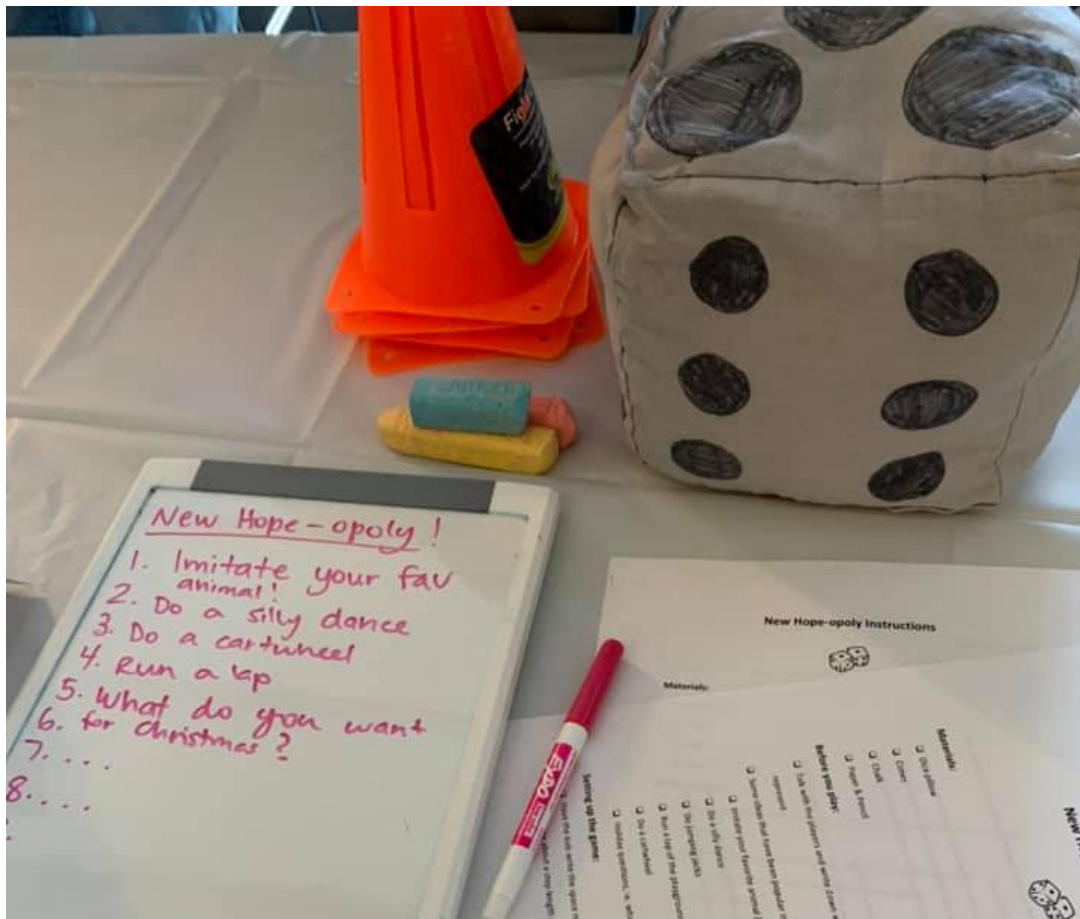


Guide to Using the Makerspace to Design Educational Materials & Toys for K-12 Students

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Goals of this Guide

- The purpose of this guide is to describe how the BeAM makerspace can be leveraged to create instructional materials for use with K-12 students in an educational setting.

Recommendations

- Encourage students to work in groups of 2-4; this enables them to reasonably and feasibly coordinate their efforts in the makerspace while keeping all participants engaged. Too many students in a group means that the makerspace work falls on just one or two group members and you lose the benefits of exposing everyone to the tools at BeAM.
- If your class size permits, schedule the makerspace orientation during a class session rather than leaving it up to students to do on their own. This, along with a check-in/progress-report mid-semester, will ensure you can keep the projects going at a consistent pace as well as helping to inspire project ideas at the outset of the semester. This allows you to be there as well so you can guide students to think about how

tools available at the makerspace can be leveraged to make materials that can be used with children and youth.

