

Properties of Materials Checklist

Developed by [Science Delivered](#) in close collaboration with the [California Reading and Literature Project](#) and [Elementary Institute of Science](#).

Find more resources at STEMTradingCards.org

Find all files below here:

https://drive.google.com/drive/folders/1PbAVTn7OiNeB_TZzxUTNT2i23dIPfCWT?usp=drive_link

This file is updated from time-to-time.

Week 0

Prelessons: *Introduction to Describing*

*The goal of the pre-lessons is to get students **explicitly** thinking about ways they can describe things.*

Week 0, Day 1

❑ **1A Discuss:** [Prelesson 1.1 Describing Stuff Part 1](#). Use the slides to have a class discussion on how to describe things. Recommended: bring a basketball into class. (15-20 min)

❑ **1B Read Aloud:** “Hairy, Scary Ordinary. What is an Adjective? By Brian Cleary



Week 0, Day 2

❑ **Simple Activity:** [Prelesson 1.1. Describing Stuff Part 2](#): Use the slides to guide the class on a “classroom treasure hunt” where students find objects with certain features. (15-20 min)

Week 0, Day 3

❑ **“Active” Worksheet:** [“Describing My Item”](#) Print the linked worksheet. Have students choose one object and describe. (20 min)

Week 0, Day 4

Do the two items below together:

❑ **4A: Read aloud:** “What Can You Do with a Line?” by Gülşah Yemen (15 min)



❑ **4B. Worksheet.** Print the worksheet [Making Lines](#). Have students make lines with different features. Students will need a pencil and crayons. (15 min)

Week 0, Day 5

❑ **“Active” Worksheet:** [“Ways to Describe Things - 1”](#) Choose to print the pdf (students will need scissors and a glue stick) or use Google Classroom.

Week 0 Review Questions:

- ❑ *What does it mean to “describe” something?*
- ❑ *What part of speech are “describing words”?*

Week 1: Describing. Introduction to Sorting & Categories

[Week 1, Day 1 : Students play the game "[Why Connect](#)" and consider the ways different items can be similar]

Week 1, Day 2

- ☐ 2A. **Video.** [Sorting & Categorizing. What Doesn't Belong?](#) From Mighty Owl Language Arts

- ☐ 2B. **Read Aloud:** "Sort it Out" by Barbara Mariconda



Week 1, Day 3

- ☐ 3A. **Worksheet:** "[Ways to Describe Things - 2](#)." Pick Version A or B or both.

In Version A students circle the answers.

In Version B students use a word bank to write answers.

Version A and B have different examples.

- ☐ 3B. **Read Aloud:** "The Crayola Sorting Book" from Crayola



Week 1, Day 4

- ☐ 4A. **Read Aloud:** "Sort it by Size" from Math Counts



- ☐ 4B. **Read Aloud:** "Sorting at the Market" from Math Around Us



Week 1, Day 5

- ☐ 5A. **Categorization Practice:** [This folder contains a Teacher's Guide and student sheets \(choose pdf printouts or Google Classroom\)](#). Choose one or two of the sheets to have students practice categorization. Students using the pdf printout will need scissors and

a

glue stick.

- ☐ 5B. **Writing.** Have students write about their categorization practice. Give students the sentence stem "One of my categories was _____. "I put these items into that category: _____."

Week 1 Review Questions:

- ☐ If you categorize by size, what are some categories you could make?
- ☐ If you categorize by material, what are some categories you could make?

Week 2: Sorting & Making Categories (Prelessons: What Sinks? What Floats?)

[Week 2, Day 1: “**Categorization with Buttons**” Learning² Instructor does word work with the verb “to sort” and possible with the noun “category”. Students play a version of 20 questions with buttons. Students sort their buttons into various categories.]

Week 2, Day 1

- ❑ **Writing Exercise:** Pick one of the writing exercises in [this folder](#).

