Let’s Learn About RUBBER

Where Does Rubber Come From? How Do We Use It?

Discover where rubber comes from and how this amazing material is used to make everything from tires to toys, elastic bands to gloves.

Materials

Rubber balls (air filled and solid), floor mats, door stops, erasers, rubber bands, boxes, pencil, corks or wood blocks, borax, white glue, cornstarch, food colorings, disposable gloves.

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-C1, 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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<tr>
<td>Explain origin of rubber and the search for alternate sources. Give various examples of rubber for students to feel and describe.</td>
<td>Show the Quadricycle and bicycles from the Wright brothers. Discuss other uses for rubber. Have students compare air-filled versus solid rubber balls and how each bounces.</td>
<td>Make a rubber band guitar with a box. Practice fine motor skills by unwrapping rubber bands from corks or wooden blocks. Make bouncy balls with cornstarch and white glue.</td>
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Let’s Learn About Rubber

Materials

Explore

Activity — Touch Exploration
- Pencil erasers
- Rubber balls
- Dustpan with rubber edge
- Step stool with rubber treads
- Gloves
- Rubber soles
- Doorstops
- Rubber bands
- Teachers can provide as many examples of glass as possible for touch exploration

Discover

Activity — Test Out the Qualities of Rubber
- Rubber play mats/doormats
- Rubber balls

Create

Project One — Rubber Band Guitar
- Empty sandwich bag, tissue or another box with a hole on one side
- 5 rubber bands, large enough to stretch around the box without crushing it
- Pencil

Project Two — Make Your Own Bouncy Ball
- 1/2 cup warm water
- 1 tablespoon borax
- 1 tablespoon cornstarch
- 2 tablespoons white liquid glue
- Food coloring
- Disposable rubber gloves (optional)

Project Three — Fine Motor Skill Practice
- Corks or wooden blocks
- Rubber bands in various sizes and colors
Let’s Learn About Rubber

Lesson Guide

Explore

Stay Curious, Uncover

Where Does Rubber Come From? .................. Page 4
Activity: Touch Exploration ........ Page 4
Links & Photos ......................... Pages 5-9

Discover

Stay Curious, Uncover

How Versatile
Is Rubber? ......................... Page 10
Activity: Test Out the Qualities of Rubber .......... Page 10
Links & Photos ....................... Pages 11-15

Artifact of the Day

Stay Curious, Uncover

1903 Model A ......................... Page 16
Links & Photos ....................... Pages 17-19

Create

Collaborate, Learn from Failure
Can Rubber Make Sound?
Project 1: Rubber Band Guitar ................. Page 20
What Can We Make with Rubber?
Project 2: Make Your Own Bouncy Ball .......... Page 21
What Games Can We Play with Rubber?
Project 3: Fine Motor Skill Practice ............... Page 22

Inspiring Stories

Stay Curious, Be Empathetic
Read Stories to Inspire Your Students .......... Page 23

Review & Extend

Stay Curious, Collaborate
Ask Students Specific and Open-Ended Questions .... Page 24
Family Connection ...................... Page 25
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Let’s Learn About RUBBER

Where Does Rubber Come From?

Rubber is a natural material, but it took inspired ideas to make it a useful material. Teachers can show students pictures of rubber trees being tapped for the rubber sap at Fordlandia, Henry Ford’s Brazilian plantation, to show where rubber comes from.

Innovators like Thomas Edison also experimented with creating man-made rubber.

Ask students what they remember about Thomas Edison. We learned about him when we talked about using sand to make glass, which he used for his light bulbs. We also learned about him when we talked about natural materials, where he used cotton thread and other materials for the light in the bulb.

Teachers can show students pictures of Edison and his Fort Myers Laboratory where he experimented with all kinds of plants, particularly goldenrod, looking for other sources of rubber.

Activity

Touch Exploration

Give students multiple examples of rubber items, and ask them what they feel like, how they are similar and different, and what else do they think might be made with rubber.

