Let’s Learn About
WOOD & METAL

Quick View

What Can Be Created When Wood and Metal Are Used Together?

Take a fresh look at wood and metal to discover how these materials compare, contrast and combine to make innovative objects we use in our daily lives.

Materials
Wood and metal cooking utensils, gardening tools, hangers, spoons, picture frames, rakes, shovels, classroom/playground items, spring clothespins, tin cans of various sizes, drumsticks or dowels approximately 12 inches long, two colors of printer paper, ruler, wide craft sticks, brass paper fasteners, glue, scissors, paint (optional), markers or crayons, fine-tip black marker.

A more detailed list can be found on Page 2.

Standards
NCECDTL, ELOF: Goal IT -ALT 3, 4, 5, 6, 7, 8, 9; Goal P-ATL 6, 7, 8, 9, 10, 11, 12, 13; Goal P-LC 1, 2, 3, 4, 5, 6, 7; Goal P-LIT 4, 5; Goal IT -C 1, 2, 3, 5, 6, 7, 9, 10, 12; Goal P-MATH 7, 8, 10; Goal P-SCI 1, 2, 4, 5, 6; Goal IT-PMP 1, 2, 3, 4, 5, 6, 7, 8; Goal P-PMP 2, 3; Mi Standards SS 1, 3.

Model i Innovation Learning Framework
Throughout this lesson, there will be opportunities to bring in Model i’s Habits of an Innovator and Actions of Innovation.

More information on Model i can be found at: thf.org/education/teaching-innovation/modeli

Lesson Overview

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<th>STEAM</th>
<th>ELA/LIT</th>
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<td>Explore</td>
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<td>Create</td>
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<tr>
<td>Ask what students remember about metal and wood.</td>
<td>Have students explore everyday items made with metal and wood: clothespins, stools, desks, toys, picture frames, etc.</td>
<td>Make spring clothespin alligators or airplanes.</td>
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<tr>
<td>Show images from The Henry Ford of old tools. Would students like to use these old tools?</td>
<td>Explore classroom/playground for wood and metal items, and think about why these materials are used together.</td>
<td>Make tin can drums.</td>
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<tr>
<td>Explore classroom/playground for wood and metal items, and think about why these materials are used together.</td>
<td>Stay Curious, Collaborate, Uncover</td>
<td>Make pinwheels.</td>
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Explore
Activity — Touch Exploration
• In the classroom: wood and metal hangers, wood and metal cooking utensils, wood-handled hammers and screwdrivers, wood doors with metal hinges, cabinets, toys such as a xylophone, etc.
• Outside: wood-handled gardening tools, rakes, shovels, wood buckets with metal handles, playground equipment, wind chimes, etc.
• Teachers should provide as many examples of wood and metal objects as possible for touch exploration.

Discover
Activity — What Kinds of Products Can Be Made with Wood and Metal?
• Spring clothespins
• Wooden stools (screws hold together)
• Desks
• Toys
• Decorative picture frames

Create
Project One — Clothespin Alligators/Airplanes
• Spring-type clothespins
• Craft sticks (plain or colored), 2 ½ per plane
• Glue
• Scissors
• Markers or crayons

Create
Project Two — Tin Can Drums
• Tin cans, variety of sizes
• Wooden drumsticks or dowels
• Permanent marker (optional)

Create
Project Three — Pinwheels
• Two sheets of paper of different colors
• Ruler
• Scissors
• Paper fastener (alternative: use a pin and pencil with eraser)
• Drinking straw or wooden stick
Let’s Learn About
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Lesson Guide

Explore

Stay Curious, Collaborate, Uncover
What Do We Remember About Wood and Metals? What Ways Have Metal and Wood Been Used Together to Make Useful Tools? ............ Page 4
Activity: Touch Exploration ....... Page 4
Links & Photos ....................... Pages 5-17

Discover

Stay Curious, Collaborate, Uncover
Activity: What Kinds of Products Can Be Made with Wood and Metal? ...................... Page 18

Artifact of the Day

Stay Curious, Be Empathetic, Uncover
Stover Windmill ..................... Page 19
Link & Photo ............................ Page 20

Create

Design, Learn from Failure
What Can We Make with Wood and Metal?
Project 1: Clothespin Alligators/
Airplanes ......................... Page 21
Project 2: Tin Can Drums ......... Page 22
Project 3: Pinwheels ............... Page 23

Inspiring Stories

Be Empathetic
Read Stories to Inspire Your Students ..................... Page 24

Review & Extend

Stay Curious, Collaborate
Ask Students Specific and Open-Ended Questions .... Page 25
Family Connection ...................... Page 26
Coloring Sheet ........................ Page 27
Let’s Learn About
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What Do We Remember About Wood and Metals?
Teachers can ask students what they know about how wood and metal are used from previous lessons. Encourage students to talk about what is similar and what is different about the two materials.

