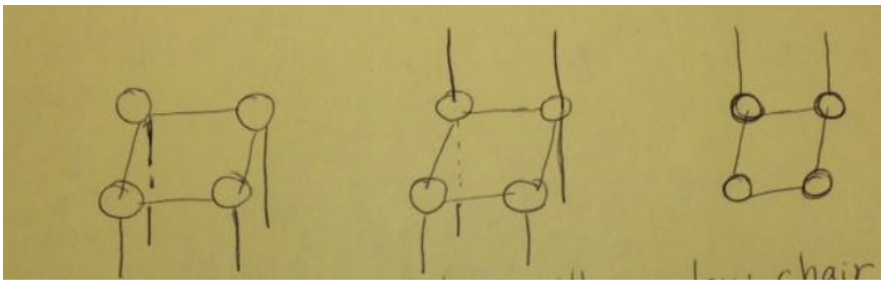
WEEK 7 Lesson 2

Science and Engineering: Matter and Its Interactions

Designing Alternative Seating

Big Ideas	Materials have observable properties. The properties of materials impact how they are used for specific purposes.
Guiding Questions	What properties of a seat will accommodate our needs as learners? What materials could the seat be made of to respond to our needs?
Content Objectives	I can use what I know about materials to create a design in response to a need. (2-PS1-2, 2.K-2-ETS1-3) I can devise a way to build a seat based on my knowledge of properties of materials. (Practice 6, 2-PS1-2, K-2-ETS1-3)
Language Objective	I can use words to describe properties of materials and why certain materials are appropriate to meet criteria for design. (L.6.2.a)
Vocabulary	**alternative seating**: places that allow people to choose how they sit according to their needs
Materials and Preparation	Review the Science and Engineering Project Overview and the resources included there. Collect materials that may be useful in building a small prototype of a chair, such as rubber bands, tongue depressors, pieces of different types of fabric and paper, styrofoam, toothpicks, cardboard, rubber, metal, wood, Beautiful Stuff. Place these on a large tray to reference during the opening meeting. ● Criteria chart from Week 2, Lesson 1 ● styrofoam balls ● toothpicks Using the styrofoam balls and toothpicks, create one or more chair prototypes that meet a specific need. See the following drawings for prototypes of a stool (no back), a chair with low legs, and a floor seat with a back.

	 ● Science and Engineering packets ● writing and drawing tools ● chart paper Title the chart paper Designing Seating for Our Classroom. Below, write some questions such as those following. Modify these questions to fit the needs previously identified by individual children or the collective classroom community. ○ *What materials will allow for bouncing in the chair?* ○ *What materials will make the seat waterproof?* ○ *What materials will resist pressure and scratching when a person is moving back and forth in the seat?* ○ *What materials will be strong enough to hold more than one person at a time?*
Opening 10 minutes	*We are getting close to the end of our study about what makes school a wonderful place for all learners. We have learned a lot about ourselves as learners. One thing we know is that not everyone needs to sit in the same way.* Name some of the particular needs the classroom has uncovered about how children like to sit and move. *This is referred to as alternative seating. Alternative seating allows people to sit in the ways they are most comfortable. As our final Science and Engineering project, we are going to design a chair or other seating that will meet our different needs.* *Let's think back. We began by designing a chair that could hold a little doll.* Together, read the Criteria chart. *We've learned that materials have specific properties, making some materials better than others for certain purposes. We've been studying properties of materials. We have tested materials for strength, flexibility, hardness, absorbency. Now we can go back to our original chair designs with much more information!* *For our classroom seating, we will have new criteria. You will set the criteria for the seating you want to build.* *What different materials do you think you might find?* Read the questions on the chart, Designing Seating for Our Classroom. Again

	name some possible criteria: the seating should accommodate more than one person, be soft, be waterproof, allow for wiggling or bouncing, etc. *You will work with your partner on a small chair model to try the materials and see if you have a successful design. Then we'll see if we can build an actual seat! Not everyone will decide to meet the same criteria or build the same kind of seating.* Show the corresponding pages in the packets. *First, Engineers, you will work with your partners to decide what kind of seating you want to design. Why does our classroom need this kind of seat? Then decide which criteria you need to meet. You'll use everything we have been discovering about properties of materials. You may also want to make some sketches as you are thinking about your design.* Show the prototype(s) built in preparation for the lesson. *Here is an example of a model. I designed this chair for people who _____ [example from the classroom such as ... like to sit on the floor but still have something to lean their back against.]* Think aloud about recording the design process in the packet. Answer children's questions about the design process, determining criteria, choosing materials, or recording plans. *Today, you will work with your partner to imagine design solutions and then sketch your designs together. Make sure to include which materials you will use for each part of the chair and why you will use those materials. Be specific about what criteria each material meets: is it waterproof? Strong? Flexible? Does it work for certain kinds of learners?*
Investigation 20 minutes	Children talk about what they want to accomplish with their seating designs and record their plans. Encourage children to discuss specific properties of materials to best meet the criteria they have identified. Once children have a plan, they can start working with their materials and building. This work will continue in the Discovery Studio.
Closing 5 minutes	Bring the group back together and ask pairs of children to share ideas they are excited about and challenges they are facing. After the lesson, collect and prepare any additional materials children have identified in their plans.
Standards	**2-PS1-1** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. **L.6.2.a** Use words and phrases acquired through conversations, reading, and being read to, and responding to texts, including using adjectives and

	adverbs to describe (e.g., When other kids are happy, that makes me happy).
Assessment	As children are working, listen to their ideas and consider what informs them. ● Do they identify appropriate criteria? ● Do they draw on previous experiences to think about how to meet those criteria? ● Notice how children collaborate. ● What language do they use to explain their ideas? Do they check for their partner's understanding? ● Do children listen to and consider seriously their partner's ideas? Review children's designs. Select those designs or aspects of designs that are likely to be successful and realistic. Plan to highlight these with the whole group during the opening of the next lesson.

Notes