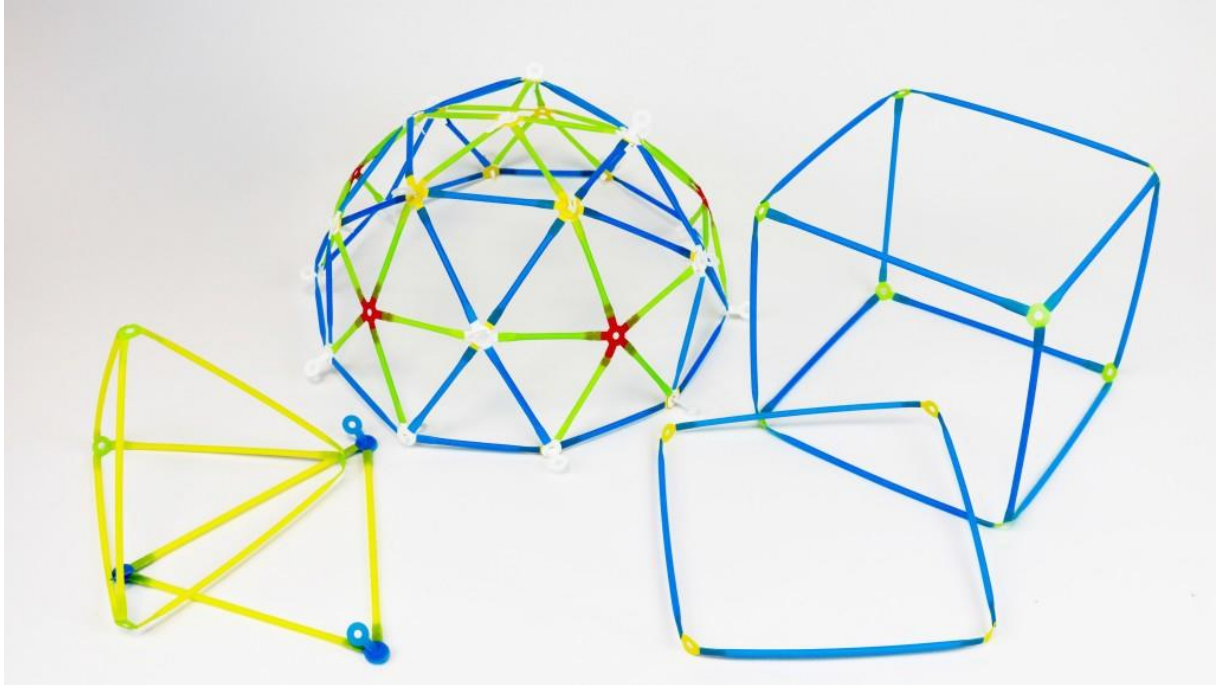


1- Introduction to Strawbees

Author Lindsay @ Strawbees



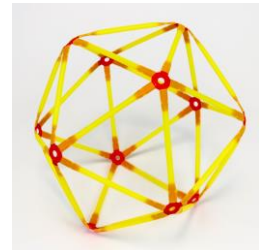
Introduction to building shapes with Strawbees.

ART

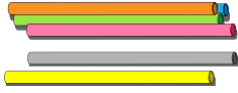
ENGINEERING

- **Duration** 120 minutes
- **Class Size** 30 Students
- **Group Size** Individuals or 2 Students
- **Overview**

In this lesson students and teachers will be introduced to the different Strawbees connectors and explore how to build shapes from an idea. This exercise is for students to discover the capabilities of Strawbees with freebuilding. Students work in teams to brainstorm an idea from a sketch and then are challenged to transform it into physical model.



■ Materials



Straws
200



1-Legged Strawbees
100



2-Legged Strawbees
100



3-Legged Strawbees
100



5-Legged Strawbees
100



Scissors
20

■ Modifications

- Lesson Split Time*
Depending on needs, this lesson can be split and taught in two 45-minute periods with an additional 15 minutes dedicated to setup and clean-up for each.

■ Learning Objectives

- Familiarity with the building capabilities using different Strawbee pieces.
- Comprehend spatial reasoning about 2D to 3D shapes and how to manipulate objects in space.
- Learn the techniques of construction with Strawbees such as hinges, joints, and locks.
- Collaborate as a team to build on the ideas of others and transform them into visual models to come up with a solution for a challenge.
- Work on problem-solving skills by rapidly prototyping their ideas and focus on fine-tuning their top idea to present.

■ Teaching Assessment

Beginning with this lesson you will be introduced to using Strawbees to build shapes, learn how to use the different Strawbee connectors, and how to make your own Strawbee connectors by combining them. You will see students learning how to improve, build on ideas by adding moving mechanics to encourage motion in Strawbees sculptures. After building basic shapes you can have students showcase their work to the class and set aside to build upon for the next lesson.

