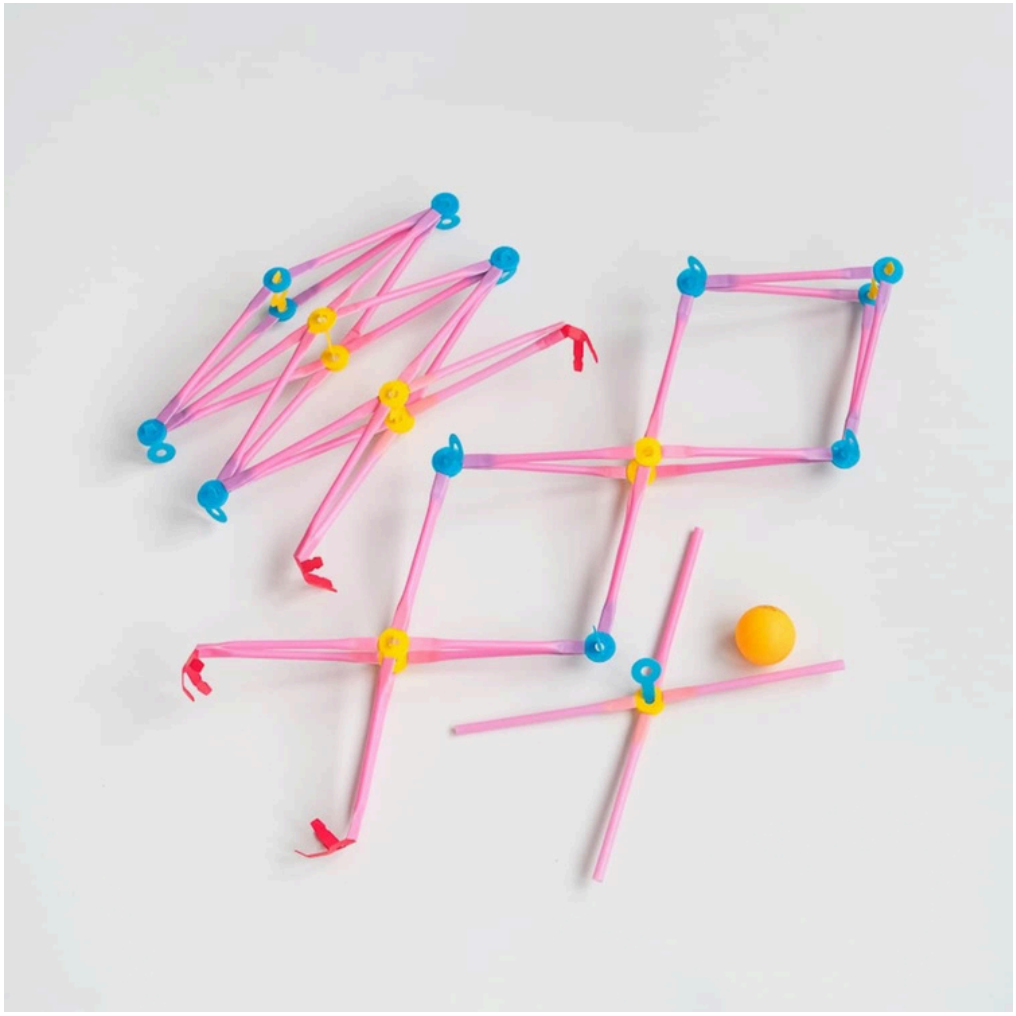
Strawbees



Mid-Valley
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Strawbees

Strawbees is an innovative construction system that uses plastic straws and snap-together connectors to facilitate hands-on learning in STEAM disciplines. Designed to boost engineering skills, creativity, and critical thinking, Strawbees allows students to construct everything from simple shapes to complex mechanical structures.

Grade Level

K - 8th grades

Group Size

up to 4 students per group

Time Duration

1 hour - multiple sessions

Content of Kits

Components

- Assorted color-coded connectors
- Plastic Straws
- Strawbees Classroom access
- Strawbees Activity Guide

Consumables

N/A

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Usage

Getting Started

1. **Unpack and Sort Materials –** Organize Strawbees connectors and straws by size and color to make building easier.
2. **First Build:** Start with a basic structure to familiarize students with connecting straws and connectors.
3. **Explore Motion and Mechanics** – Demonstrate how to create moving parts, such as hinges or spinning elements, using Strawbees.
4. **Encourage Creativity** – Challenge students to design structures, bridges, or mechanical systems using their knowledge.

