Meet in the Middle

Thank you for downloading the science and mathematics activity packet! Below you will find a list of contents with a brief description of each of the items. This activity packet contains all the information (including any handouts) you will need to run this activity in your own classroom or at a science festival.

Please note: some activities might require the need for a facilitator to be present to oversee the activity. Activities that require a facilitator will be clearly noted.

-Community Resources for Science

Meet in the Middle

ACTIVITY PACKET CONTENTS

1. Organizer instructions for the person running the activity
    - Print suggestion: 1 for the facilitator
    - Includes information for setup prior to the event (e.g., materials prep)
    - Estimated cost for one set of supplies, excluding common household items
    - Estimated number of participants per one set of supplies
2. What's Going On? (tabletop sign/printout)
    - Print suggestion: 1 to put in a plastic sign holder
    - Explains the science and background information behind the activity
3. Participant Instructions (tabletop sign/printout)
    - Print suggestion: 1-2 to put in a plastic sign holder
4. Take home ½ sheet activity instructions for participants
    - Print suggestion: number of expected participants
    - Easy-to-follow materials list and instructions for participants to try the activity at their homes

Meet in the Middle

ORGANIZER INSTRUCTIONS

Grade(s): 4-7

Standard connections:

- **CCSS.Math.Practice.MP5** Use appropriate tools strategically
- **CCSS.Math.Practice.MP2** Reason abstractly and quantitatively
- **CCSS.Math.Practice.MP6** Attend to precision

Next Generation Science Standards: Science and Engineering Practices

- **Obtaining, Evaluating and Communicating Information** Communicate scientific and/or technical information orally and/or in written formats, including various forms of media as well as tables, diagrams, and charts

Objective: Use math and communication skills to match "tunnel entrances" on opposite sides of the same piece of cardboard

Activity overview and background: Student-directed, partner activity

Materials: (for each team)

- Large piece of corrugated cardboard or foam-core board
- 2 books or blocks
- 2 ballpoint pens
- Paper
- Ruler

Setup:

1. Stand cardboard on edge between the partners and hold in place with the books or blocks
2. Each pair of students also receives pens, paper, and rulers

Further Exploration:

- Provide each team member simple building materials, such as straws and paper clips, or toothpicks and gumdrops. Partners sit back to back.
    - One partner builds a simple structure, with step-by-step description The other partner should follow those directions at the same time
    - When finished, see how closely the two structures match up
- Challenge kids to design and build a tunnel through a box of sand, without touching the sand with their hands and using only 4 toilet-paper tubes, paper, tape, and a paper cup

What's Going On?

One challenge of tunnel engineering is making precise measurements to ensure that teams building from each end of the tunnel come together in the middle. This was also an issue in building the first intercontinental railroad, with the east and west teams meeting at Promontory Point, Utah. Here, you'll get to see the importance of choosing which measurements to make and communicating them accurately.

Tip: Try to consider different ways of communicating the locations of each group's tunnel entrances using the materials they have!

Connect to Engineering

No matter how good the engineering concept, a project won't work if engineers can't communicate accurately and effectively. With more than six million kilometers of highways and 240,000 kilometers of railways snaking across the United States, life above ground has become increasingly congested. Tunnels provide some of the last available space for cars and trains, water and sewage, even power and communication lines.

Instructions

***This activity requires 2 people**

1. Find a partner to work with for this activity
2. Stand cardboard on edge between the partners and hold in place with the books or blocks
3. First team member: holding onto the cardboard to keep it standing, draw a circle about the size of a penny somewhere on your side of the cardboard. Label it Tunnel A
4. Second team member: draw a circle on the other side and label it Tunnel B
5. Partners take turns describing the location of Tunnels A and B. Based on description, each partner draws the other end of Tunnel A or Tunnel B
6. First team member: use the pen to carefully punch a hole where you think your partner's Tunnel B is located
7. Second team member: punch a hole where you think Tunnel A is located
8. Now turn the cardboard around to see how well you communicated!

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