■ Preparation

- 1 If there are various age ranges in the group, print out different sets and have the students pick from the appropriate age range.
- 2 Have a set of scissors handy for students for trimming and sculpting structures.
- 3 Place containers of materials to the side of the room until students are ready to build.
- 4 Have additional small caddies or bowls around the room on desks or the floor to collect cut or broken straws pieces to save for future projects and help with cleanup.

■ Lesson Steps

1. Introduction to Strawbees

Duration: 5 minutes

Begin by asking what is an invention to the class and have them share ideas of what this means. Ask a second question of what are examples of inventions that we use today.

Continue to ask the class if they have ever sketched their idea or described it in a notebook and then made it out of a different material such as paper, cardboard, clay, or anything else. Have students share examples of this process!

Explain to students this a process that inventors often use to make their ideas come to life through brainstorming and prototyping. Let them know that prototyping does not always mean they will make just one and will often make many versions!



2. Shape Challenge

Duration: 10 minutes

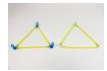
Introduce Strawbees and the different types of connectors: 1, 2, 3, & 5-legged Strawbees. As an example, build a 2D triangle and a square. You can find instructions for the cube and tetrahedron in the Strawbees Booklet below at the end of this lesson. Share the absolute best way to insert a Strawbee leg into a straw is to hold the head of the Strawbee in your hand and the leg up. Then pinch the end of the straw and push down. The Strawbee will slip in easier this way and won't cause the straw to bend. Encourage students to bend Strawbees if they need to as they are very flexible for tough joints.



3. Building Warm-Up

Duration: 15 minutes

For a warm-up, pass out Strawbees and straws to everyone and challenge students to build a square or triangle in 30 seconds. At the end have students lift up their creations to share for everyone to see. Inform your students that there is no wrong way to build with Strawbees and to figure out how to build something can be solved with many different methods using these connectors.



For the next step of the lesson if students need help to visualize they can draw on a sheet of paper a flat drawing on the shape then cut and assemble Strawbees on top of the sheet. Students working in pairs will brainstorm an idea before building a simple prototype using Strawbees. You can pass out sheets of paper with pencils and move on to the next step.

4. Base Building

Duration: 30 minutes



To start building students will have to learn about designing bases for their structures to be supported. They will learn about making shapes and transforming them into three-dimensional models with joints and corners. Discuss there are different kinds of connectors because you will be able to make the same joint, multiple ways.

Introduce a cube and a tetrahedron, both three-dimensional versions of a square and triangle. For the next warm-up give students about 3 minutes to transform their squares or triangles into a cube or tetrahedron. At the end of the 3 minutes have students hold theirs up in the air. Students can observe what fellow classmates have completed for the corners and joints made for these shapes. Attached at the bottom of this lesson is the **Strawbees Booklet** for instructions on how to build a few geometric shapes if you need inspiration.

From this warm-up, have them raise their projects to show! Like the last warm-up, everyone has different ways to building one shape. Now this has become more open-ended in what the base structure will look like.

5. Making Strawbees Move

Duration: 10 minutes



Mention that the structures that were just built do not stay stationary and can become kinetic with a set of hinges and locks called the **Hinge and Friction lock**. The **Tension lock** is for holding a Straw through the head of the Strawbee in place with a 1-Legged Strawbee squeezed inside and holding it all in place.

To save on time, present a simple Strawbees example with the image above with at least 2 friction locks, and tension lock to secure loose joints on structures. You can refer to the Strawbees Booklet on how to build these as practice before teaching your students.

6. Challenge

Duration: 30 minutes

Challenge your students to build a space station, on either a planet or floating in space. Ask them, "What do you think astronauts need to survive and what would you build to ensure that they can live in space for up to a year?"

Ask the following questions: "What are necessities for sustaining human life?" "What are daily challenges astronauts may have?" "What inventions would you build for an astronaut's spacesuit."

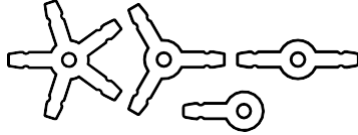


7. Showcase

Duration: 10 minutes

Have students set up their structures on tables and do a gallery showcase where everyone wanders around the room to see the shapes students made. If you are running low on time, you can have everyone around the room share with their neighboring classmates or stand up and share around the room. You can have students deconstruct structures or set aside for future Strawbees lessons to build upon later.

■ Vocabulary



Strawbees

Recycled plastic pieces with a head and legs used for connecting straws and to other Strawbees.



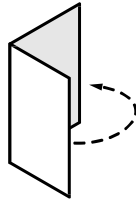
Head

The rounded portion of the Strawbee with the hole to allow support for both straws and the legs of Strawbees.



Leg

The connectors that can be inserted into a straw or other Strawbee pieces.



Fold

The ability to bend so that one part covers another.



Innovation

The improvement of an existing idea, product, or process that might result in something new.