What Ways Have Wood and Metal Been Used Together to Make Useful Tools?
Teachers can show students pictures to investigate objects made of wood and metal: plows and other agricultural implements such as the New York Dutch Plow, Swivel Plow, various hand tools, furniture, toys, even automobiles such as the 999 Race Car.
Ask students what they think about these implements or how they would like to use these old tools.

How Does Combining Wood and Metal Make a Better Tool?

Activity — Touch Exploration
Teachers can have students use tools that combine the two materials and think about reasons these two materials are used together.

Try Tools Such As:

- In the classroom: wood and metal hangers, wood and metal cooking utensils, wood-handed hammers and screwdrivers, wood doors with metal hinges, cabinets, toys such as a xylophone, etc.
- Outside: wood-handed gardening tools, rakes, shovels, wood buckets with metal handles, playground equipment, wind chimes, etc.

Links and photos for this section are on Pages 5-17.

Model i Innovation Learning Framework

Stay Curious, Collaborate, Uncover

- Ask questions like what, why, how.
- Talk about helping, working together.
- What do you see (characteristics, properties)? What problems does this material help us solve?
Let’s Learn About

WOOD & METAL INNOVATION LEARNING

Explore — Links

New York Dutch or Hog Plow, circa 1780
thf.org/collections-and-research/digital-collections/artifact/274280
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Explore — Links

Swivel Plow, circa 1890
thf.org/collections-and-research/digital-collections/artifact/37558
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Hammer, circa 1900

thf.org/collections-and-research/digital-collections/artifact/24633
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Explore — Links

Twist Auger, 1900-1920
thf.org/collections-and-research/digital-collections/artifact/208879
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Explore — Links

L. Miller & Son Store Display of Wood Chisels and Folding Rulers, 1923-1928

thf.org/collections-and-research/digital-collections/artifact/366977
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Explore — Links

Phonograph, 1925-1929
thf.org/collections-and-research/digital-collections/artifact/32072
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Explore — Links

Sideboard with Carving by Samuel McIntire, circa 1795-1805
thf.org/collections-and-research/digital-collections/artifact/266792
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Explore — Links

Child’s chair designed by Ray and Charles Eames, circa 1944

thf.org/collections-and-research/digital-collections/artifact/204331
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Explore — Links

Eames Molded Plywood Dining Chair, 1947-1983
thf.org/collections-and-research/digital-collections/artifact/178760
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Explore — Links

Musical Tall Case Clock, 1798-1799

thf.org/collections-and-research/digital-collections/artifact/133721#slide=gs-265672
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Explore — Links

Wood and Metal Model Train, 1990
thf.org/collections-and-research/digital-collections/artifact/307922#slide=gs-455580
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Explore — Links

Ford 999 Race Car, Henry Ford Driving, Spider Huff Riding on Side
thf.org/collections-and-research/digital-collections/artifact/10639
Let’s Learn About
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Explore — Links

Ford 999 Race Car, 1902-03, Driven by Barney Oldfield
thf.org/collections-and-research/digital-collections/artifact/104160
Activity
What Kinds of Products Can Be Made with Wood and Metal?

Students can explore what happens when you combine the two materials in everyday items like spring clothespins, wooden stools (screws hold together), desks, toys, decorative picture frames, etc.

What might make a spring clothespin better than a traditional one? What purpose do the screws serve in a wooden stool?

Students can find products that can be made of wood and metal by exploring their classroom or playground, weather permitting. Students may have experience with a playscape that is constructed of wood and metal or swings with chains and wooden seats.

Model i Innovation Learning Framework
Stay Curious, Collaborate, Uncover

- Ask questions like what, why, how.
- Talk about helping, working together.
- What do you see (characteristics, properties)? What problems does this material help us solve?
Let’s Learn About
WOOD & METAL

Artifact of the Day

What Is the Stover Windmill?
Teachers can show the images of the Stover Windmill and explain that people learned long ago to harness the power of wind and water.

Windmills are used more and more for home generation of electricity.

Additional Presentation
Invite a guest who has or uses windmill power, or who works in the industry, for students to see that old technology is in use again.

Model i Innovation Learning Framework
Stay Curious, Be Empathetic, Uncover

- Ask questions like what, why, how.
- How did the characters in the stories feel? How might the stories make others feel?
- What do you see (characteristics, properties)? What problems does this material help us solve?

