Unit 1 (Materials):
Changing Materials

Concept Different tools are used to change different materials.

Content Objectives
Students will identify the characteristics and common uses of tools such as scissors and hand drills.
Students will understand how tools can be used to change materials to make them better fit for certain tasks.
Students will categorize materials according to the tools that can be used with them.

Language Objectives
Students will discuss and present on common tools and how they can be used at home and in their community.
Students will infer the name of a tool by reading written descriptions.
Students will produce visual and written descriptions of common tools.

Standards

- **NGSS:**
  - **K-2-ETS1-1**. Ask questions, make observations, and gather information about a situation people want to change to define problem that can be solved with a new or improved object or tool.
  - **K-2-ETS1-3**. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses
- **TEKS**
  - **1A** Demonstrate safe practices during classroom investigations.
  - **3D** Connect grade-level appropriate science concepts with the history of science.
  - **4A** Collect, record, and analyze information using tools.
  - **4B** Use safety equipment as appropriate, including safety goggles and gloves.
- **ELPS**
  - **1A** Use prior knowledge and experiences to understand meanings in English. [Prior knowledge]
  - **1C** Use strategic learning techniques such as concept mapping, drawing, memorizing, comparing, contrasting, and reviewing to acquire basic and grade-level vocabulary.
  - **4F** Use visual and contextual support and support from peers and teachers to read grade-appropriate content area text, enhance and confirm understanding, and develop vocabulary, grasp of language structures, and background knowledge needed to comprehend increasingly challenging language
  - **4K** Demonstrate English comprehension and expand reading skills by employing analytical skills such as evaluating written information and performing critical analyses commensurate with content area and grade-level needs

Tools	Hand drill; Clamp; Hole Punch; Scissors; Hammer; Screwdriver; Saw
Materials	Soft wood pieces (Cedar, Bass); Clay; Foil; plastic scraps; paper; cardboard; Safety first! Buttons; Recycled items (e.g., butter tubs, plastic soda bottles, Styrofoam trays, milk jugs, cardboard tubes) Handouts **3.1.1-3.1.3**
Literature Connections	*Tool Book* by Gail Gibbons *The Toolbox* by Anne Harlow Rockwell *Whose Tools* by Toni Buzzeo *The Home Depot Big Book of Tools* by Kimberly Weinberger

Day 1: Engage/Explore Materials- Changing Materials

Teacher Says/Does	Student Says/Does	Language requirements
1. Introduce tools with a read aloud of the book of your choice related to construction or tools. 2. Ask students to brainstorm a list of different tools and what they're used for. Follow up by asking more about the tools, e.g. which tools have you seen at school? What do you use them for? Which tools have you seen your mom or dad use? 3. Distribute pictures from Handout **3.1.1** to student pairs so they discuss one tool and share out the way it is used. 4. Make a chart on the whiteboard or poster paper similar to the one on the "Uses of Tools" handout. Ask students to share about the kinds of tools and their uses in the read aloud and to connect them to life experiences. 5. Discuss what a hand drill and a clamp are used for.	Students share what they know about tools	• hand drill • tool

Day 2: Explore/explain Materials- Changing Materials

Teacher Says/Does	Student Says/Does	Language requirements
1. Allow students to examine some classroom objects, like scissors and a hole-punch, a piece of construction paper, a pencil sharpener, data projector, computer. Ask them to identify which of are tools, and which are not, and to explain their reasoning. 2. Lead a discussion about the characteristics of tools. Ask students to define the word TOOL. Write students' ideas and the definition of a tool on the board/projector. Have students work together to develop a class definition. ["TOOLS" are used to change a material in some way, such as scissors to cut paper (demonstrate)]. 3. Present samples (or pictures from the handout) of materials like cloth, plastic, foil, and cardboard to the class. 4. Ask students to turn to a partner and share what tools they would use to change each of the following materials: cloth, plastic, foil, and cardboard. Share out answers. 5. Tell students that they all will become engineers since an "ENGINEER" is a person who changes materials so that the materials become better fit for certain tasks. Refer to students as engineers from this point forward during the lesson. 6. Use Handout **3.1.1**, and have groups of students identify materials each tool could be used to change, e.g. they will recognize the "saw" will only work for objects made of wood. 7. Have each group present to the class sharing what they found. Use Handout **3.1.2** with templates to support students' responses if necessary.	Students construct a definition for the term tool *tool*, and examine tools and materials. Identify examples and nonexamples of tools. Justify reasoning. A tool is _____. _____ is a tool because _____. _____is not a tool, based on our definition, because _____.	