Pick [Button Writing Follow Up "And/But"](#)

OR [Button Writing Follow Up - Who/What](#)

Week 2, Day 2

- ❑ **2A. Read Aloud:** “Polar Opposites” by Eric Brooks



- ❑ **2B. Worksheet:** [“Opposites”](#). Have students complete 1, 2, 3 OR 4 word sets.

Week 2, Day 3

- ❑ **3A. Book.** Read “Sorting by Texture” from *Math Counts*



- ❑ **3B. Simple Activity:** Have students pick an item to bring to the carpet (or you can tell them in advance to bring a small, inexpensive, unbreakable item from home). Put all the items

on the carpet. As a class, find fun and interesting ways to sort the items and make different categories.

Week 2, Day 4

- ❑ **4A. Categorization Practice:** [This folder contains a Teacher’s Guide and student sheets \(choose pdf printouts or Google Classroom\)](#). Choose one or two of the sheets to have students practice categorization. Students using the pdf printout will need scissors and a glue stick.

These are the same files from the week prior. Leave at least one sheet to use for an assessment.

- ❑ **4B. Writing.** Have students write about their categorization practice. Give students the sentence stem “One of my categories was _____.” “I put these items into that category: _____”

- ❑ **4C. Watch the video:** [“Science video for kids- Sink or Float Experiments”](#) from Ryan’s World (stop at minute 3:25)

Week 2, Day 5

- ❑ **5A. Categorization assessment:** [Pick a new sheet from this folder and assess students’ ability to categorize](#). The assessment can be done with printed pdf sheets (students need scissors and a glue stick) or on Google Classroom.

- ❑ **5B. Word work:** [Sink/Float: Find Files Here](#).

Week 2 Review Questions:

- ❑ What does it mean to “categorize” items?
- ❑ What are some ways you can sort or categorize items?

Week 3: What Sinks? What Floats? (+ Prelessons for Measuring Cubes)

[Week 3, Day 1: “What Sinks? What Floats?” The enrichment instructor reads *Blue Floats Away* by Travis Jonker. The instructor demos an investigation to see what sinks or floats. The students continue that investigation at their desks and collect data.]

Week 3, Day 2

- ❑ 2A Consolidate Learning: [“Sink Float Properties Follow-up” worksheet](#)

- ❑ 2B Read: *Swim Jim* by Kaz Windness



Week 3, Day 3

- ❑ 3A Read: “Does it Sink or Float” by Susan Hughes on Epic



- ❑ 3B Watch the video: [Ounces, Pounds, & Tons Song](#) (2:03) from *Math Songs* by Numberock

- ❑ 3C Experimental Design: [Testing if Items Sink or Float](#) Option to do this now or later! This is a worksheet-only intro to experimental design. It may be challenging. This could also be done at the end of the unit, after students have had more experiences with doing experiments. (We are working on worksheets if you actually want to do the activity)

Week 3, Day 4

- ❑ 4A Worksheet: [Speaking: Properties of my clothes](#)

- ❑ 4B Read Aloud (or Epic): *On the Scale a Weighty Tale* by Brian P Cleary



Week 3, Day 5

- ❑ 5A Watch the video: [Measuring objects using a ruler](#) (4:19) from *Boddle Learning*

- ❑ 5B Watch the video: [How to Use a Scale](#) (3:39) from *Science Delivered*

Week 3 Review Questions:

- ❑ What materials tend to float? What materials tend to sink?
- ❑ Do “heavier” (denser) items tend to sink? Do ALL heavy items sink? (Think of a boat)
- ❑ Pick up items around the classroom and ask “Is a property of [item x] that it sinks or floats?”

Week 4: Measuring Cubes (+ Prelessons for What Absorbs?)

[Week 4 Day 1. "**Measuring Cubes**" The instructor reads "How much does a Ladybird Weigh" by Alison Limentani. Students get 4 cubes made from 4 different materials. Students measure the side of the cubes with a ruler. Students then weigh each cube. They compare the cubes size and weight).