Common Rubber Objects

- Pencil erasers
- Rubber balls
- Dustpan with rubber edge
- Step stool with rubber treads
- Gloves
- Rubber soles
- Door stops
- Rubber bands

Conclude this part of the lesson by asking students how they use rubber in their home.

Links and photos for this section are on Pages 5-9.

Model i Innovation Learning Framework

Stay Curious, Uncover

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

Explore — Links

Fordlandia

thf.org/collections-and-research/digital-collections/artifact/99178#slide=gs-365619

thf.org/collections-and-research/digital-collections/artifact/146684#slide=gs-184165
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Tapping a Rubber Tree with Ford, Edison and Firestone

thf.org/collections-and-research/digital-collections/artifact/216612
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Explore — Links

Edison’s Fort Meyers Lab, 1885

thf.org/collections-and-research/digital-collections/artifact/26213
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Explore — Links

Thomas Edison Experimenting with Goldenrod as an Alternative Source of Rubber, Florida, 1929

thf.org/collections-and-research/digital-collections/artifact/197848
Let’s Learn About
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Goldenrod Plant at the Edison Botanic Research Laboratory,
Fort Myers, Florida, January 28, 1931

thf.org/collections-and-research/digital-collections/artifact/223242
How Versatile Is Rubber?

Teachers can show students pictures of the Wright Cycle Shop, where two brothers made and sold bicycles before they decided to figure out how to fly.

Ask students, “Does it surprise you that Henry Ford’s first car rode on bike tires? How are bicycle tires different from the tires on your family car?” Perhaps students can see cars outside the classroom to be able to compare.

Teachers can show students pictures of Henry Ford’s Bagley Avenue Workshop, where he built his first version of an automobile, the Quadricycle. Ford used bicycle tires to get his Quadricycle rolling. Ask students what is different about Henry Ford’s Quadricycle and their cars.

Teachers can explain that old tires can be ground up and used under football fields (like Ford Field), in playground bases, doormats, even shoes.

Activity

Test Out the Qualities of Rubber

Rubber can be hard or soft, both strong and stretchy.

Check out the rubber surface you play on if you have play mats, a rubber doormat, the rubber wheels on a cart, etc.

Students can put rubber to the test. See how different rubber balls bounce. Do solid rubber or air-filled rubber balls bounce higher?

Materials

• Rubber play mats/doormats
• Wheels on cart
• Rubber balls

Links and photos for this section are on Pages 11-15.
Let’s Learn About
RUBBER

Discover — Links

Wright Cycle Shop
thf.org/collections-and-research/digital-collections/artifact/146088
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Bagley Avenue Workshop
thf.org/collections-and-research/digital-collections/artifact/261678
Let’s Learn About
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Interior of Bagley Avenue Workshop in Greenfield Village, 1935

thf.org/collections-and-research/digital-collections/artifact/364739
Let’s Learn About RUBBER

Discover — Links

1896 Quadricycle

thf.org/collections-and-research/digital-collections/artifact/252049
Let’s Learn About

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Discover — Links

1896 Quadricycle, Henry and Clara Ford
thf.org/collections-and-research/digital-collections/artifact/447462
Let’s Learn About
RUBBER

Artifact of the Day

1903 Model A Tires

In 1906, Harvey Firestone sold 2,000 sets of tires to Henry Ford for his automobiles, the world’s largest order of automobile tires at the time. Teachers can show pictures of this early car, the 1903 Model A, and its tires to students and ask what they remind them of. Students should remember that Ford first used bicycle tires and his later tires are not much larger. Comparing these early cars to their family car, students can think about why modern cars need bigger tires.

Additional Presentation

Teachers can invite guests who work with tires, know about rubber plants, build rubberized playgrounds or have other related jobs.

Model i Innovation Learning Framework

Stay Curious, Uncover

• Ask questions like what, why, how.
• What do you see (characteristics, properties)? What problems does this material help us solve?

