

Activities to Build a Mathematical Mind

OBJECTIVE

- Students will reflect on the vital behaviors of a healthy mathematician.
- Students engage in on-going self reflection of their own behaviors and attitudes

MATERIALS

- Manilla folder for each participant
- Copies of the Athletic Chart for each participant

SETUP

- None

INSTRUCTIONS

1. Begin a discussion by asking participants the following questions:
 1. How does an athlete know if they are in good shape?
 2. What are the goals an athlete in training can set for themselves to know they are progressing?
 3. What does an athlete do to get in shape? (Possible responses include: working out a different muscle each day, setting a time limit and trying to beat it, practicing each day, practicing with people who are better than them)
2. Ask participants:
 1. Being a good mathematician requires both a good attitude, and the willingness to make sense of problems and persevere in solving them. What are some ways we could assess ourselves to see if we are in good shape?
3. Explain that each participant will create an Athletic Chart to track their progress each week.
4. Explain that many athletic training gyms give their members a card that they can use to set goals, and fill in each time they go to the gym to see how well they are doing
5. Distribute a manila folder and the Athletic Chart to each participant
6. Have participants fill out their charts for themselves
7. Have participants decorate the cover of their manila folders
8. Explain that participants will get to review their chart and fill it out for themselves at the end of each class session, and share their progress in an athletic reflection session
9. Have participants get into groups of 3 for their first athletic reflection session
10. Ask each participant to share how they rated themselves, and what they would like to get better at as a mathematician.
11. Have each group select an inspirational word or phrase that they will use to describe their reflection session
12. Have each group share their word/phrase with other groups

DEBRIEF

- What are the things you feel good about in your Athletic Chart?
- What are the things you want to work on?
- What inspires and motivates you to keep working?
- Why is it important to track our goals, and our progress towards achieving them?

Mathlete Athletic Chart

Student Name

Please fill in each column in the chart below with the smiley face that reflects how you feel you did in each category today.



Very happy



Happy



In between



Unhappy



Very unhappy

| Date | | | | | |
|--|--|--|--|--|--|
| I shared my thinking about how I solved a problem | | | | | |
| I exchanged ideas with a friend | | | | | |
| I used words and drawings to think about a problem | | | | | |
| I used numbers to think about a problem | | | | | |
| I understand the math better because of a new idea from my peers | | | | | |
| I had a good attitude | | | | | |
| I believe I can be good at math | | | | | |

OBJECTIVE

- To have participants practice geometry through movement

MATERIALS

- Plastic tarp
- Blue Tape
- Music device: mp3 player, iPhone,

SETUP

- On a large plastic table-cloth or tarp use blue tape to make a big triangle, square, diamond, and trapezoid on the floor

INSTRUCTIONS

1. Explain to the participants that they will be playing a game similar to musical chairs. In this activity music will play and when it stops they will have to be inside one of the shapes. However, there can only be the number of students in the shape as there is lines in that shape
2. Play music and have kids walk all around the tarp- they can't step on the tarp
3. When the music stops the kids should find a place to sit inside of the shape: 3 kids in the triangle, 4 kids in the square, 4 kids in the diamond, and 5 in the trapezoid
4. If someone doesn't fit then they are out and become coaches for one round, they can re-join in the next round
5. If too many students are in the square they do ro-sham-bo to figure out who leaves
6. After you have played this game a few times invite a few students to take over leading and facilitating
 - Assign one person to be in charge of the music
 - Assign 2 people to ensure the right number of people are in the squares

DEBRIEF

- What did you like about this activity?
- How did it feel when you were out?
- What was the fastest way to figure out how many participants could sit inside each shape?
- Which shapes were the most confusing to decide how many participants should be inside?

OBJECTIVE

- To have students practice geometry through art

MATERIALS

- 20 half-sheets of paper
- Sticker Dots
- Poster board for finished product
- 2 Jumbo dice
- **Robots Save the World Handout**

SETUP

- Make copies of the Robots Save the World Handout

INSTRUCTIONS

1. Tell participants that in this activity they will be world-saving engineers whose job is to design a robot that will solve a real problem in their school and community
2. Ask participants: What are some problems we have in our school and community?
3. Write each of their ideas on a half-sheet of paper and place on the floor in the middle of the room
4. Tell participants that they will now take a vote as the engineering department to decide which problem the group will solve. They will work on the top 3 choices.
5. Give each student a strip of 3 sticker-dots
6. Explain that these dots will represent the engineers' choices
7. The engineers should think about which problems they want to solve. They will then place their stickers on the problems they want the whole group to work on.
8. Note: They can place 3 stickers on one idea, or 1 sticker each on 3 different ideas.
9. Have participants get up from their seats and place their stickers on the ideas they that they are most excited to work on
10. Ask a few volunteers to count the total number of stickers on each paper, and write that number on the paper and circle it, so it is easy to see.
11. Ask 3 volunteers to help you rank the ideas from the ones that got the most stickers to the ones that got the least
12. Explain to the participants that the engineers have spoken! Each engineer can choose from the top 3 ideas to build a robot that will solve this problem.
13. Stick the top 3 ideas on the board with a piece of tape
14. Now explain that the engineers will develop their robot using a scientific process
15. The robots will be made of a variety of shapes. Draw an outline of the following shapes on the board with space to write inside each one: *Circle, Square, Triangle, Rectangle.*

INSTRUCTIONS

16. Explain that you will call on a volunteer to come to the front of the room and roll the jumbo dice for each shape
17. Whatever number the dice lands on will represent the number of that shape that the robots must contain.
18. Give each student a **Robots to Change the World Handout**, and a pencil
19. Explain that the students will take the worksheet and record the number of each shape they will need for their robot
20. Call a student to the front and have them roll the dice, then write the number in the shape outline, have students repeat the process on their worksheets
21. Have the engineers design a prototype of their Robot and design them on their worksheet
22. When the students have finished their first draft, ask them to bring it to you for a materials grant to build their robot on poster board (Use this opportunity to check their work)
23. Give participants who pass your quality check a materials grant of a poster board and art supplies to design their robot

DEBRIEF

- What did you like most about your robot?
- What shapes did you use for which body parts?
- What was unique about your robot?
- Were there other shapes you wish you could have used?
- How did it feel to imagine that you were an engineer and that your invention would solve problems in the world?