Let’s Learn About
METAL & GLASS

Quick View

What Everyday Items Do We Create When We Combine Metal and Glass?

These activities draw upon two previously explored materials, metal and glass, to discover how those separate materials are combined to create useful new items we see every day.

Materials
Glass measuring cup, glass baking pan, metal measuring cup, metal baking pan, light bulb, metal picture frame, 8 glass jars the same size, water, food coloring, drumstick, baby food jars, small figure to fit in baby food jar, glue, glitter, glycerin, individual pictures of your students.

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, 4, 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

<table>
<thead>
<tr>
<th>STEAM</th>
<th>ELA/LIT</th>
<th>SS/HST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Explore</strong></td>
<td><strong>Discover</strong></td>
<td><strong>Create</strong></td>
</tr>
<tr>
<td>Ask what students remember about how we get metals and glass.</td>
<td>Explore around the classroom for items made when you combine metal and glass.</td>
<td>Make a water xylophone.</td>
</tr>
<tr>
<td>Explore everyday objects that are made of both metal and glass.</td>
<td>Identify items from their homes and around their neighborhood.</td>
<td>Make baby food jar snow globes.</td>
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<tr>
<td>Show and talk about the similarities and differences of metal and glass measuring cups and baking pans.</td>
<td>Make baby food jar picture frames.</td>
<td>Make baby food jar snow globes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Design</strong></th>
<th><strong>Inspiring Stories</strong></th>
<th><strong>Artifact of the Day</strong></th>
<th><strong>Review &amp; Extend</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stay Curious, Collaborate, Uncover</td>
<td>Read stories related to the learning: All in a Jam by Rebecca Bielawski and Pete the Cat's Groovy Bake Sale by James Dean.</td>
<td>Lamy's Diner. Explain that before fast-food restaurants like McDonalds, diner cars like Lamy's were where customers could stop to get a quick meal.</td>
<td>Ask students specific and open-ended questions.</td>
</tr>
<tr>
<td></td>
<td>Near Christmas, read The Night the Lights Went Out on Christmas by Ellis Paul.</td>
<td></td>
<td>Family Connection worksheet to send home.</td>
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<td></td>
<td></td>
<td></td>
<td>Coloring sheet to send home or work on in class.</td>
</tr>
<tr>
<td>Stay Curious, Collaborate, Uncover</td>
<td>Stay Curious, Be Empathetic, Learn from Failure</td>
<td>Stay Curious, Be Empathetic</td>
<td>Stay Curious, Collaborate</td>
</tr>
</tbody>
</table>
Let’s Learn About METAL & GLASS INNOVATION LEARNING

Materials

Explore

Activity — Touch Exploration

- Glass baking pan
- Metal baking pan
- Glass measuring cup
- Metal measuring cup
- Teachers should provide as many examples of metal and glass objects as possible for touch exploration.

Create

Project One — Water Xylophone

- 8 Mason jars with lids
- Water
- 8 different colors of liquid food coloring
- Pencils (chopsticks or drumsticks are other options)

Project Two — Baby Food Jar Snow Globe

- Baby food jars (or other similar size glass jar with lid)
- Small pine cone or other decorative figure that fits inside jar
- Water
- Glitter
- Glycerin (optional, available in a cake decorating section or drugstore)
- Confetti (plastic or metallic)
- Glue (hot glue gun optional)

Project Three — Baby Food Jar Picture Frame

- Baby food jars, larger size
- Self-sealing laminating sheets (optional: laminate pictures with laminating machine)
- Water
- Glitter
- Glycerin (optional, available in a cake decorating section or drugstore)
- Confetti (plastic or metallic)
- 2 copies of each student’s photo, 1/4- to 1/2-inch smaller than jar opening
Let’s Learn About
METAL & GLASS
Lesson Guide

Explore
Stay Curious, Collaborate, Uncover
How Are Metal and Glass Used? ............... Page 4
Activity: Touch Exploration ........ Page 4

Discover
Stay Curious, Collaborate, Uncover

Artifact of the Day
Stay Curious, Be Empathetic
Lamy’s Diner ......................... Page 6
Links & Photos ......................... Pages 7-8

Create
Design
What Can We Make with Metal and Glass?
Project 1: Water Xylophone .......... Page 9
Project 2: Baby Food Jar
  Snow Globes ............... Page 10
Project 3: Baby Food Jar
  Picture Frames .............. Page 11

Inspiring Stories
Be Empathetic, Learn from Failure
Read Stories to Inspire
Your Students ...................... Page 12

Review & Extend
Stay Curious, Collaborate
Ask Students Specific and
Open-Ended Questions .......... Page 13
Family Connection .................. Page 14
Coloring Sheet ...................... Page 15
Let’s Learn About
METAL & GLASS

How Are Metal and Glass Used?
Teachers can ask students what they remember about how we get metals (from the ground) and glass (from sand). What other characteristics of each do they remember?

Students can explore everyday objects that are made of both metal and glass. Then discover what bright ideas are made by combining both materials.

Activity
Touch Exploration
Teachers can show and talk about the similarities and differences of metal and glass objects such as measuring cups and baking pans:

- Which is heavier?
- Why would one work better for the task over the other?