Links and photos for this section are on Pages 17-19.
Let’s Learn About RUBBER

Artifact of the Day — Links

1903 Model A

thf.org/collections-and-research/digital-collections/artifact/48168
Let’s Learn About
RUBBER
Artifact of the Day — Links

Automobile Tire & Spoked Wheel, circa 1910
thf.org/collections-and-research/digital-collections/artifact/141159
Let’s Learn About

RUBBER

Artifact of the Day — Links

Pair of Ford Model T Wheels with Tires, circa 1925

thf.org/collections-and-research/digital-collections/artifact/366885
Let’s Learn About
RUBBER
Create — Can Rubber Make Sound?

Project 1: Rubber Band Guitar
Stretch rubber bands around a box without its lid. Students can pluck and strum to hear the sounds. Use different thicknesses of rubber bands. Does this change the sound?

Materials
- Empty sandwich bag, tissue or another box with a hole on one side
- 5 rubber bands, large enough to stretch around the box without crushing it
- Pencil

Instructions
1. Place the pencil on the edge of the hole.
2. Wrap the rubber bands around the box, holding the pencil in place. This acts as a bridge, allowing the rubber bands to be plucked.
3. Option: Use varying widths of rubber bands to produce different sounds.

Model i Innovation Learning Framework
Collaborate, Learn from Failure
- Talk about helping, working together.
- Talk about “trying again,” what’s another way to...

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Let’s Learn About RUBBER

Create — What Can We Make with Rubber?

Project 2: Make Your Own Bouncy Ball

Materials

- 1/2 cup warm water
- 1 tablespoon borax
- 1 tablespoon cornstarch
- 2 tablespoons white liquid glue
- Food coloring
- Disposable rubber gloves (optional)

Instructions

1. Mix the warm water and borax in a cup.
2. In a separate cup, mix the glue, cornstarch, and food coloring.
3. Pour the glue mixture into the water-borax mixture.
4. The mixture will harden after 10 seconds. Use a fork to take it out of the water mixture. If the glue mixture is still sticky, squeeze it in your hands and dip back in the water.
5. Roll the mixture in your hands to make a ball. It becomes firmer with handling.

Model i Innovation Learning Framework

Collaborate, Learn from Failure

- Talk about helping, working together.
- Talk about “trying again,” what’s another way to...

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Create — What Can We Make with Rubber?
Let’s Learn About
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Create — What Games Can We Play with Rubber?

Project 3: Fine Motor Skill Practice

Materials

• Corks or wooden blocks
• Rubber bands in various sizes and colors

Instructions

1. Wrap rubber bands around a cork. Vary the number on each cork. Wrap some tightly and some loosely.
2. Have students remove the rubber bands one at a time. This requires the use of their fine motor skills.
3. Option: Have students practice counting skills by counting the numbers of rubber bands on various corks.

Model i Innovation Learning Framework

Collaborate, Learn from Failure

• Talk about helping, working together.
• Talk about “trying again,” what’s another way to...

Create — What Games Can We Play with Rubber?
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RUBBER

Inspiring Stories

Read Stories to Inspire Your Students

Bouncy Tires!
by Mary Tillworth

Ada Twist, Scientist
by Andrea Beaty

Model i Innovation Learning Framework

Stay Curious, Be Empathetic

• Ask questions like what, why, how.
• How did the characters in the stories feel? How might it make others feel?
Let’s Learn About RUBBER

Review & Extend

Ask Students Specific and Open-Ended Questions

• Tell me what happened in the story.
• What did you think about the old cars we saw?
• What other things do you think we could make with rubber?

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 25 home with students to be completed at the end of the lesson.

Coloring Sheet

Have students color the picture on Page 26 as a part of the lesson, or send it home to be colored.
Let’s Learn About RUBBER

Take the Learning Home

We are learning about rubber and the way it is used in many items around us every day.

Please take your student on an "I Spy" adventure through your home, and maybe your neighborhood (perhaps you have a playground with a rubber surface), to see what kinds of things are made with rubber.

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.

10 Little Rubber Ducks by Eric Carle
Gracie Goat’s Big Bike Race by Erin Mirabella
The Bike Lesson (The Berenstain Bears) by Stan and Jan Berenstain