

# Pre-Field Trip Activity: Insect Engineering

## Overview

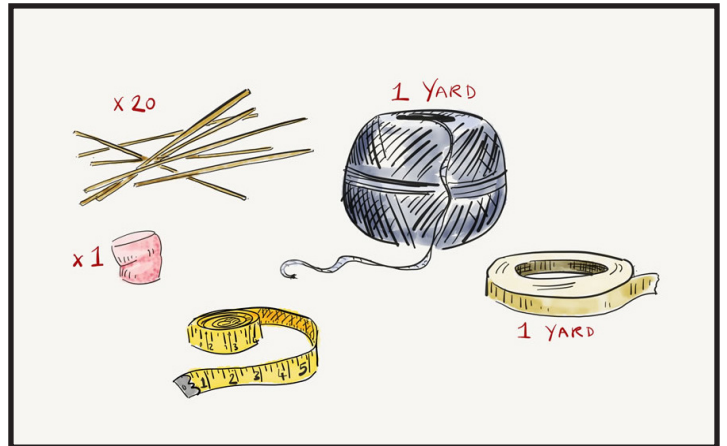
**Total Time Required:** 30 - 40 Minutes

**Materials: (per team of 4 students)**

- 20 sticks of uncooked spaghetti
- 1 yard of masking tape
- 1 yard of string
- 1 marshmallow

**Purpose**

During the field trip to the Insectarium students will be put into teams of four, working to design an insect “exoskeleton”. This “Marshmallow Challenge” helps students to work on their team work skills and gives them practice with prototyping a new design. Both of these skills will come in handy during their field trip to the Insectarium.



## Lesson Steps

**Lesson Steps:**

Hand out one batch of supplies to each team as you start to explain the rules.

- Teams will have **18 minutes** to plan, organize, and assemble the tallest possible free-standing (not attached to anything) structure with the materials provided.
- Teams can use all of the materials provided, or just a few. However, they must design the structure so that the marshmallow is at the very top.
- At the end of **18 minutes** all team members will be required to step away from their structures. Some structures may fall over as soon as team members remove their hands from their structures, their score would be 0 inches.
- The leader will measure the teams’ structures to determine which team built the tallest. Chart the results on the white board.

## Suggestions for Successful Teams

**Suggestions & Tips for Teams:**

- Before you touch your building materials, spend 2 or 3 minutes discussing ideas, drawing examples, and planning how the finished product will be put together.
- Work together to keep all members of the team engaged and on task. Talking is good, as long as you are talking about the Marshmallow Challenge. One of the best ways to keep team members on task is to assign each other particular jobs – one member of your team may be responsible for putting together the base of the structure, while another team member works on the top portion, for example.
- Take a break to check out what other teams are doing; their progress or failures may give you valuable ideas or insights.
- Don’t wait until the very end of the 18 minutes to put together your structure and put your marshmallow on the top. This often produces a crisis “uh-oh” moment rather than the anticipated “ta-da” moment. Building test structures along the way allows the team a chance find weaknesses in the design of their structure during the planning stage rather than at the last minute, when it is too late.

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Wrap Up Discussion

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### Ask students-

- What did the winning team do that helped them make a big tower?
- How well did each team work together?
- What would you do differently next time?

## The Bigger Context-

This is an activity that is done by people of all ages, from kindergartners up to CEOs of big companies and all kinds of adults. Can the students guess what age is best at doing this challenge? Kindergartners! That's because they weren't afraid to test out a design, have it fail and try again. CEOs (who lead big companies and think they're very smart) often spend all their time on one design only to have it fail at the end and get a 0 inch score. What does this tell us about designing things in the future? Practicing and prototyping works! Don't be afraid to fail as long as you try again!

There is a great Ted Talk video about the Marshmallow Challenge under the title "Tom Wujec: Build a tower, build a team." Additionally, his website has a lot of great extra information: [www.tomwujec.com/design-projects/marshmallow-challenge/](http://www.tomwujec.com/design-projects/marshmallow-challenge/)

Insight to Share with Students

The screenshot shows a TED video player interface. At the top left is the TED logo with the tagline "Ideas worth spreading". To the right are navigation links for "WATCH", "DISCOVER", and "ATTEND". The main content area features the speaker's name "Tom Wujec:" followed by the title "Build a tower, build a team" in large white text. Below the title, it says "TED2010 · 6:51 · Filmed Feb 2010". There are also links for "34 subtitle languages" and "View interactive transcript". The video thumbnail shows a group of people around a table with a play button overlay. At the bottom of the video area, a progress bar is visible with labels for "Plan", "Build", and "Ta-Do!". The total duration "18 Minutes" is shown on the right. The player controls at the bottom include a play button, a volume icon, the text "Filmed February 2010 at TED2010" and "Tom Wujec: Build a tower, build a team", and a subtitles icon.