Week 4, Day 2

- ❑ 2A Consolidate learning: [Measuring Cubes Follow-up](#)
- ❑ 2B Watch the video: [Math Antics: Units of Distance](#) (watch up to 6:33) from math antics.
- ❑ 2C Watch the video: [What unit is mass measured in?](#) (3:52) from ClickView

Week 4, Day 3

- ❑ 3A Word work: [Measure & Weigh. Find the files here](#)
- ❑ 3B Video: [This Man Lives on an Island Paradise](#): Floating on Trash! *From The Science Channel* - focus on how the "empty" or air-filled water bottles help keep the man's island Afloat. REVIEW of Sink-Float

Week 4, Day 4

- ❑ 4A Video: [Hunting for Properties](#) (3:59) from CrashCourse Kids- don't worry about all the details of this video. Focus on how an item's measurements are one of its properties.
- ❑ 4B Worksheet: [Speaking and Listening: Properties](#)

Week 4, Day 5

- ❑ 5A Watch the video: [Sesame Street: Word on the Street Absorbs](#) (can stop at minute 2)
- ❑ 5B Discussion: Discuss **absorption** and how water interacts with different materials.

Week 4 Review Questions:

- ❑ What units do you use to measure length and height? What unit can you use to measure weight?
- ❑ Which material is heavier (denser)? Foam or acrylic?
- ❑ Find an item at your desk. Talk to your table partner about its properties.

Week 5: What Absorbs? Investigation (+ Prelessons for Watercolors Absorb)

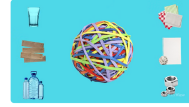
[Week 5 Day 1: “What Absorbs?” Enrichment instructor does word work with “absorb.”

Students investigate which materials do or don’t absorb water. Students take data.]

Week 5, Day 2

☐ **Consolidate Learning:** [“What Absorbs” Follow-up](#)

☐ **Watch the video:** [Materials and their Properties](#) (3:57) from ClickView



Week 5, Day 3

☐ **A Word Work:** [Repel](#)

☐ **B Watch the video:** [Inches, Feet and Yards song](#) (2:03) from Mathsongs by Numberrock
(measurement review)

Week 5, Day 4

The two lessons below go together. Watch the video first.

☐ **Watch the video:** [Comparing Cubes](#) (3:49) from ClickView

☐ **Worksheet:** [Comparing Cubes](#) (students think critically about how an item could be bigger and lighter than another item).

Week 5, Day 5

Do the two items below together:

☐ **A Watch the video:** [Different types of paints for beginners](#). (watch up to 6:15) From Fatema’s Art Show



☐ **B Worksheet:** [Different Types of Paints: Questions](#)

Week 5 Review Questions:

TBD

Week 6: Watercolors Absorb (+ Prelessons for “Superabsorbers”)

[Week 6 Day 1: “**Watercolors Absorb**” Learning² Instructor reads *Ablaze with Color. A Story of Painter Alma Thomas* by Jeanne Walker Harvey. Students do RESIST art - watercolor with crayon. The paper absorbs the water while the crayon repels it.]

Week 6, Day 2

- ❑ **Consolidate Learning:** [“What Absorbs Watercolors” Follow-up](#)

Week 6, Day 3

- ❑ **Video:** [Absorb & Repel](#) (5:04) from *Science Delivered*
- ❑ **Worksheet:** [What is a good material for a raincoat?](#) (connecting properties and function)

Week 6, Day 4

- ❑ **Read Aloud:** Flip Float Fly: Seeds on the Move by JoAnn Early Macken
- ❑ **Video:** [How do erasers erase?](#) from *Mystery Science* This is a fun video that talks about the properties of erasers and how they work. We put this in week 6 but it can be watched anytime.



Week 6, Day 5

- ❑ **5A Video:** [Harvesting Chia](#) (0:28) from *Mayorga Organics*
- ❑ **5B Video** (for fun): [Original Chia Pet Commercial](#) from *Retrobox*

Week 6 Review Questions:

TBD

Week 7: Chia Seeds Absorb(+ Prelessons for Gloves Investigation)

[Week 7 Day 1: “Chia Seeds Absorb” Learning² Instructor does a “magic trick demo” with superabsorbent diaper powder (don’t tell the students in advance!). Students explore the absorbency of chia seeds.]

