

CUPCAKE DELIVERY

Duration: 30 minutes-2 hours

Institution: The Tech Museum of Innovation

Skill level/Age Level: Age 6 and older

Group size: Variable, depending on space constraints; roughly 10-50 participants

INTRODUCTION

In this hands-on activity, participants create wind-powered land yachts to deliver 3D-printed cupcakes to hungry beachgoers. This activity is a great introduction into constructionist engineering for participants ages 6 and up. While the activity can be completed in around 20 minutes, don't be surprised if you have participants staying 45 to 60 minutes perfecting their creations.

KEY CONCEPTS AND/OR SUBJECT AREA

Wind-powered propulsion

Weight

Momentum

Iteration-toward-innovation design process

Constructionist engineering

MATERIALS AND TOOLS

(Note: All materials are consumable for this activity.)

Essential Materials:

Masking tape

Index cards

Craft sticks

Paper

Cardboard

Round wheel-like pieces (CDs, bottle caps, etc.)

Optional Materials:

Foam craft sheet

Fabric scraps

Tissue paper

String

Wooden dowels

Binder Clips

Paperclips

Rubber bands

Various food service paper goods (lids, trays, etc.)

Tools:

Scissors

Fan

Flat surface for test track (If in a carpeted area, flattened cardboard can be used as a track.)

Small plastic cupcake (or other small object to deliver)

Optional: Hot glue gun

HOW TO OR STEP-BY-STEP

Set Up

Set your supplies up buffet style in an easily accessible place.

Evenly distribute scissors and masking tape along the workspace tables.

Outline the test track, marking the distance measurements; place the fan behind the start line.

Optional: Set out bins for recycling used materials.

Optional: Set up a showcase table for participants' creations.

How to or Step-by-Step

1. Invite participants into the workshop area; orient them to the space (e.g. where materials are, where to build and to test). Explain the design challenge and any additional goals or constraints. Here are a few ideas for additional design challenges:
 - i. Try using an odd number of wheels on your land yacht.
 - ii. Create your land yacht using only one type of material.
2. Allow participants to build. Assist with any material requests but try to limit giving any design hints. Instead use guided inquiry to help them think critically about their design.
3. When guests are ready, help them test their creations. Create a spectacle using chants or cheers to help build hype in the workshop. Ask questions to help prompt the participants' reflection. What design elements worked? Why? How might you change your design?
4. Encourage reiteration and retesting.
5. Encourage participants to take their creations home or place them into the recycle bins as they exit the workshop.

FACILITATION TIPS

- Having a separate table for a hot glue gun station helps contain messes and ease supervision.
- You can use any small object as your item to be delivered. Sturdier objects work best because they will be handled a lot.
- It is helpful to have building materials of different weights.
- If your space is carpeted, use flat cardboard to create a smooth runway.

MATERIALS SOURCES

Recycling centers; if you are in the Bay Area, RAFT is a great resource.

<http://www.raftbayarea.org/membership?gclid=Ciftl-2YqsECFeVaMgodKmcACg>

KEYWORDS

Wind-power, Constructionist, Indoor