<table>
<thead>
<tr>
<th>Glass baking pan</th>
<th>Metal baking pan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the job</td>
<td>Does the job</td>
</tr>
<tr>
<td>Heavier</td>
<td>Lighter</td>
</tr>
<tr>
<td>Thicker-longer baking time</td>
<td>Thinner-shorter baking time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Glass measuring cup</th>
<th>Metal measuring cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures ingredients</td>
<td>Measures ingredients</td>
</tr>
<tr>
<td>Breakable</td>
<td>Durable</td>
</tr>
<tr>
<td>See-through</td>
<td>Lighter</td>
</tr>
</tbody>
</table>

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?
Activity

What Can You Make with Metal and Glass?

Students can discover what innovative objects can be made when you combine metal and glass by exploring around the classroom.

Students might note windows, doors, light bulbs, computer screens, picture frames, etc.

Students may be able to identify items from their homes that are made with metal and glass, such as tables, dishes, picture frames, measuring cups and baking pans, etc.

Ask students about their neighborhood. Do they have metal and glass objects like traffic lights, storefronts, cars, trucks and buses.

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 METAL & GLASS

Artifact of the Day

What Is Lamy’s Diner?
Teachers can show the pictures of Lamy’s Diner and explain to students: Before fast-food restaurants like McDonalds, diner cars like Lamy’s were where customers could stop to get a quick meal.

Built in 1946 and made of metal and glass, this entire diner could be lifted onto rollers and moved like a mobile home. What a cool innovative improvement over the earlier horse-drawn lunch wagons!

Links and photos for this section are on Pages 7-8.

Model i Innovation Learning Framework
Stay Curious, Be Empathetic
• Ask questions like what, why, how.
• How might people have felt eating at a diner car, like Lamy’s, for the first time?
Let’s Learn About
METAL & GLASS

Artifact of the Day — Links

Lamy's Diner, 1946
thf.org/collections-and-research/digital-collections/artifact/188375#slide=gs-200328
Let’s Learn About
METAL & GLASS

Artifact of the Day — Links

Lamy's Diner, 1946
thf.org/collections-and-research/digital-collections/artifact/188375#slide=gs-195717
Let’s Learn About METAL & GLASS

Create — What Can We Make with Metal and Glass?

Project 1: Water Xylophone

Materials

- 8 Mason jars with lids
- Water
- 8 different colors of liquid food coloring
- Pencils (chopsticks or drumsticks are other options)

Instructions

1. Add water to jars in graduating amounts.
2. Add a drop of a different food coloring liquid to each jar. Screw jar lids on firmly.
3. Use pencils (chopsticks, drumsticks) to tap side of each jar to create different tones.

Model i Innovation Learning Framework

Design

- Make, build and create.
### Project 2: Baby Food Jar Snow Globes

#### Materials
- Baby food jars (or other similar-size glass jar with lid)
- Small pine cone or a decorative figure that fits inside jar
- Water
- Glitter
- Glycerin (optional, available in a cake decorating section or drugstore)
- Confetti (plastic or metallic)
- Glue (hot glue gun optional)

#### Instructions
1. Glue small pine cone or decorative figure to inside of jar lid. Let dry.
2. Fill jar with water.
3. Add glitter and confetti to water. (Optional: Add a drop of glycerin to prevent glitter from falling too quickly.)
4. Screw lid on firmly.
5. Turn upside down.

### Model i Innovation Learning Framework

#### Design
- Make, build and create.
Project 3: Baby Food Jar Picture Frames

Materials

- Baby food jars, larger size
- Self-sealing laminating sheets (optional: laminate the pictures with laminating machine)
- Water
- Glitter
- Glycerin (optional, available in a cake decorating section or drugstore)
- Confetti (plastic or metallic)
- 2 copies of each student’s photo, 1/4- to 1/2-inch smaller than jar opening

Instructions

1. Laminate students’ photos back to back with self-sealing laminating sheets or laminating machine. Rub out any bubbles and be certain edges of photo are sealed.
2. Cut excess lamination, leaving about 1/4 inch around edge.
3. Fill jar with water.
4. Add glitter and confetti. Adding a drop of glycerin will prevent glitter from falling too quickly.
5. Place sealed photo in jar.
6. Tighten lid firmly and turn jar upside down.

Model i Innovation Learning Framework

Design

- Make, build and create.
Let’s Learn About
METAL & GLASS
Inspiring Stories

Read Stories to Inspire
Your Students

All in a Jam
by Rebecca Bielawski

Pete the Cat’s Groovy Bake Sale
by James Dean

If completing lesson near Christmas, teachers may also want to read:

The Night the Lights Went Out on Christmas
by Ellis Paul

Model i Innovation Learning Framework

Be Empathetic, Learn from Failure

• How did the characters in the stories feel? How might the stories make others feel?
• Talk about “trying again,” what’s another way to...
Let’s Learn About METAL & GLASS

Review & Extend

**Ask Students Specific and Open-Ended Questions**

- Tell me what happened in the stories we read.
- What would you make using metal and glass?
- What did you like the most about the activities we did today?

**Family Connection**

Send the worksheet on Page 14 home with students to be completed at the end of the lesson.

**Coloring Sheet**

Have students color the picture on Page 15 as a part of the lesson, or send it home to be colored.

**Model i Innovation Learning Framework**

**Stay Curious, Collaborate**

- Ask questions like what, why, how.
- Talk about helping, working together.
Let’s Learn About
METAL & GLASS

Take the Learning Home

We are learning about how metal and glass 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 metal and glass items you can find. What are some of these things? Have them draw what they find.

You might continue the adventure on a shopping trip to see how many buildings and items you find that combine metal and glass.

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

Elphie and Dad Go on an Epic Adventure
by Hagit R. Oron

Practice Makes Perfect: Robert Can Learn to Do Anything
by D.J. Eva
Lamy's Diner