WEEK 2 Lesson 2

Science and Engineering: Matter and Its Interactions

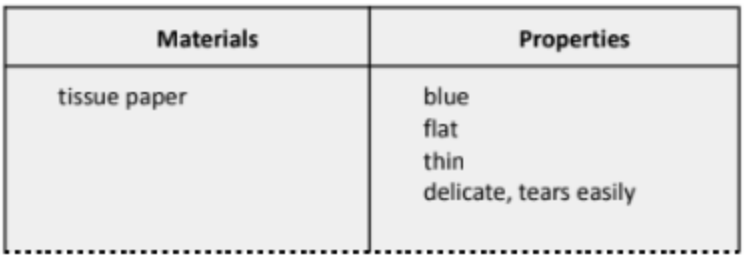
Exploring properties of materials to design and build a chair

Big Ideas	Materials have observable properties. The properties of materials impact how they are used for specific purposes.
Guiding Questions	How do we choose the right materials when we design an object for use? What should we consider when designing an object for a specific user?
Content Objectives	I can test materials and analyze how their properties affect the success of a design. (2-PS1-2) I can describe and compare properties of materials. (2-PS1-1)
Language Objective	I can describe properties of materials and how they affect the design of a chair. (L.1.2.b, 2-PS1-1)
Vocabulary	**criteria:** what is required in a design to solve a problem or address a need **material:** what a thing is made of, such as wood, paper, metal, plastic, cloth, or cardboard **engineer:** a person who designs, builds, or maintains machines, or constructions **design:** a plan or drawing to show how something looks or works **test:** a procedure to make sure something works well before we use it **property:** the attribute or characteristic of an object
Materials and Preparation	● Children's work from Lesson 1, including materials bags ● Science and Engineering packets ● Writing and drawing tools ● Criteria chart from Lesson 1 ● Chart paper and markers to prepare the following chart:

<table>
<tr><td></td><td>
<table>
<tr><td>Materials</td><td>Properties</td></tr>
<tr><td></td><td></td></tr>
<tr><td colspan="2">Questions about materials and their properties</td></tr>
</table>

On the whiteboard, write the following sentence stems.
The chair we built worked well/did not work well because _____ .
One property of _____ is _____.
</td></tr>
<tr><td>Opening
1 minute</td><td>Today you have more time to design, build, and test your chairs. Remember the criteria you are trying to meet. You may not come up with a perfect design, and that's okay! Record what you are working on in your packets. Today's page looks just the same as yesterday's. You might record some of the same information if your design is successful, and some new information, as you make changes to your design.

Afterwards, we will gather to discuss what worked and didn't work in your designs.</td></tr>
<tr><td>Investigation
20 minutes</td><td>Children continue working in pairs to come up with a design and to record their work in their individual packets.
As the time draws to a close, assure children that they will have time to continue their work at the Discovery Studio.</td></tr>
<tr><td>Closing
9 minutes</td><td>Gather children for a whole group discussion. Have them sit with their partners, with their chairs in front of them.
Talk with your partner about how your design is working so far. What was successful and what was difficult about designing the chair with these materials? You might talk about the properties of the materials you have used. When we talk about properties, we describe the characteristics of something. For example, my shirt is made of fabric, and the fabric is soft. Softness is a property.
As children talk with their partners, refer to the sentence frames to encourage them to use the word property in context.
Facilitate a whole group discussion, recording materials and the properties children name or describe. For example:</td></tr>
</table>

	 *We are recording this information so that we can refer to it as we keep working. This is what engineers do as they try to solve problems they encounter.* *Turn and talk again: How could you improve your design? Is there anything you need to know more about the materials before you continue working on your chair?* Offer an example of a question related to materials children are using, such as "Are some kinds of cardboard stronger than others?" Record children's questions at the bottom of the chart. *We've learned that some materials, because of their properties, work better than others for making a chair for these dolls. We'll keep thinking about materials and their properties as we design a chair for our classroom.* Have children save their work. After the lesson, empty the bags and make the materials available as a shared collection for continued use at the Discovery Studio. (Reuse these bags for successive lessons.)
Standards	**ETS:** K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. **2-PS1-2** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
Assessment	Listen as children talk about how they developed their ideas, used the materials, and negotiated their interactions. Note what words and language they use to describe the properties of materials.