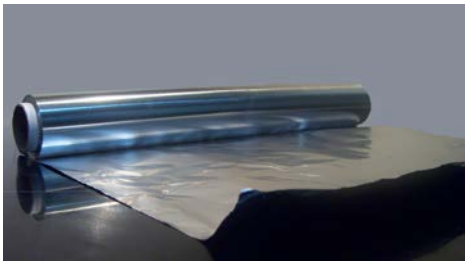
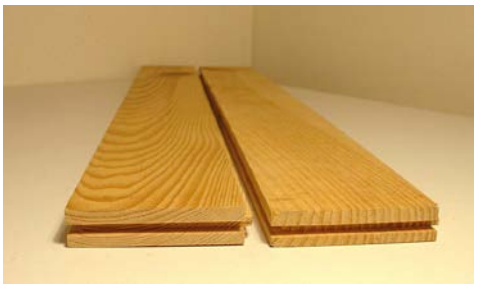
Day 3: Explore/ Explain (Optional activity at Woodworking Area) Materials- Changing Materials

Teacher Says/Does	Student Says/Does	Language requirements
1. Put on a *SAFETY FIRST button* to remind students to be careful when working in this area; *discuss* safety and the necessity of being calm and good listeners during this activity. 2. Tell students that they will need to listen very carefully. Provide specific instructions on how to hold and use the hammer. Have students discuss in partners and share their understanding of precautions with the rest of the class. Adapt and correct as necessary. 3. Demonstrate what happens when a hammer hits a piece of clay representing a finger, and then–if considered appropriate– have one student demonstrate how to hold a hammer properly and safely. 4. <u>If considered appropriate</u>, have all students try hammering piece of wood individually while you check their procedures such as safe placement of hands, use of clamp, etc. 5. Show the children how to use the adhesive, hand drill, stapler, and glue gun. Provide specific instructions for each one. If considered appropriate, let individual students try using each tool. 6. Use Handout **3.1.3** to have student pairs write down two precautions for each tool. Then, have each pair share with another pair. Discuss how important it is to take proper precautions when working with tools.	Students work at a woodworking area with tools and learn precautions when using them. We could use a hammer for____ We could use a drill for _____ A _____ would be a good tool to use on _____ if I wanted to _____. A _____ is not a good tool to use on _____.	precautions

Teacher Says/Does	Student Says/Does	Language requirements
7. Group Work: Provide a set of materials including cloth, plastic, foil and cardboard and a set of tools (could include scissors, crayons, hole-punch, duct tape or other strong tape, craft glue or wood glue) to each group of 4-5 students. Allow them to change each material with the different tools. 8. While groups are working independently, ask one group at a time if they would like to try to change one of their materials using either the hammer or the drill. 9. Come together after using tools. Have students share in partners: How did it feel to use the hammer? The drill? Why might we use a hammer? With which kinds of materials? Why might we use a drill? With which kinds of materials?		

Day 4: Elaborate/Evaluate Materials- Changing Materials

Extensions into the disciplines	Practical Extensions	Language requirements
1. Display the descriptions in handout **3.1.4**: guess the type of tool, do a choral reading of the descriptions, and have students guess the name of the tool. 2. Organize students in pairs and use the handout **3.1.5**: what would you use if you wanted to… Have students complete the handout. 3. Have students pick one favorite tool and write one paragraph describing its characteristics, how it is used, and safety rules tha are needed when using it. 4. Have groups give presentations to the class.	Students extend their conceptual understanding of tools and materials	

Material	Tool	What you do	Result
Paper	Scissors	cut	small pieces of paper
	Crayons		
	Tape		
	Whole-punch		
	Craft glue		

Sample sentence:

We can use scissors to cut paper and obtain small pieces of paper.

Taking Precautions with Tools

List two precautions to take when using each of the following tools.

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Guess the Type of Tool

1. I am heavy. I make loud noises. I am used to hang up heavy things. I can't do it by myself though. I usually need a nail to help. What am I?

2. I am sharp. You have to be very careful using me. I am used to cut a lot of things, but mostly not so tough things like hair, paper, and cloth. What am I?

3. I do not work alone. I make your job a lot easier because you don't have to turn your arm too much when you use me. I am used to attach different materials to each other. My partner is a screw. What am I?

4. I am sharp. I have sharp teeth. I am used to cut wood. What am I?

5. If you ever want to put a piece of paper in a binder, you probably need to use me first. Some people have gotten creative with my design, so I no longer only create circles, but lots of different shapes. I work best with paper. What am I?

6. I am very small and skinny. I am helpful when you want to make sure that two or more pieces of paper stay together in a certain order. I am very common, but you may not have though of me as a tool before. What am I?

7. I am metal. I have a flat top and pointy bottom. I can help you create a movable pivot point between two materials like cardboard and construction paper. What am I?

8. I am used all over the place. I can attach paper to paper, paper to a wall, string to paper, string to a wall; all kinds of things. You don't really need a lot of me, and you have to be careful when you use me because sometimes, I stick to myself. What am I?

What would you use if you wanted to…?

Hang up a heavy mirror?	
Cut a piece of cloth?	
Attach a piece of metal to a piece of wood?	
Cut a piece of wood?	
Put a piece of paper in a binder?	
Attach two pieces of paper?	
Create a movable pivot point between cardboard and construction paper?	
Attach a piece of paper to a wall?	