Week 7, Day 2

- ❑ **Consolidate Learning:** [Chia Seeds Absorb Follow-Up](#)
- ❑ **Video:** [Brainpop Jr. Grams and Kilograms](#) (watch up to 2:45) (measurement review)

Week 7, Day 3

- ❑ **Reading & Questions:** [Chia Seeds Reading](#)
- ❑ **Video:** [The Unique Adaptations of Frogs’ Skin with Zookeeper Jawine Payne](#) (5:48) from *Science Delivered*. This video show another example of a “natural material” - frog skin - that absorbs water (and air!). Jawnie Payne is also a popular STEM Trading Card STEMist.

Week 7, Day 4

- ❑ **Video:** [Could you build a real house out of cookies and candy?](#) (6:54) from *Mystery Science* This video links properties to function, in addition to being fun!
- ❑ **Absorbency Categorization Practice:** [Use these files to have students categorize items that absorb and items that repel liquids.](#) This can be done with printed pdf sheets (students need scissors and a glue stick) or on Google Classroom.

Week 7, Day 5

- ❑ **Video:** Rewatch: [Absorb & Repel](#) from *Science Delivered*

Week 7 Review Questions:

TBD

Week 8: Gloves Investigation (+ Prelessons for A Whole from Parts w/ LEGOS)

[Week 8 Day 1: **“Gloves Investigation”** This week we apply what students have been learning about properties of materials in an investigation. Students investigate the properties of four different gloves and determine what the gloves are best used for based on those properties.]

Week 8, Day 2

- ☐ **Consolidate Learning:** [Gloves Follow-Up Questions](#)

Week 8, Day 3

Do the two items below together:

- ☐ **A Read Aloud:** Read either *Nian, the Chinese New Year Dragon* by Virginia Loh-Hagan OR *Me and My Dragon* by David Biedrzycki (or both)

- ☐ **B Worksheet:** [Dragon-Handling Glove](#) (20-30 min)



Week 8, Day 4

- ☐ **A Properties Assessment:** [Weeks 1-8](#)

- ☐ **B Read Aloud:** *Parts* by Ted Arnold To ensure this is conceptually relevant to the lesson series, focus on how many parts come together to make a whole. Also point out how some parts can be removed and go elsewhere.



Week 8, Day 5

- ☐ **A Video:** [Pati Jinich Dulce de Leche Caramel Cinnamon Banana Bread](#) from Pati Jinich Focus on the “parts” (ingredients) going into the recipe.

- ☐ **B Worksheet:** [What parts is it made from?](#)



Week 8 Review Questions:

TBD

Week 9: A Whole from Parts: LEGO Build (+ Prelessons for All About Air)

[Week 9 Day 1: “A Whole from Parts: LEGO Build” This week all students get the same set of LEGOs and see the different things they can build!]

Week 9, Day 2

- ☐ **Read aloud:** *Brick by Brick* by Heidi Woodward Sheffield

Focus on how the bricks (and mortar) are parts and pieces of a house or building. You can also compare the properties of LEGO bricks and real bricks.



- ☐ **Reading & Questions:** [Parts of a Whole](#), page 1-2

Week 9, Day 3

Do the two items below together. You can choose if it makes sense to read the book or watch the video first.

- ☐ **Video:** Watch and Discuss: [Watts Towers and Simon Rodia segment from INSPIRATION episode](#) (5:47) from *Craft in America*. Focus on the parts Simon Rodia used and the properties of those parts. Focus on how he reused trash. Good environmental message but also good for the idea of how matter is used and reused and reused (like atoms and molecules!)

