

Teacher Resources: Engineering Exploration

Table of Contents

Tech Mobile Contact Information	2
Equipment Checklist	3
Station Set-Up	4
FAQ	6
K-4 Standards Connections	7
Instructional Supports	8

Tech Mobile Contact Information

If you notice anything is missing, damaged, or would like consultant support or professional development, please contact us as soon as possible. Thank you!

Contact Name	Contact Information
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Website Quick Links		
Main Tech Mobile Page Tech Mobile Network	Explorations Explorations Request	Integrations Integrations Request
Indoor Gardens	Rental Items Rental Requests	Partnership in Planning

Equipment Checklist

Item(s)	Quantity
<input type="checkbox"/> Plastic Marble Run	1 extra-large tote
<input type="checkbox"/> Wooden/Musical Marble Run	1 extra-large tote
<input type="checkbox"/> GEO Boards with cards	6
<input type="checkbox"/> Modeling Dough	2 x 3 lb. tubs
<input type="checkbox"/> Modeling Tools	2 sets
<input type="checkbox"/> Incastro Builders	1 medium tote
<input type="checkbox"/> IQ Builders	2 small totes
<input type="checkbox"/> Straws and Connectors	1 large tote
<input type="checkbox"/> Brain Flakes	1 set
<input type="checkbox"/> Challenge Cards	1 set
<input type="checkbox"/> Popsicle Sticks	1 set
<input type="checkbox"/> Acrylic Station Signs	1 set

Station Set-Up

Video supports located online at sourcewell.co/TechResources

Station 1: Marble Mania



Station Includes: 1 extra-large tote with plastic marble run materials, 1 extra-large tote with wooden/musical marble run materials.

- This station works best on the floor

Station 2: Geo Boards



Station Includes: 6 Geoboard sets with rubber bands and cards.

- This station works best on a table

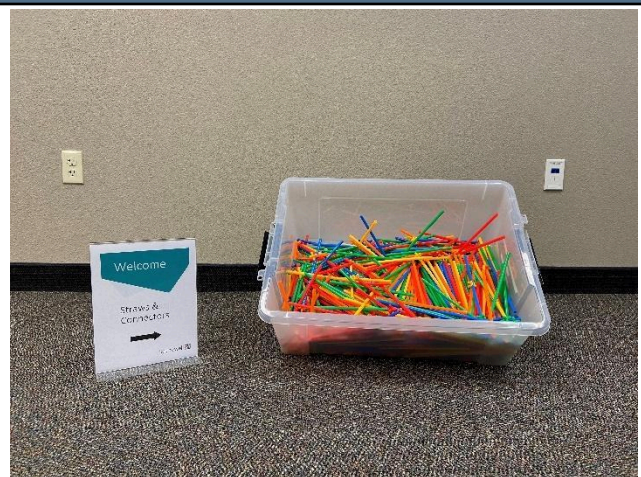
Station 3: Creative Building



Station Includes: IQ Builders (left), Incastros Builders (center), Brain Flakes, Modeling Dough, Modeling tools.

- This station works best on a table

Station 4: Straws and Connectors



Station Includes: One medium tote filled with straws and connectors.

- This station works best on the floor

*Optional Station 5: Tami's Tower



Image: *Tami's Tower Home Screen*. Retrieved March 18, 2021, from <https://ssec.si.edu/tamis-tower>. (2021).

Tami's Towers is an educational engineering design game that helps students learn how to design solutions using engineering design principles.

To access Tami's Towers, visit <https://ssec.si.edu/tamis-tower>. Have students click on "Play this Game" and they will be able to get started.

- This station works best on a table
- Devices are not included
- This station is recommended for students in grades K-2.

*Optional Station 6: BlocksCAD



Image: *BlocksCAD Logo*. Retrieved March 18, 2021, from www.blockscad3d.com. (2019).

BlocksCAD is a block-based computer-aided-design program that allows students to write a computer program to create a 3D model.

To access BlocksCAD, visit <https://www.blockscad3d.com/>. Have students click on "Create Now" and they will be able to get started.

- This station works best on a table
- Devices are not included
- This station is recommended for students in grades 3-4.

