

Getting Started With Makerspaces

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Published by *K20 Center*

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Time Frame 120 min

Essential Question(s)

- What is the added value of Makerspaces to learning?
- What do you need to start up a Makerspace with students?

Summary

Now that many schools have added student devices to their schools, they are looking for other ways to integrate technology and give students enhanced authentic opportunities to apply learning. Makerspaces provide a platform for that, but many educators and administrators do not know where to start. By the end of this session, participants will leave with a better understanding of Makerspaces and how to start them in low cost/no cost ways as they build capacity.

Learning Goals

- Understand how to develop a culture of Making.
- Develop a plan for using low cost/no cost Maker tools.
- Explore the best tools to add to their own spaces.

Standards

InTASC Model Core Teaching Standards (K-12th)

2a: The teacher designs, adapts, and delivers instruction to address each student's diverse learning strengths and needs and creates opportunities for students to demonstrate their learning in different ways.
8g: The teacher engages learners in using a range of learning skills and technology tools to access, interpret, evaluate, and apply information.

Attachments

- Designing a School Makerspace.htm
- Four Corners Posters—Getting Started with Makerspaces.docx
- Four Corners Posters—Getting Started with Makerspaces.pdf
- Makerspace Activity Ideas.htm
- Presentation Slides—Getting Started with Makerspaces.pptx

Materials

- Makerspace Activity Ideas (digital; provide a copy for participants to have after the session)
- Presentation Slides (attached)
- Designing A School Makerspace Article (optional; print for participants)
- Four Corners posters (attached; 1 copy of each)
- Surplus art/office supplies for Maker challenge
- Sticky notes in 6 different colors
- Participant devices that can connect to the internet

5E Snapshot

Engage

Participants use materials to make a creation that shows the most important concept of the last unit they taught.

Explore

Participants research Makerspace examples and share what they notice with others at their table.

Explain

Table groups work together to generate a list of existing materials at their school that could be used for a Makerspace.

Extend

Participants share what they think a Makerspace looks like, sounds like, and feels like. Later, participants learn about OETT grants to develop a Makerspace.

Evaluate

Participants consider their comfortability with different Makerspace tools and their degree of expertise.

Preparation

Prior to the session, put any surplus art/office supplies you have on hand on tables. Some examples are paperclips, scrap paper, tape, glue, popsicle sticks, Play-Doh, yarn, scissors, folders, construction paper, masking tape, etc. It helps to have some things with shapes that can be manipulated and some that can be connected together.

20 minutes

Engage

Use **slides 1-4** to introduce the session. Review the Essential Questions on **slide 3** and the Learning Objectives on **slide 4**. Display the instructions on **slide 5**. Participants have 8 minutes to use materials on their table and create something that shows the most important concept of the last unit they taught.

Presenter's Note

Emphasize that we have to have a space where people are comfortable to fail. Things do not have to be perfect or pretty. We want to emphasize process over product.

Give participants time to share at their tables what they made and how it shows the most important concept of the last unit they taught. As a whole group, ask for volunteers to share something they liked about a tablemate's creation. Then ask the group what they learned while creating and talking about their creations. Who had a creation that didn't go as planned? What can we learn from things that don't work?

Ask: *What was this experience like for you? What did you like about it? What could you see your students doing?*

30 minutes

Explore

Display **slide 6**. Explain to participants that they now have some time to explore existing Makerspaces on their own using the I notice, I wonder strategy. You can give participants the choice of searching Makerspace images and recording what they notice or print and pass out the article **Designing a School Makerspace** (see link in Materials above) for them to read and record observations.

On each table, make sure to have a stack of blue and a stack of yellow colored sticky notes. Ask participants to record something they notice about Makerspaces on a yellow sticky note and something they wonder on a blue sticky note. They may record as many notices and wonders as they can think of.

Move to **slide 7**. Ask the participants to take turns reading their sticky notes aloud and discuss any observations or questions that stand out.

After sharing, have participants group similar sticky notes together, looking for common themes, surprising ideas, or questions that several people share. Encourage them to consider: What features make a Makerspace inviting and effective? What opportunities do Makerspaces offer students? What questions or challenges might educators need to consider when designing one?

Invite each table to share one key observation and one compelling question with the whole group.

25 minutes

Explain

Presenter's Note

For the following activity, download the **Makerspace Activity Ideas** article (linked in Materials above). For easier sharing with participants, cut and paste the link and add that to **slide 9**. This will give participants access to the materials and activities suggested in the article. Alternatively, you can offer a copy of the article following the session. Be sure to print several copies before the session for potentially interested participants.

Display **slide 8**. Explain that there are many ways that we can apply low cost and no cost materials to the curriculum and content when trying to integrate Makerspace. The hardest part can be brainstorming creative applications for what we have on hand.

Open the Makerspace Activity Ideas, making sure that it is visible for participants to see. Attendees work as a group to first call out materials that already exist at their school. This could include lined paper, broken crayons, paperclips, etc. Record responses. Generate a list of materials on a white board or chart paper and revisit the list as participants share possible projects and products students could create using the materials listed in the article.