- ☐ **Read Aloud:** *Dream Something Big: The Story of the Watts Towers* by Dianna Hutts Aston



Week 9, Day 3

- ☐ **Video:** [Wonderful Wool!](#) (3:06) OR [How is glass made?](#) (4:38) from *Mystery Science*
Wool coming from sheep and glass being made from sand are referenced in the “Parts” reading.

- ☐ **Reading:** [Parts of a Whole](#), pages 3-4

- ☐ **Video:** Watch and Discuss: [Do things exist that we cannot see?](#) (2:25) from *Science Delivered*

Week 9, Day 4

- ☐ **Reading:** [Parts of a Whole](#), page 5-6

- ☐ **Read Aloud:** *Water is Water* by Miranda Paul



Week 9, Day 5

- ☐ **5A Video:** Watch and discuss "[What is Air?](#)" from *Science Delivered*

- ☐ **5B Discuss:** Ask students: “Is air something or nothing?” and “Why do you think that?” Let them work through different ideas on this, as the answer is not always obvious. Conclude as a class that air is something.

Week 10: Properties of Air & Intro to Types of Gases

[Week 10 Day 1: Through demos and activities with the Learning² Instructor, students gather evidence that air is something and not nothing.]

Week 10, Day 2a

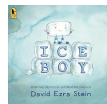
- ❑ **Consolidate Learning:** [All About Air- Follow-up](#)

Week 10, Day 3

- ❑ **Reading & Questions:** [All About Air - Reading & Questions](#)
- ❑ **Video:** [Solid, Liquid and Gas states of matter song](#), (2:16) from Silly School Education We recommend watching this multiple times so kids get parts in their heads. It will help them remember the vocab.

Week 10, Day 4

- ❑ **Reading & Questions:** [Liquids & Solids](#)
- ❑ **Read aloud:** Ice Boy by David Ezra Stein



Week 10, Day 5

- ❑ **Read Aloud:** Matter Comes in All Shapes by Darlene Stille
- ❑ **Video:** Watch and discuss [What is a gas?](#) (4:12) from fun science demos



Week 10 Review Questions:

TBD

Week 11: Fizzy Fun

[Week 11 Day 1: Students mix baking soda and citric acid to create carbon dioxide gas, which is present inside bubbles. [See instructions here](#). Students do word work for: solid, liquid, and gas.]

Week 11, Day 2

☐ **Consolidate Learning:** [Fizzy Fun Lab Report](#)

☐ **Video:** [Matter Chatter](#) (song about solids, liquids and gases) (3:15) from *Harry Kindergarten Music*. We recommend watching this multiple times so kids get parts in their heads. It will help them remember the vocab.

Week 11, Day 3

☐ **Read Aloud:** What is a Gas? by Jennifer Boothroyd



☐ **Video:** [Why can we see our breath in the cold?](#) (5:50) from Mystery Science

Week 11, Day 4

☐ **Reading & Questions:** [Gas](#)

☐ **Read Aloud:** Drop: An Adventure Through the Water Cycle by Emily Kate Moon
Focus on the three states that water can be in.



Week 11, Day 5

☐ **Reading & Questions:** [Types of Gases](#)

Week 12: Evaluation and beyond

[Week 12 Day 1: Students watch a review video, take an assessment (and go over the answers) and receive a small present. Even though our direct lessons are over we encourage you to continue with the extensions!]

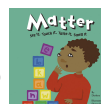
Week 12, Day 2

❑ **Reading & Questions:** [What is Matter?](#) *note this is a longer reading*

❑ **Video:** [The arrangement of particles in solids, liquids and gases](#) (2:27) from Edukite Learning

Week 12, Day 3

❑ **Read Aloud:** Matter: See it, Touch it, Taste it, Smell it by Darlene Stille



Week 12, Day 4

❑ **Read Aloud:** Fairy Science: Solids, Liquids, and Gassy by Ashley Spires



❑ **Categorization Practice:** [States of Matter Categorization](#) *Print single-sided*