*Optional Station 8: PBS Kids

PBS Kids has several games that focus on engineering practices. Here is a list of some of the games you might try:

- (K-2) Wild Kratts: Creature Mobile - <https://tinyurl.com/y7f4kfx4>
- (K-2) Dinosaur Train: Bridge Builder - <https://tinyurl.com/y3wab78a>
- (3-6) Don't Flood the Fidgets - <https://tinyurl.com/y8poymwr>
- (3-6) Total Darkness - <https://tinyurl.com/y59lm3l7>

FAQ

What should I do if any of the equipment is lost or damaged?

If you notice equipment is missing or damaged, please e-mail techmobile@sourcewell-mn.gov.

Include the following information:

- Date
- Damaged or missing item(s)
- Description of what is damaged, missing, or broken
- Any additional information

Example format

Date	Missing/Damaged Items	Description
09/24/2020	Cars with the Roll n Race Ramp station	We started with 4 cars in the Roll n Race ramp station, but we are only able to locate 2 of the cars.
9/24/2020	Cars with the Magic Trax station	We noticed that 2 of the cars included with this station are missing their wheels and no longer work.

Do my students have to use every station?

That is completely up to you! Feel free to omit any stations listed.

What are the popsicle sticks for?

Popsicle sticks can be used as a silent selection method when telling students which station, they should go to first. Place a single colored popsicle stick at each station sign. Hand out popsicle sticks to students. When they receive their popsicle stick, they will go to the station that matches theirs. These are completely optional.

K-4 Standards Connections

Below is a list of potential standards to consider connecting to this exploration learning experience.

Content Area	Standards Connection
Kindergarten	
Math	K.3.1.3- Use basic shapes and spatial reasoning to model objects in the real-world. K.3.2.1- Use words to compare basic objects according to length, size, weight, and position.
First Grade	
Math	1.3.1.2- Compose and decompose two- and three-dimensional figures such as triangles, squares, rectangles, circles, rectangular prisms, and cylinders.
Science	1.1.1.1.1- When asked “How do you know?” students support their answer with observations. For example: Use observations to tell why a squirrel is a living thing.
Second Grade	
Math	2.3.1.1- Identify and name basic two- and three-dimensional shapes, such as squares, circles, triangles, rectangles, trapezoids, hexagons, cubes, rectangular prisms, cones, cylinders and spheres.
Science	2.1.2.2.1- Identify a need or problem and construct an object that helps to meet the need or solve the problem. For example: design and build a tool to show wind direction. 2.1.2.2.3- Explain how engineered or designed items from everyday life benefit people.
Third Grade	
Math	3.3.1.1- Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids.
Science	3.1.1.1.1- Provide evidence to support claims, other than saying “Everyone knows that” or “I just know,” and question such reasons when given by others. 3.1.1.2.1- Generate questions that can be answered when scientific knowledge is combined with knowledge gained from one’s own observations or investigations. For example: investigate the sounds produced by striking various objects.
Fourth Grade	
Science	4.1.2.1.1- Describe the positive and negative impacts that the designed world has on the natural world as more and more engineered products and services are created and used. 4.1.2.2.1- Identify and investigate a design solution and describe how it was used to solve an everyday problem. For example: investigate different varieties of construction tools. 4.1.2.2.2- Generate ideas and possible constraints for solving a problem through engineering design. For example: Design and build an electromagnet to sort steel and aluminum materials for recycling.

	4.1.2.2.3- Test and evaluate solutions, considering advantages and disadvantages for the engineering solution, and communicate the results effectively. 4.1.3.3.1- Describe a situation in which one invention led to other inventions.
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Instructional Supports

Introduction

Below is a list of suggested ideas to introduce the exploration content to students before participating in the stations.

- Show the Tech Mobile introduction video located online at sourcewell.co/TechResources
- Utilize Tech Mobile visuals located online at sourcewell.co/TechResources

Extension Resources

Below is a list of suggested ideas to extend this learning experience beyond the exploration.

- Allow students to explore diverse topics/questions related to engineering at Wonderopolis.org.
- Allow students to explore more about engineering at PBSlearningmedia.org.
- Allow students to explore engineering games at PBSkids.org.
- Schedule a Tech Mobile integration to deepen student learning with engineering.
- Request Partnership in Planning to work directly with a Tech Mobile Consultant to design extensions