MiddieMakers Activity Guide

Discovery Stations

<table>
<thead>
<tr>
<th>Middie Designer:</th>
<th>Attribute to Creator:</th>
</tr>
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<tbody>
<tr>
<td>Terri Kempthorne</td>
<td>Blue Bot ideas: Kylie Docherty, QSITE</td>
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</tbody>
</table>

| Subjects: Engineering and/or Technology | Topic or Unit of Study: Engineering & Art |

| Grade/Level: 2-5 | Time Allotment: 1 week |

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Activity Description

Students will explore various methods of building and constructing their own ideas using a variety of provided materials. Students will then share their creations with each other.

Challenge Questions (for each station):

- ALL Stations
  - Can you figure out a way to present your creation at the end of the week?
- Snap Circuits
  - What is the most complex circuit you can create?
  - How many different things can you make your circuit board do at once?
- Keva Planks
  - Using Keva Planks, can you create your own version of a real building from a picture?
- Bloxels
  - Can you create and animate a character of your own design?
  - Can you provide animations for your character for all three types of movement? (Idle, Walk, and Jump)
- Blue Bots
  - Can you make your Blue Bot draw a hexagon using only repeat and 45* turns?
  - Can you complete at least two of the tasks presented in Challenge Mode?
- Origami
  - Can you fold paper into a recognizable animal?
  - Can you teach someone else how to make that animal?
- Makedo
  - Can you create a free-standing structure large enough to hold a stuffed animal?
  - Can you also build accessories for that structure?

**Activity Goals**

Allow students to have a creative outlet to design and develop their own ideas and innovations, while providing them with stimulating challenges and problems to solve.

**Standards**

**ISTE 1a** - Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.

**ISTE 1b** - Students build networks and customize their learning environments in ways that support the learning process.

**ISTE 1c** - Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

**ISTE 2a** - Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.

**ISTE 3c** - Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.

**ISTE 3d** - Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

**ISTE 4a** - Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
ISTE 4c - Students develop, test and refine prototypes as part of a cyclical design process.

ISTE 4d - Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

ISTE 5d - Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

ISTE 6b - Students create original works or responsibly repurpose or remix digital resources into new creations.

Materials & Resources

<table>
<thead>
<tr>
<th>Materials</th>
<th>Resources</th>
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<tbody>
<tr>
<td>Keva Planks</td>
<td><a href="https://www.origamiway.com/">https://www.origamiway.com/</a></td>
</tr>
<tr>
<td>Books with architecture images</td>
<td></td>
</tr>
<tr>
<td>Bloxels</td>
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<tr>
<td>Ipad (x5 for Bloxel use)</td>
<td></td>
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<tr>
<td>Blue Bots (up to 3)</td>
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<tr>
<td>- Ipad for Blue Bot</td>
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<tr>
<td>- Blue Bot mats</td>
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<tr>
<td>Origami paper (or lightweight</td>
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<tr>
<td>paper cut into squares</td>
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<tr>
<td>Origami books</td>
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<tr>
<td>Chromebooks (x5 for Origami</td>
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<tr>
<td>use)</td>
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<tr>
<td>Markers / crayons / colored</td>
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</tr>
<tr>
<td>pencils</td>
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</tr>
<tr>
<td>Makedo materials</td>
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<tr>
<td>Cardboard of various shapes</td>
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<tr>
<td>Assortment of stuffed animals.</td>
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Setup

Have each separate station set up at different tables, so that the students can choose where they want to work and what they want to interact with.

Stations:

1. Keva Planks - may be set-up with challenge cards, or allow students to develop their own structure. Be sure to include architecture books at this station.
2. Blue Bots - include Blue Bot maps & ipads
3. Snap Circuits
4. Bloxels - include ipads
5. Origami - set up with origami paper, origami books, and/or chromebooks for access to directions.
6. Makedo - include assortment of stuffed animals and cardboard

Implementation

Learning Context

The presented materials are all ones that the students have been instructed on how to use, and are familiar with (except Bloxel). The purpose of this lesson is to allow the students to further explore their own ideas and capabilities using materials they are familiar with, to challenge and develop their own ideas.

Procedure

1. **Anticipatory Set:** Briefly explain what the various stations options are to the students.
2. **Direct Instruction:** Explain that they will have the week to develop, design, and present a creation of their own making using whatever station(s) they choose. Demonstrate any items that the students may not have experienced before.
3. **Guided Practice:** Have the students remind you of some of the things they have done with the provided materials.
4. **Check for Understanding:** Ask if there are any questions about anything, and remind the students to feel free to ask if they are unsure about anything, but that they should try to solve the problems on their own first.
5. **Independent Practice:** Allow the students to choose their own station(s) to work at. Allow them to tinker, create, and be innovative. If a student seems to be purposeless, engage them with some probing questions such as, “what are you designing?”, “How would this be used?”, “Can you write a set of instructions so that someone else could make it?”
   a. Encourage students to write sample directions, or make a drawing / diagram, or photograph their work efforts.
   b. Even if their ideas do not work in the long-run, there is value in the effort.
   c. Encourage students to document their work or progress. Be willing to take photos for students.
6. **Closing:** Have the students, either individually, or as groups, demonstrate what they have designed, and its purpose / how they met the proposed challenge.

Differentiated Instruction & Coaching Tips

**Visual Learners** - Encourage students to draw their ideas to help them better visualize the direction they want to go.
Auditory Learners - Encourage the students to discuss their ideas out loud either with you, or with their peers.

Kinesthetic Learners - Encourage students to develop something that would promote movement and interaction.

ELS Students - Encourage students to collaborate with their teammates to work out their ideas. Provide guidance and demonstrations only as needed.

At-risk Students - Encourage their participation at whatever station grabs and holds their interest. If they are showing signs of disinterest or boredom, encourage them to try a different station.

Advanced Learners - Encourage students to incorporate items from various stations into their design. They could also work collaboratively with other students from other stations.