Storage

Organize and store straws and connectors in their designated containers to maintain order and ensure durability.

Troubleshooting

- **Loose Connections** – Ensure straws are fully inserted into the connectors for a secure fit; try a different connector if needed.
- **Structure Collapsing** – Reinforce weak points by adding extra straws or using triangles for better stability.
- **Joints Too Tight** – Gently twist the straws while inserting them to prevent bending or damaging the connectors.
- **Moving Parts Sticking** – Check for overly tight connections; slightly loosen joints for smoother movement.
- **Straws Bending Too Much** – Use shorter or double-layered straws for added strength in load-bearing structures.

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Activity Guide

Beginner

Simple Geometric Structures
Students will start by constructing basic geometric shapes using Strawbees. They will learn how different shapes contribute to structural stability and strength. After mastering individual shapes, students will connect them to form simple 3D structures like pyramids and cubes. This hands-on activity introduces fundamental engineering and geometry principles while encouraging creativity in design.

Intermediate

Dynamic Models
Students will build functional models such as bridges, cranes, or simple machines using Strawbees. They will explore mechanical principles like tension, compression, and load distribution. Through trial and error, they will adjust their designs to improve strength and functionality. This activity deepens their understanding of engineering while reinforcing problem-solving skills as they troubleshoot structural weaknesses.

Advanced

Inventive Creations
Students will design and build original inventions that solve real-world problems using Strawbees. They might create prototypes for energy-efficient structures, robotic arms, or disaster relief shelters. By applying engineering and physics principles, they will iterate on their designs, testing and refining them for improved performance. This challenge fosters innovation, critical thinking, and real-world application of STEAM concepts.

Extension Activities:

STEAM Challenges
The class will engage in competitive or collaborative STEM challenges requiring them to integrate multiple STEAM concepts. Teams may race to build the tallest freestanding tower, construct a bridge that supports weight, or design a working catapult. Each challenge emphasizes teamwork, problem-solving, and applied engineering principles, pushing students to think critically while working under constraints.

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Learning Extensions

STEAM Connections:
Manufacturing - Design - Structural Engineering

Learning Objectives:

- **Understand Basic Geometry** – Learn to create and identify shapes while understanding their structural properties.
- **Explore Structural Engineering** – Build stable 3D models and learn how to apply principles like balance, load distribution, and tension.
- **Develop Problem-Solving Skills** – Apply trial and error to improve designs and solve engineering challenges.
- **Enhance Creativity and Innovation** – Design original inventions or prototypes, fostering problem-solving and creative thinking.
- **Collaborate and Communicate** – Work in teams to design, build, and refine projects, learning to communicate ideas effectively.

Career Connections:

- **Civil Engineer** – Design and build structures such as bridges and buildings, applying principles of stability and load distribution.
- **Architect** – Use geometry and design thinking to create blueprints for buildings, homes, and other structures.
- **Mechanical Engineer** – Design machines or systems that incorporate moving parts.
- **Industrial Designer** – Create functional prototypes or products, improving designs based on user needs and engineering principles.
- **Construction Manager** – Oversee the planning, design, and building of physical structures.

Essential Employability Skills:

- Creative-Thinking
- Collaboration
- Critical-Thinking
- Problem Solving

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Resources and Accessibility

Safety Guidelines

- **Handle Connectors with Care –** Avoid forcing pieces together to prevent breakage or accidental injury.
- **Use Scissors Safely –** If cutting straws, ensure students use child-safe scissors and follow proper cutting techniques.
- **Keep Small Parts Contained –** Store connectors and straws in containers to prevent choking hazards for younger students.

Accessibility

- **Use Pre-Cut Straws –** Provide wider or pre-cut straws for students with fine motor difficulties to make assembly easier.
- **Adaptive Grips for Connectors –** Offer assistive tools like rubber grips or 3D-printed holders to help with connecting pieces.
- **Flexible Instructions –** Use visual guides, step-by-step demonstrations, and verbal instructions to accommodate different learning styles.
- **Collaborative Building –** Pair students for teamwork, allowing those with mobility challenges to direct design while others assemble.

Library Catalog

Library Resources

Feedback

QR to feedback survey