Link and photo for this section is on Page 20.
Let’s Learn About WOOD & METAL INNOVATION LEARNING

Artifact of the Day — Links

Stover Windmill, circa 1883

thf.org/collections-and-research/digital-collections/artifact/95593#slide=gs-333912
Let’s Learn About
WOOD & METAL
Create — What Can We Make with Metal and Glass?

Project 1: Clothespin Alligators/Airplanes

Materials
- Spring-type clothespins
- Craft sticks (plain or colored), 2 ½ per plane
- Glue
- Scissors
- Markers or crayons

Instructions for Airplanes
1. Allow students to decorate two craft sticks for the wings and a clothespin for the body of their plane.
2. Cut a third craft stick in half horizontally for the tail (one half per plane). Allow students to decorate these.
3. Place one dot of glue on the bottom of the plane, just below the metal and glue one craft stick for the bottom wing.
4. Place one dot of glue on the top of the plane just below the metal so the wings are aligned.
5. Place one dot of glue near the end of the top of the plane, and attach the half craft stick as the tail. Allow to dry.

Instructions for Alligators
1. Allow students to color/paint the clothespin green.
2. Then using black markers, make nostrils, eyes and scales.

Model i Innovation Learning Framework

Design, Learn from Failure
- Make, build and create.
- Talk about “trying again,” what’s another way to...

Create — What Can We Make with Metal and Glass?
Let’s Learn About
WOOD & METAL
Create — What Can We Make with Metal and Glass?

**Project 2: Tin Can Drums**

**Materials**
- Tin cans, variety of sizes
- Wooden drumsticks or dowels
- Permanent marker (optional)

**Instructions**
1. Allow students to line up cans as drums.

**Model i Innovation Learning Framework**

**Design, Learn from Failure**
- Make, build and create.
- Talk about “trying again,” what’s another way to...

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![Tin Can Drums](image-url)
Let’s Learn About
WOOD & METAL
Create — What Can We Make with Metal and Glass?

Project 3: Pinwheels

To correlate with the Artifact of the Day, students can make pinwheels with construction paper (paper is made from wood), a craft stick and a metal fastener.

Materials

- Two sheets of paper of different colors
- Ruler
- Scissors
- Paper fastener (alternative: use a pin and pencil with eraser)
- Drinking straw or wooden stick

Instructions

1. Cut out a 6- by 6-inch square (the square can be larger or smaller).
2. If using a second sheet of paper, cut out the same size square and glue the two papers together back to back.
3. Use a ruler to trace a line from corner to corner.
4. Make a mark on each line 1/3 away from the center.
5. Cut along the lines you traced until you reach the 1/3 mark.
6. Bring the cut edges to the center of the square; do not fold flat. Overlap edges in the center.
7. Make a hole through all four edges in the center for the paper fastener (unless using a pin and pencil).
8. Make a small cut into the wooden stick or straw to allow the paper fastener through.
9. Stick the paper fastener into the wooden stick or the paper fastener into the straw or pin into the eraser of a pencil.

Model i Innovation Learning Framework

Design, Learn from Failure

- Make, build and create.
- Talk about “trying again,” what’s another way to...

Create — What Can We Make with Metal and Glass?
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Innovation Learning

Read Stories to Inspire Your Students

*The World of Farming: Farm Machines*
by Nancy Dickmann

*Whose Tools?*
by Toni Buzzeo and Jim Datz

Model i Innovation Learning Framework

Be Empathetic

- How did the characters in the stories feel?
- How might the stories make others feel?
Let’s Learn About
WOOD & METAL

Review & Extend

Ask Students Specific and Open-Ended Questions
- What did you think about the old farm tools?
- What would it be like to work with those old tools?
- What is your favorite activity from today?
- What happened in the story today?
- What would you make with wood and metal?

Model i Innovation Learning Framework
Stay Curious, Collaborate
- Ask questions like what, why, how.
- Talk about helping, working together.

Family Connection
Send the worksheet on Page 26 home with students to be completed at the end of the lesson.

Coloring Sheet
Have students color the picture on Page 27 as a part of the lesson, or send it home to be colored.
Let’s Learn About
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Take the Learning Home

We are learning about wood and metal as they are combined to make many items we use every day.

Please take your student on an "I Spy" adventure through your home and neighborhood to see what wood and metal items you can find. What are some of these things? Have them draw what they find.

These are some of the stories related to our learning. You might enjoy reading them with your student.

We Are Happy Farmers (Let’s Play Series) by Andrew Tlock

Eat My Dust! Henry Ford’s First Race by Monica Kulling

Raise the Roof! by Anastasia Suen
Ford 999 Race Car