- It is helpful to allocate class time for students to brainstorm and share project ideas. Showing examples from prior class projects, if possible, is also extremely helpful.
- It is important to have a clear instructional goal in mind (standards-based if applicable), and then consider the following questions:
 - How will the materials design in the BeAM makerspace facilitate teaching and learning around that goal(s)?
 - How will you assess the usefulness of these materials in students' progress toward the instructional goal?
 - How will you reflect on how the materials were used and incorporate those reflections in to subsequent design iterations?
- Make sure students consider the following logistics:
 - How many sets of materials do you need to make based on the number of children you are teaching?
 - How will the materials be stored and/or safely transported to the educational site?
 - What ages of children will be using the materials you create? Are there safety considerations you need to keep in mind related to age (e.g., size of materials if working with very young children)?
 - How durable and/or reusable are the materials you are creating (keeping in mind that many children may be using them)?
 - Do you plan to leave the materials behind for use in the school site? If so, what instructional materials/instructions do you need to provide?
- Use the affordances of the makerspace to use personalization to your advantage. Children and youth, even adults, enjoy customized and personalized objects made just for them. This will result in more interest, engagement, and usefulness of the instructional materials. For example, incorporate student interests, names, or knowledge-bases into the materials you create or the images you include on materials.

Things to Avoid

- Avoid recreating materials you could already purchase or locate elsewhere just because you can make them in the Makerspace. The idea here is to customize the materials you are making to differentiate your instruction or engagement with students in order to serve an identified need.
- Don't be too prescriptive in the directions you give students about the type of materials they can create, but also provide some limits/constraints so they can accomplish their work within the timeframe of the course/semester.

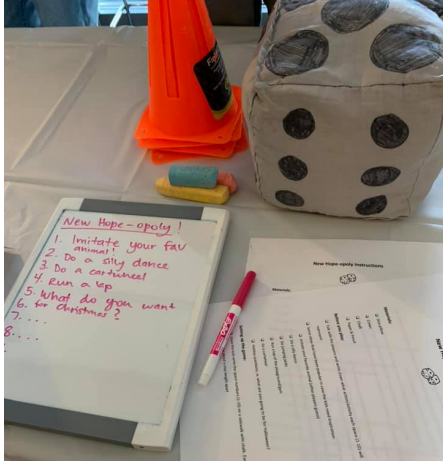
Modifications

- Think about languages of the students you are teaching, as well as abilities which your materials need to accommodate.
- You can be more specific about the type of instructional material students create in the makerspace, e.g., something specific for a content area.

Other Resources

The poster below, designed for display at the UNC maker fair, explains more about the process of creating educational materials in the makerspace for use with K-12 students.

Appendix A: Example Photos of Projects



Appendix B: Course Poster

CREATING CONNECTIONS: SCHOOLS+COMMUNITY COLLABORATION

The School of Education & BeAM Makerspace | EDUC 615



THE COURSE

EDUC 615: Schools and Community Collaboration explores the intersection between culture, families, communities, schools, and learning and the responsibilities educators have for working in this complex terrain. In Fall 2019, 60 students fulfilled 30 hours of volunteer work with children in local after school programs to explore and understand the cultural, linguistic, and community assets, or **funds of knowledge** (Moll et al., 1992), youth bring to schools.

ESSENTIAL QUESTIONS

EDUC 615 students used the BeAM Makerspace to design and make artifacts to support the "Funds of Knowledge Club Projects". Clubs engaged tinkering and making through the lens of multiliteracies theory (New London Group, 1996) to explore essential questions about the elementary and middle school children they worked with, such as:

- What **assets** do children bring to school?
- How should I **design learning** to engage these assets?
- Which **learning engagements** best facilitate student engagement in school, and why?
- What is the role of **connection** and **relationships** between students, teachers, and families, and how does that impact student learning?



SCHOOL OF
EDUCATION

EDUC 615 ARTIFACTS

Explore our tables & explore how these UNC students engaged local children and youth in after school programs. Some examples of club projects EDUC 615 created in the BeAM makerspace include:

The **Sticker Squad**, where 615'ers designed and made letter and picture stickers on the BeAM vinyl cutters to teach reading to kindergarteners.

The **Color Club** was designed to engage middle schoolers in games and activities that facilitated talking and relationship building. Each week 615'ers and the students together played UNO, baked cookies, tie-dyed socks, and played color-based games outdoors.

The **Friendship Club** happened because 615 students noticed that their students needed extra connection at the end of a long school day. Together, club members made friendship bracelets and collaborated on finding 3-D printed animals in the sandbox.

REFLECTION

At course end, EDUC 615 students asked themselves, "**What did I learn** about myself as a teacher and learner through this **iterative design process**? What did I learn about children and their families using the artifact I created, and how did that **impact our work together**?"