and let them begin the challenge of trying to set the rod down.
d. This sounds very easy, but it is not. The more people involved, the harder the process, so feel free to have mentors and others involved in this activity.

8. SPACE WALK

- ★ Teamwork Skills – verbal communication, listening, cooperation, patience, time management, decision-making, taking on roles
- ★ Astronauts face challenges during their time in space that we cannot even imagine here on Earth. Simple travel, such as walking, becomes an interesting experience. For example, Mars has only 1/3 the force of gravity of that of the Earth, so walking on Mars is much different than on Earth. Some planets have even less gravitational pull.

Materials:

- Four pieces of corrugated cardboard measuring 1' x 1'
  (Special gravity walking space plates)
- Two blindfolds
- A clear space on the ground of about 10' by 10'

Scenario:
NASA has developed special gravity walking plates to assist astronauts in walking on planets where there is a low gravitational pull. Unfortunately, the plates must have human contact to be activated, and the people using them cannot let go of the plates while using them, or they become deactivated. Once deactivated, a plate cannot be reactivated. This is a design flaw that is currently being worked on.

Your team has been asked to test the gravity walking plates for an emergency mission to Mars, which has a low gravitational force field. An additional task has been added in order to test your crews' teamwork ability. If you have 6 team members, two of your team members will be blindfolded. If you have 4-5 team members, only one member will be blindfolded.

Steps:

a. Place markers on the ground measuring 10 feet so that students can see the space they need to cross.
b. If you have 6 team members, blindfold two members. If you have 4-5 team members, blindfold one member.
c. Challenge the entire team to use the plates to walk on the surface of Mars for a total distance of 10 feet.
d. Remind the team that they cannot let go of the plates at any time or the plates will not work. (They can be holding a plate, standing on one, or just touching one in order to maintain this human contact and keep the plate active. However, note they cannot step anywhere on the ground off of the plates at any time, or they will be subjected to Mars' true gravitational force, and thus fail the mission. More than one student can be standing on / touching / holding a plate at the same time.)
e. During the crossing process, if the students fail to keep contact with a plate, even for a second, confiscate the deactivated plate. **The goal is to get all of team members across the area, and to hold onto as many plates as they can**. Below is a drawing to help you visualize the process.