Hands-On Design Challenge

The Tech Interactive
San Jose, CA

We will be starting momentarily.
Tech Interactive- Intro Poll

When poll is active, respond at PollEv.com/amybucher783
Text AMYBUCHER783 to 22333 once to join

We will get started momentarily. In the meantime, let us know something you are hoping to gain from this session.
# Materials Check!

<table>
<thead>
<tr>
<th>Items for structure – such as</th>
<th>Round things – such as</th>
<th>Items with surface area – such as</th>
<th>Fasteners – such as</th>
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Fan or hairdryer, scissors, hole punch. Payload = Small toy or item
Hands-On Design Challenge

The Tech Interactive
San Jose, CA
Welcome

Erica Barrueto
Bowers Institute
Senior Director

Amy Bucher
Bowers Institute
Professional Development Specialist

Session Goals:
• Walk-through and experience a Design Challenge.
• Discuss strategies for facilitating design challenges.
• Explore adaptations for a virtual environment.
Agenda

1. Introduction to Design Challenge Learning
2. Strategies for Virtual Hands-on Learning
3. Do a Design Challenge!
4. Facilitation Tips
5. Q & A
A Design Challenge is..

Design challenges use real-world problems to engage learners in an iterative design process.
Key Features of Design Challenges

• Solvable by **multiple solutions**.
• Provide opportunities for **iteration**. Students can test and improve designs.
• Connect with **participant interests**.
• Make explicit connections to **real world problems** and **careers**.
Virtual Settings

- Assign the challenge at the beginning of a week. Provide instructions for sharing towards the end of the week.
- Support families with information on materials, process and how to support student work.
- Vary length. Incorporate different topics depending on content.

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<td>Students work asynchronously on their own.</td>
<td>Students capture their process with photos and videos.</td>
<td>Small group collaboration through video, shared documents, or online platforms.</td>
</tr>
<tr>
<td>Use printed instructions/materials kits, written journals.</td>
<td>Use text messages, emails to communicate and share feedback.</td>
<td></td>
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Parent Guide (PDF)  Educator Guide: (PDF)
Let’s DO a Design Challenge!

1. Frame & Introduce
2. Prototype: Imagine, Create, Test & Reflect
3. Share Solutions
4. Debrief
Welcome: Guiding Questions

- What have you created or engineered?
- What are the qualities of an innovator?
What have you created or engineered?
What are the qualities of an innovator?
Design Process & Mindsets
Pupcake Delivery: Design Challenge

Design a dog treat delivery device.

Create a delivery system that transports ‘dog treats’ using wind power!

• Criteria:
  – Uses only the wind as power
  – Can carry the “cupcake” and reach the furry friends (6 ft.)

• Constraints:
  – 10 minutes to build and test
  – Use only available materials
  – No tape or glue
Introducing Challenges

- Question
- Video
- Story/Scenario

How would you inspire your students?
How much did you prototype already?

A Lot! I have a prototype!

Only a little. I'd like more time.

Not at all.
During Prototyping

<table>
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<th>Just Starting</th>
<th>Prototype</th>
<th>Take it Further</th>
</tr>
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<tr>
<td><strong>Do a Materials Scavenger Hunt and test materials with wind power.</strong></td>
<td><strong>Test and reflect.</strong></td>
<td><strong>Use one of the Challenge Cards below.</strong></td>
</tr>
<tr>
<td>• What items in your house would work for this challenge?</td>
<td>Which parts of the device can you test to inform the overall design?</td>
<td>• How reliable is your device? Can it stand up to multiple tests?</td>
</tr>
<tr>
<td>• What questions do you have about the materials you found?</td>
<td>What components are working in your design? Where are the failure point(s)? What caused them?</td>
<td>• Try changing one of these variables: increase the distance, add more weight, have it go faster.</td>
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Materials Reminder:

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Questions for Prototyping

Partial Build
• Which parts of the device can your team test to inform the overall design?

Problem Solving
• What components are working in your team’s design?
• Where are the failure point(s)? What caused the failure?
  ○ How can your team start to alter that part of the design?

Pushing Design Further
• What can your team try to make this design even better?
• What is a different way to solve the problem?
Prototyping
Imagine, Create, Test & Reflect

Scenario 1- “I’m not ready!!”
The device isn’t working and there are only two minutes left before sharing and feedback.

Scenario 2- “I’m done!”
The first attempt worked. Don’t want to keep building.
## Virtual Prototyping

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<td><strong>Prototyping &amp; Iteration</strong></td>
<td>Students work asynchronously on their own.</td>
<td>Educator sends email/text with prompts.</td>
<td>Video call prototyping in small groups.</td>
</tr>
<tr>
<td><strong>Journaling</strong></td>
<td>Written journal. Take a photo or drop off later.</td>
<td>Use photos and videos to capture the process.</td>
<td>Online document or platform.</td>
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If possible, check in with students throughout the week as they prototype and test.
Device: Gallery Walk

• Choose gallery view on Zoom.
• Turn on your camera and make sure your device is visible.

Questions:
How are the devices similar or different?
What did you notice about how the devices traveled?
1. Gather around the testing area/screen.
2. One person/team shares at a time.
   – Explain your design and your design choices.
   – How it is intended to work.
3. Everyone make observations of successes and failure points during testing.
4. Sharer shares the changes they would make for the next iteration.

Facilitators say:

“Show us your design, tell us how it is intended to work.”

“What changes did you make as you were building?”

“What changes would you make if you had more time?”
Sharing Solutions

- Team Share
- Pair Share
- Gallery Walk
- Silent Awesomeness
- Interviews
- Formal Showcases

- How would you celebrate and include everyone?
- How/Where would you share out yourself?
Debrief (Session Close)

**WHAT**

- Process
- Mindsets (ex: Collaboration)
- Content Connection

**HOW**

- Written Journal
- Small/ Large Group Discussion (Video Call)
- Exit Ticket/ Survey
- Student Video Reflection
Innovator Mindsets Debrief

Tech Tip: Innovator Mindsets (PDF)
Which innovator mindset did you think you embodied the most today?

- Bold
- Curious
- Perseverant
- Empathetic
- Collaborative
Which innovator mindset do you want to try next time?

- Bold
- Curious
- Perseverant
- Empathetic
- Collaborative
## Mindsets Self-Reflection

<table>
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<tr>
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<th>1-5 Area of Strength</th>
<th>How did I embody this today?</th>
<th>What do I want to try next time?</th>
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What did you notice?

**AS PARTICIPANT**
- What pieces of the experience stood out?
- Which parts of the process felt more empowering or challenging?

**AS FACILITATOR**
- How would this affect how you facilitate a design challenge?
- How would you support students through those pieces?
Debrief your experience as a participant. What pieces of the experience stood out? What parts of the process felt more empowering or more challenging?
Debrief as a facilitator. How would this experience influence how you support students through a design challenge?
Remind Yourself:

You are learning and iterating too!

- Be flexible.
- Vary your strategies.
- Test and reflect.

Think about: What will you try next?
Q & A
Resources

- **Educator Resources:** thetech.org/resources
- **Parent Guides and Videos:** thetech.org/athome
- **Spanish Guides and Videos:** thetech.org/en-casa
Exit Survey

We need your feedback!

Bit.ly/DCL527
Thank you!

Stay in touch!

BowersInstitute@thetech.org