

# Maker Lesson Plan

## Objectives:

Students will learn collaborative problem solving skills.

Students will learn how to use our classroom's role cards.

Students will understand why we have each of the seven group norms we have in my classroom.

## Common Core Standard for Mathematical Practice 1 ([CCSS.MATH.PRACTICE.MP1](#)):

Make sense of problems and persevere in solving them.

[ISTE Standard 2d](#): Contribute to project teams to produce original works or solve problems.

## Big Idea:

We hear more ideas when we work together. Together we are smarter.

## Essential Question:

How does working as a group benefit everyone?

## Rationale:

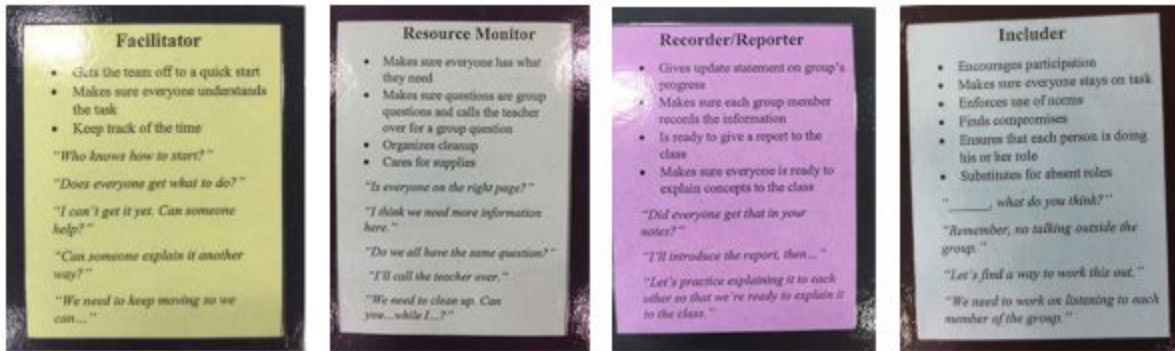
This lesson would take place in the first week or two of school to introduce students to collaborative problem solving. According to Xiauqing Gu, Shan Chen, Wenbo Zhu, and Lin Lin (2015), collaborative problem solving skills are not innate; they need to be learned. Pavlo D. Antonenko, Farzaneh Jahanzad, and Carmen Greenwood (2014) state in their article about collaborative problem solving that although problem solving is becoming an increasingly important skill in the real-world, many schools are not teaching this skill more to prepare their students for this change in the workforce. I use collaborative problem solving frequently in my classroom, and my students need to have the appropriate collaborative problem solving skills in place before I expect them to use them in a mathematical context and when they are adults.

In this lesson, I introduce collaborative problem solving skills in the context of a Makey Makey activity. This is a motivating context in which to introduce these skills. Dale Dougherty says in his [TED Talk](#), "Kids are particularly interested in [making]: in the ability to control the world and be able to use things like microcontrollers and build a robot." Motivation and learning skills in multiple contexts (not just math) are key factors of transferring learning to other contexts (Bransford, Brown & Cocking, 2000, pp. 61-62).

## Materials:

- 1 Makey Makey per group (including USB cable and alligator clips)

- 1 laptop at each group
- 1 set of role cards at each group



- 1 [Makey Makey Group Activity](#) per student
- A variety of conductors (such as pennies, paper clips, silverware, tin foil, bananas, potatoes)
- A variety of materials that do not conduct electricity (such as paper, cardboard, plastic utensils, rubber bands, tape, paper plates)

### Day 1 Lesson (45 minutes):

“Today we are going to talk about what it looks like to work with a group really well. After we talk about it, we are going to practice it with a fun activity. When we work with a group in this classroom, the very first thing you will need to do is to get out your role cards and give them to the appropriate person. We will practice that in just a minute. Then you will read the instructions on the activity as a group, you will discuss and answer the questions on the activity together, and you will keep working until the time is up.”

“Let’s practice taking out those role cards and looking at what they are. They are in the middle of your table. Do you see the number on them that matches your table number? Do you see the other numbers in the corners of your tables? Those are your personal numbers. Today, person 1 is going to take the Facilitator card, person 2 is going to take the Recorder/Reporter card, person 3 is going to take the Resource Monitor card, and person 4 is going to take the Includer card. Let’s check to make sure you all have the correct card. Facilitators, hold up your card. Recorder/Reporters, hold up your card. Resource Monitors, hold up your card. Includers, hold up your card. Good. Now I want you to take a minute to read what your card says.” *Give the students time to read their role cards.*

“If I say a description that sounds like something you read on your role card, I want you to hold your card high in the air. This will allow us to see who is in charge of what. Who is in charge of making sure your group has the supplies they need today? Who is in charge of making sure everyone is following their role today? Who is in charge of keeping track of time today? Who is in charge of making sure your group is starting on the activity right away? Who is in charge of

making sure everyone is writing the information down? Who is in charge of making sure everyone in your group is participating? Who is in charge of making sure everyone in the group is ready to explain your work to the class? Who is in charge of organizing cleanup today?"