Week 12, Day 5

❑ **Read:** Melting Matter by Amy S. Hansen



❑ **Video:** [What's the hottest place on Earth?](#) (7:21) from Mystery Science

❑ **Video:** [Shipping candles in the summer | My HOT car melted a candle | Candle Experiment](#) from She's Making a Home (7:30; **watch 1:45 - 5:03**; **NOTE** she says "b*tload" at 1:19, the link should start the video after this moment). *This is a video from a candlemaker about the issues with shipping candles in the heat because they melt. Have students notice the temperatures she records and the changes in the appearance and movement of the candle wax as the temperature gets higher. Watch out for language at 1:19.)*

Classroom Experiment Files

1. [What Happened to My Art?](#) (Color Bleaching) - a guided-inquiry activity where students develop an experiment to figure out why the color on construction paper fades.
2. [Spoons in the Sun](#) - a simple hands-on activity where students explore how heat and temperature affect metal objects.
3. [Ice Cubes in the Sun](#) - a simple hands-on activity where students explore how heat and temperature affect ice cubes.
4. [Learning About Dissolving](#) - a simple hands-on activity where students explore dissolving.
 - First watch [Why is the Ocean Salty](#) (6:04) from Mystery Science
 - Don't forget to do the "Absorb, dissolve, and melt" follow-up sheet (in folder).

Additional videos that may be of interest

[How is plastic made?](#) (5:16) from Mystery Science

[How do they turn wood into paper?](#) (4:35) from Mystery Science

[Where does metal come from?](#) (4:28) from Mystery Science

[How are pencils made?](#) (5:42) from Mystery Science

[How is money made?](#) (5:38) from Mystery Science

[How is gold made?](#) (5:32) from *Mystery Science*
[How are diamonds made?](#) 5:41 from *Mystery Science*
[How do bees make honey?](#) (5:49) from *Mystery Science*
[How were LEGO Bricks invented?](#) (8:28) from *Mystery Science*
[What is dust?](#) (6:45) from *Mystery Science*
[Where does chocolate come from?](#) (6:01) from *Mystery Science*
[How crayons are made](#) (7:44) from *Factora*

Integrating with [SDUSD's STEAM curriculum](#)

The Properties of Materials lessons here address the same [Matter and its Interactions](#) standards as SDUSD's [Mix it Up lessons](#). There are two sections of the Mix It Up Unit we really like (and two we really dislike).

Check out:

Lesson 5: Discusses dissolving

Lesson 6: Includes heating and cooling activities.

We do NOT recommend most of Lessons 3 & 4 in Mix it Up,

Issues with Lesson 3:

- A large part of lesson three is having students keep a food log and discussing how they can make their diets healthier. Many or most students do not have control over their diets. This also may feel invasive for some students.
- Telling students to eat $\frac{1}{4}$ grow, $\frac{1}{4}$ go and $\frac{1}{2}$ glow foods is overly prescriptive. It is also highly impractical, many foods are mixtures of these categories and serving sizes can be challenging to determine without measuring cups and scales, even for adults.
- Way too much time is spent on classifying foods as “glow, grow, or go” foods. We’d much prefer to see class time being spent on more concrete concepts like learning about meats, grains, fruits and vegetables etc. and/or proteins, fats, fiber, sugar etc.

Issues with Lesson 4:

- A large portion of lesson four “matches” fruit & vegetables colors with the purported healthy effects on the body.

We agree that “eat the rainbow” is good nutrition advice. However, nutrition research is notoriously difficult. Saying that “red foods are good for the heart, yellow are good for the immune system,” etc, *is overly reductive to the point of being incorrect*. (Most nutrients are typically important for multiple aspects of health).

Further, these STEAM units can be light on content knowledge. Spending time having students memorize these reductive color-body connections is not a good use of classroom time.

- As an alternative, students could learn about different parts of their body and learn that fruits and vegetables, generally, are important for keeping our systems running smoothly. They could learn some of the most well established nutritional information, like that ONE role of calcium is helping us keep healthy bones and calcium is found in dairy, leafy greens, and other foods.

