

Unit 2 (Materials): Connecting Materials

Concept There are different ways to connect different materials.

Content Objectives Students will use adhesives, nuts and bolts, brass fasteners and tape to connect wood, cloth, plastic, foil, paper, plastic, and cardboard.
Students will learn how materials can be connected using connectors.
Students will learn basic features of fasteners and bolts.
Students will learn different ways in which materials can be connected.

Language Objectives Students will learn the meaning of the word connector

Students will use the words: connectors, fasteners, and bolts as part of oral discussions

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-ETS1-2.** Make a drawing or physical model to illustrate how the shape of an object helps it to solve a problem.
- **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** Demonstrates 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:**

- **1C** Use strategic learning techniques such as concept mapping, drawing, memorizing, comparing, contrasting, and reviewing to acquire basic and grade-level vocabulary. [Metacognitive Strategies]
- **1H** Develop and expand repertoire of learning strategies such as reasoning inductively or deductively, looking for patterns in language, and analyzing sayings and expressions commensurate with grade level learning expectations

- **2D** Monitor understanding of spoken language during classroom instruction and interactions and seek clarification as needed [Comprehensible Input]
- **5B** Write using newly acquired basic vocabulary and content-based grade-level vocabulary

Tools

Hand drill; C-clamp; Hole punch; Scissors; tape dispensers; staplers; low temp glue gun

Materials

Wood; paper; cloth; foil; plastic; safety first buttons; white butcher paper (2 yards); recycled plastic items; Bolts; Paper Fasteners (i.e. brads) [Optional additional tools: Ratchet; grommet tool; riveter; soldering iron]

Handouts **3.2.1-3.2.6**

Literature

Zip It by Patricia Hegarty and Fhiona Galloway

Connections

Snap, Button, Zip: Inventions to Keep Your Clothes On by Vicki Cobb

Day 1: Engage/Explore

Teacher Says/Does	Student Says/Does	Language requirements
<ol style="list-style-type: none"> 1. Look around the room. Point out places where two or more pieces of material are connected, such as buttons that connect parts of clothing, bolts that connect desk parts, glue that connects paper, and so on. Ask questions to promote a discussion about how these materials are connected. 2. Display or distribute a graphic organizer (see Handout 3.2.1) and ask the students to turn to a partner, select three classroom materials that are connected, talk about the materials and how they are connected, and then share with the rest of the class. 3. Show samples of classroom materials that are not connected. Ask, “How might we connect cloth to wood?”, and go through the foil, paper, wood, and other materials, writing down student ideas on an experience chart: 4. With samples in hand, introduce connecting objects such as: thread, paper fasteners (brads), glue, nails, screws, bolts, and hinges, and mention one property of each. 5. Discuss the difference between a fastener and a bolt, and fill in diagram on 3.2.1. 6. Using Handout 3.2.2, have each pair write about their materials, then pass their writing to the pair on the right. 7. Then, have pairs read the paragraphs given to them and share with the class one aspect of interest from another pair. 	<ul style="list-style-type: none"> • Students talk about classroom materials that are connected • Students discuss differences between a fastener and a bolt 	<ul style="list-style-type: none"> • Connectors • Fastener • Bolt

Day 2: Explore/Explain

Teacher Says/Does	Student Says/Does	Language requirements
<ol style="list-style-type: none"> 1. Give students Handout 3.2.3 for writing down precautions, and tell them that they will need to observe a demonstration and write down the main precautions taken. 2. Demonstrate safe use of the adhesive(s), stapler, hand drill, and low temperature glue gun. (If you choose to employ a hot melt glue gun in some of these activities, be sure the children know it is for teacher use only.) Whatever adhesive material you have, look at the list of ingredients and read them aloud. 3. Organize students in groups, and have each student read to members in a group what they wrote down, then have a discussion, and have them add in more observations. Have one member of each group present to the class. 4. Explain to students that sometimes things are connected when they are arranged together, such as shoelaces, Velcro, and latches. Tell them that sometimes there are things we want attached only part of the time. 5. Using Handout 3.2.4, lead the class to identify examples of connections that allow movement, connections that allow unfastening without damage, and connections that can be re-fastened. 6. Have students form groups; have half the groups gather objects and classify them into connector categories, and the other half classify connectors into objects that go with them. Use a graphic organizer (see Handout 3.2.5 and 3.2.6). 	<ul style="list-style-type: none"> • Students learn about precautions when handling certain tools • Students learn about types of connectors and the materials that are associated with them 	<ul style="list-style-type: none"> • connectors • fasteners • bolt • stapler • hand drill • glue gun • adhesive material