"Excellent job, class. You are really close to being ready to work with a group. One last, really important thing before we start. We have seven group norms in this class. I will have them posted on the bulletin board for the whole year so that we can refer to them anytime we need to. We are going to read through them now, and you will have time to think about them much more in depth later. (1) No talking outside your group. (2) Helping does not mean giving answers. (3) No one is done until everyone is done. (4) You have the right to ask for help and the responsibility to help. (5) Follow your group role. (6) Call the teacher for group questions only. (7) Show respect to one another. With our role cards and our group norms, we will be able to work really well with others in order to solve problems."

"Now, I am going to pass out the group activity that you will be working on today and tomorrow. Who do you think should read the instructions?" *Expect the students to say that everyone should read the directions, which is true. Encourage them to pick one person to read the directions out loud so that everyone sticks together.* "Who should make sure that your group is starting right away?" *The students should respond, "The Facilitator."* *While the students are reading the directions, pass out the Makey Makeys and ensure that there are enough conductors and insulators on a table or countertop somewhere in the classroom. Students will work in their assigned groups until class is over. They will continue this activity the next day.*

### **Day 2 Lesson (45 minutes):**

"Can someone please raise their hand to remind the class what we worked on yesterday?"

*Students should say they experimented with the Makey Makey.*

"What did we talk about yesterday before working on the activity?"

*Students should say we talked about working with a group. We talked mostly about role cards.*

"You guys have good memories! We talked yesterday mostly about role cards. Today you are going to still use the role cards, but you are going to think much more in depth about the group norms (that are posted on the bulletin board) than we did yesterday. You will also get a chance to use the Makey Makey again."

"Please take out the Makey Makey Group Activity from yesterday. Today, you will work on Part 2. Facilitators, please get your groups started right away." *Groups will work together until 20 minutes remain in class.*

*When 20 minutes of class remain,* "Class, we are going to have a whole group discussion based on what you wrote about the group norms. Everyone is prepared to share because everyone was

part of a small group conversation about the norms and everyone wrote something about each norm.” *With the remaining time in class, we will have a short discussion about each norm. I will aim to call on 3 to 4 students per norm (from different small groups) so that the class can hear various ideas and I can add anything important that was missed. The last question I will ask is “How does working as a group benefit everyone?” I want at least 3 students to provide insight to this question.*

*With 3 minutes remaining, “Resource Monitors, please collect your group’s Makey Makey Group Activity and turn them into the turn-in tray. Decide who in your group is in charge of cleaning up what. When class ends in 3 minutes, everything should be cleaned up.”*

**Assessment:**

Students are formatively assessed on Day 1 when they are showing me that they can play the racing game with the Makey Makey. If a whole group can do it, it tells me that they have been working together to come to their solution.

Students are formatively assessed on Day 2 during the whole group discussion at the end of class. If a student can share something relevant when I call on them, they have been participating in their group’s work about group norms.

References:

Antonenko, P. D., Jahanzad, F., & Greenwood, C. (2014). Fostering collaborative problem solving and 21st century skills using the DEEPER scaffolding framework. *Journal of College Science Teaching*, 43(6), 79-88. Retrieved July 17, 2018, from <http://ezproxy.msu.edu.proxy2.cl.msu.edu/login?url=https://search-proquest-com.proxy2.cl.msu.edu/docview/1537943282?accountid=12598>

Bransford, J., Brown, A.L. & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience and school* (pp. 61-62). Washington, D.C.: National Academy Press. Retrieved from <http://www.nap.edu/openbook.php?isbn=0309070368>

Common Core State Standards Initiative. (n.d.). *Standards for Mathematical Practice*. Retrieved July 23, 2018, from <http://www.corestandards.org/Math/Practice/>

Gu, X., Chen, S., Zhu, W., & Lin, L. (2015). An intervention framework designed to develop the collaborative problem-solving skills of primary school students. *Educational Technology*,

*Research and Development*, 63(1), 143-159. Retrieved July 17, 2018, from <https://search-proquest-com.proxy2.cl.msu.edu/docview/1648860089/F09C2A5AC6BE4CDDPQ/12?accountid=12598>

International Society for Technology in Education. (2007). ISTE Standards: Students. Retrieved July 23, 2018, from [https://www.iste.org/docs/pdfs/20-14\\_ISTE\\_Standards-S\\_PDF.pdf](https://www.iste.org/docs/pdfs/20-14_ISTE_Standards-S_PDF.pdf)

Makey Makey Classic How To. (n.d.). Retrieved July 9, 2018, from <https://makeymakey.com/apps/>

Racing Games|Lightning Speed. (n.d.). Retrieved July 9, 2018, from <http://lol.disney.com/games/racing-games>

*TEDTalks: Dale Dougherty – We Are Makers* [Video file]. (2011, January). Retrieved July 1, 2018, from [https://www.ted.com/talks/dale\\_dougherty\\_we\\_are\\_makers](https://www.ted.com/talks/dale_dougherty_we_are_makers)