Sample Responses

Lined paper could be used to make paper rockets, sails, parachutes, etc. Plastic baggies could be used to mix paints, create stained glass windows, experiment with refraction, buoyancy, etc. Popsicle sticks could be used to build with, make puzzles, or create catapults.

After participants have had time to generate a list of materials with multiple ideas, return to the slides and display **slide 9**. Give participants time to scan the QR code.

10 minutes

Extend

Move to **slide 10** and reflect on all you have seen and done. Ask participants to share out what they feel Makerspaces look like, sound like, and feel like.

Sample Responses

Makerspaces look messy, collaborative, engaging. They sound noisy, busy, engaged. They feel exciting, engaging, experimental.

Remind participants that this is all with low-cost/no-cost materials. Adding big ticket items can be exciting for teachers and students, but it is the mindset we create that makes the biggest impact. Display **slide 11** and share that OETT has a grant program that can be used to expand Makerspaces and add more technology/robotics. Share the OETT link with participants and either give them time to explore the site and ask questions or encourage them to explore it further on their own time: https://www.oett.org/grants/

10 minutes

Evaluate

Remind participants that mastery does not come before applying a tool with students. If we waited to allow students to use materials until we had mastered every tool that we use in our Makerspaces, students would never get to use them. Additionally, with low-cost materials, we never know what students may create, so it is best to provide opportunities and see where they take them. When we don't fully have a tool or material mastered, we have the chance to authentically model how to find the information we need to make things work and authentically model a growth mindset. Do not be afraid to be open. Kids need to see us model struggle so that they can begin to be comfortable with struggling by themselves.

Move to **slide 12**. Participants can consider their comfort in using common Maker tools by engaging in a four corners activity. Explain that we are going to show our TEAM spirit in this activity by moving to the poster in the room that matches our experience with a variety of both high-and low-end maker tools. In this instance, TEAM stands for Try, Explore, Apply, Master. Display the **Four Corners** posters (attached) around the room. Use **slides 13-19** to gauge participants comfort with a variety of Maker tools. Remind participants' that they are considering what category they fit in as they look at the Maker tools displayed:

1. Willing to **Try**
2. Have already **Explored**
3. Have **Applied** to learning with students
4. **Mastered** and use regularly

Continue to display **slides 13-19** to gauge the participants' willingness to work with different Maker tools. After participants move each time, ask what has made it difficult to work with the tools, or what supports they have found helpful in integrating the tools.

End by reminding participants that tools are engaging, but their willingness to try and model is at the heart of a successful Makerspace. Giving students space to explore, tinker, and try will develop a growth mindset and a readiness to think about their world in new ways.

Research Rationale

Makerspaces are currently used for activities such as STEM challenges, free play, or literacy extensions. While Makerspaces continue to grow in popularity, there is currently a lack of research on best practices for implementation and outcomes regarding the efficacy and impact of Makerspaces on learning (Davis, 2018; Vongkulluksn, et al., 2018). The problem facing Makerspaces today is that there is no standardized pedagogical framework for best practices in implementing and assessing learning in Makerspaces. However, within a school, a Makerspace has the potential to reach a multitude of learners across a variety of learning styles including those who learn best in a hands-on environment (Sheffield et al., 2017).

For Makerspaces to have a positive impact on student learning, teachers and leaders have to be prepared to select materials and coach learners. Educators need to understand how to guide students to develop a growth mindset while working in a Makerspace. The process and not the product needs to be the central focus for learning. Makerspaces are often viewed as expenses but using less costly materials to build and create can be both more sustainable and replicable (Lakind et al., 2019). Learning should be the focus over high-priced materials (Fontichiaro, 2018). This session helps educators see how they can use low-cost or no-cost materials to support student learning through Making.

Resources

- Davis AML. (2018). Current trends and goals in the development of makerspaces at New England college and research libraries. *Information Technology & Libraries.* 37(2):94-117.
- Fontichiaro, K. (2018). Beware the magical object: stop expecting tools to be teachers. *Teacher Librarian*, 46(2), 49–51.
- K20 Center. (n.d.). Four corners. Strategies. https://learn.k20center.ou.edu/strategy/138
- K20 Center. (n.d.). 8-minute timer. [Video]. YouTube. https://www.youtube.com/watch?v=R-21YM7Ey7k
- Lakind, A., Willett, R., & Halverson, E. R. (2019). Democratizing the maker movement: A case study of one public library system's makerspace program. *Reference & User Services Quarterly*, 58(4), 235–245.
- Sheffield, R., Koul, R., Blackley, S., & Maynard, N. (2017). Makerspace in STEM for girls: a physical space to develop twenty-first-century skills. *Educational Media International*, 54(2), 148–164. https://doi.org/10.1080/09523987.2017.1362812
- Vongkulluksn, V. W., Matewos, A. M., Sinatra, G. M., & Marsh, J. A. (2018). Motivational factors in makerspaces: A mixed methods study of elementary school students' situational interest, self-efficacy, and achievement emotions. *International Journal of STEM Education*, 5.