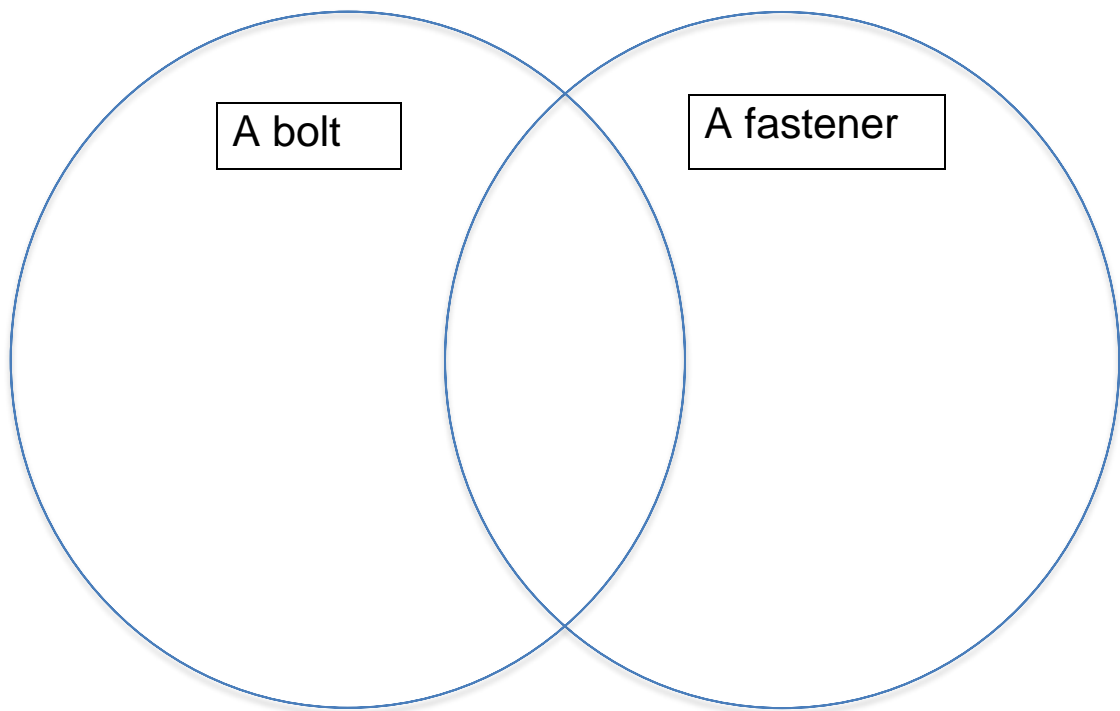
Day 3 Elaborate and evaluate

Extensions into the disciplines	Practical Extensions	Language requirements		
<p>1. Go on a tour of the school to see how different materials are connected.</p> <p>2. Begin an experience chart by placing a sheet of butcher paper on the floor, or make labels of the headings shown:</p> <div style="text-align: center; margin: 10px 0;"> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Materials to connect</td> <td style="padding: 5px;">Tools and conn</td> </tr> </table> </div> <p style="margin-left: 40px;">i.</p> <p>3. Have the children place the actual items on the floor chart.</p> <p>4. Have the building supervisor or another technician come in and demonstrate how to connect different materials. You may also like to ask the art teacher in your school to talk about means of connecting craft materials.</p> <p>5. Explain to the students that the Class Log will be used to document their activities and what they've learned. Begin writing in the Class Log: "Today we found out how to connect..." and write what connecting materials, tools and building materials were used. Also let them tell you what to write concerning teamwork: "Teams make us better workers because. . ." or some other generalization.</p> <p>6. Have each student investigate in his or her houses for connectors-at least one connector per student, and bring back a drawing and an explanation of how it works. Organize presentations for students to share from their home and school investigations and share in class</p>	Materials to connect	Tools and conn	<p>Today we found out how to connect ____ and ____.</p>	
Materials to connect	Tools and conn			

Graphic organizer to collect student ideas as part of a whole-group discussion

Material 1	Material 2	How they are connected
Foil		
Paper		
Wood		

Comparing a bolt and a fastener



The two connected materials that we selected were _____ and _____.

They are connected by a _____

Two materials that are connected by a fastener are _____ and _____

Two materials that are connected by a bolt are _____ and _____

One difference between a fastener and a bolt is _____

Our paragraph:

Handout for writing down precautions

	Write down precautions used by the teacher	
	Individual observation	After group discussion
Adhesive		
Stapler		
Hand drill		
Glue gun		

For whole group activity

Connected by being arranged together	
Connected by being attached	
Connections that allow movement	
Connections that allow fastening without damage	
Connections that can be re-fastened	

Sorting activity: choose three connector categories and identify materials that go with it

Connector category: _____	Connector category: _____	Connector category: _____
Materials :	Materials :	Materials :

Sorting activity: choose a material and then identify connectors that go with it

Type of material: _____	Type of material: _____	Type of material it can be used with: _____
Connectors	Connectors	Connectors