

Activity Title:	If I Built a House - Engineering Design Process
Timeframe:	~3 40 Minute Class Periods
Big Ideas and/or Essential Questions:	<ul style="list-style-type: none"> <li>• How can I use the Engineering Design Process to design a house?</li> <li>• How do 4Cs behaviors help me work through the Engineering Design Process?</li> </ul>
NGSS Science Practices:	<ul style="list-style-type: none"> <li>• Asking Questions and Defining Problems</li> <li>• Developing and Using Models</li> <li>• Planning and Carrying Out Investigations</li> <li>• Using Mathematics and Computational Thinking <i>**Optional</i></li> <li>• Constructing Explanations and Designing Solutions</li> <li>• Obtaining, Evaluating, and Communicating Information</li> </ul>
Learning Target(s):	<ul style="list-style-type: none"> <li>- I can use the Engineering Design Process to design a house.</li> <li>- I can model 4Cs behaviors.</li> </ul>
Materials:	<ul style="list-style-type: none"> <li>• If I Built A House, Book by Chris Van Dusen</li> <li>• Upcycle Supplies</li> <li>• Paper &amp; Drawing Utensils for Blueprinting</li> </ul>
Activity Procedures:	<ol style="list-style-type: none"> <li>1. Read story - If I Built A House, Book by Chris Van Dusen</li> <li>2. Talk about use of 4C's in the story (communication, collaboration, critical thinking, creation); review classroom expectations of modeling 4Cs behaviors when working in groups</li> <li>3. Briefly Teach/Review Engineering Design Process - Optional Crash Course Kids Youtube Video: <a href="https://www.youtube.com/watch?v=fxJWin195kU">https://www.youtube.com/watch?v=fxJWin195kU</a></li> <li>4. Split class into groups of 3-5</li> <li>5. Directions for Design Process: <ol style="list-style-type: none"> <li>a. Define the Problem</li> <li>b. Identify Constraints: <ol style="list-style-type: none"> <li>i. *See Optional Math Connections Below</li> <li>ii. Your model may not be larger than (give size here)</li> <li>iii. You may use ANY supplies in the room</li> <li>iv. Only take what you need</li> <li>v. Your house has to have certain components (an area for food, sleeping, personal hygiene, doors)</li> </ol> </li> <li>c. Brainstorm: <ol style="list-style-type: none"> <li>i. Think of a variety of design ideas</li> </ol> </li> </ol> </li> </ol>

	<ul style="list-style-type: none"> <li>ii. You need to draw up blueprints for your house</li> <li>iii. You will need to create a supply list</li> <li>iv. <b>**Optional:</b> If time allows, have students seek peer feedback before moving on to the building stage.</li> <li>d. Select the most promising solution</li> <li>e. Prototype Your Design: You will need to create a model of your house, not full size</li> <li>f. Test: Have students pair up with another group to provide feedback -- consider glows/grows approach</li> <li>g. Iterate: Allow students time to make design better.</li> <li>h. Communicate: Student share out of blueprints and projects.</li> </ul> <p>6. Wrap-up Group Conversation: How did you use the 4Cs with your group members? What do you love about your design? What didn't turn out the way you wanted it to? What would you do differently if you could do it again? How did you use the Engineering Design Process?</p> <p><b>Note:</b> This activity is designed to allow students to plan a creation and see it through to completion. You can customize the design challenge as you see fit for your class. The learning is in the problem solving, resiliency and creation.</p> <p>Extension Activities/Math Connections:</p> <ul style="list-style-type: none"> <li>● Add a monetary amount to each item used. Ask students to come in below a certain budget.</li> <li>● Measure square footage (use graph paper to design blueprints)</li> </ul>
Assessments:	<p>Wrap-up Group Conversation: How did you use the 4Cs with your group members? What do you love about your design? What didn't turn out the way you wanted it to? What would you do differently if you could do it again? How did you use the Engineering Design Process?</p>



