Chapter 14

Crayons

Description

Crayons provide a fun and familiar context for learning about science and engineering. Students observe their properties; explore how they can be changed by breaking, melting, and cooling; and learn the many steps involved in manufacturing crayons. After designing their own process for recycling broken crayons, they demonstrate their understanding through a creative writing activity.

Suggested Grade Levels: K–2

LESSON OBJECTIVES Connecting to the *Framework*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Planning and Carrying Out Investigations Obtaining, Evaluating, and Communicating Information	**PS1.B:** Chemical Reactions **ETS1.A:** Defining and Delimiting Engineering Problems	Energy and Matter Cause and Effect

Featured Picture Books

TITLE: ***The Day the Crayons Came Home***
AUTHOR: **Drew Daywalt**
ILLUSTRATOR: **Oliver Jeffers**
PUBLISHER: **Philomel Books**
YEAR: **2015**
GENRE: **Story**
SUMMARY: *In this clever story of Duncan's crayons, a colorful bunch that have survived a series of misadventures, each color has a tale to tell and a plea to be brought home to the crayon box.*

TITLE: ***From Wax to Crayon***
AUTHOR: **Robin Nelson**
PUBLISHER: **Lerner Classroom**
YEAR: **2013**
GENRE: **Non-Narrative Information**
SUMMARY: *Simple text and full-color photographs describe each step in the production of crayons—from melting wax to coloring a picture.*

Chapter 14

Time Needed

This lesson will take several class periods. Suggested scheduling is as follows:

Day 1: **Engage** with Mystery Object and *The Day the Crayons Came Home* Read-Aloud and **Explore** with Crayon Observations and Crayon Questions

Day 2: **Explain** with Card Sequencing, *From Wax to Crayon* Read-Aloud, and Melting Crayons Demonstration

Day 3: **Explain** with "How People Make Crayons" Video and Favorite Crayon Colors Graph

Day 4: **Elaborate** with Crayon Recycling Design Challenge

Day 5: **Evaluate** with Postcard From a Crayon

Materials

For Mystery Object

- Paper bag
- 1 crayon of any color

For Crayon Observations

- Crayons to be observed and broken (1 per student; to make wrapper removal easier, you can pre-score the wrappers with a knife before giving the crayons to students)
- Ruler (1 per student)
- Box of crayons, any size

For Crayon Recycling Design Challenge

- Ovenproof, nonstick or silicone candy-making or baking molds; silicone ice cube trays (interesting shapes are fun; you will need 1 cavity per student); or silicone muffin cups (1 per student)
- Cookie sheet
- Nonstick spray
- Oven or toaster oven (for teacher use only)

For Card Sequencing (per group of 2–4 students)

- Precut How Crayons Are Made Cards in plastic sandwich bags

For Melting Crayons Demonstration

- Blowdryer (for teacher use only)
- Cardstock
- Several colors of unwrapped crayons
- Hot glue gun (for teacher use only)

SAFETY

- Be careful when using hot appliances and hot or liquid wax in the classroom, and keep those items away from children.
- Melting crayons can produce irritating fumes. Before heating crayons, make sure the room has proper ventilation.

Student Pages

- Crayon Observations
- Postcard From a Crayon template
- STEM at Home

Background for Teachers

Crayons have been an important staple of the elementary classroom for many years. They were first invented to solve a problem voiced by many teachers in the late 19th century: the need for an affordable writing and drawing tool available in a wide variety of colors that was safe for classroom use. Artists' wax crayons were available, but many brands were expensive and often contained toxic pigments. The Binney & Smith chemical company of Pennsylvania came up with a solution. In 1903, it introduced the first box of Crayola brand crayons for children. The crayons, made of paraffin wax and colorful, nontoxic pigments, were individually wrapped in paper and labeled with their colors. Each box of eight crayons cost a nickel. Edwin Binney's wife, Alice Stead Binney, is credited with coming up with the name Crayola from the French words *craie,* meaning "chalk," and a shortened form of *oléagineux,* meaning "oily."

Although several crayon companies competed in the lucrative school market before Crayola did, the Crayola name is by far the most famous. The first box contained the colors red, orange, yellow, green, blue, violet, brown, and black. Now, there are 120 colors of Crayola crayons. Crayola has a team of chemists and chemical engineers who are in charge of developing new crayon colors. Their laboratory holds the secret formula to every crayon color! The engineers experiment with different color combinations to come up with new shades. When they discover a promising new color, they test it on hundreds of kids to see whether children like it. After extensive testing and further product development (including the invention of a catchy, descriptive name), a new crayon is ready for the box. Some of the improvements to the original 8-pack of Crayola crayons include a 48-color "stadium seating" box, a 64-color assortment with a built-in sharpener, washable and twistable versions, and crayons with glitter.

The invention, design, and manufacture of crayons demonstrate the intersection of science, technology, and engineering. This lesson also demonstrates how science and art intersect. Students are inspired by a picture book to think about all of the ways crayons can be changed. Then, they explore the properties of crayons and learn that by adding heat, crayons can be changed from solid to liquid. Students also learn that sometimes changes in matter are reversible, and sometimes they are not. Students observe how crayons are manufactured and design a process for creating crayons of mixed colors and different shapes out of crayon pieces. Finally, students creatively write about the changes their crayons experienced.

Chapter 14

engage

Mystery Object

Inferring

In advance, hide a crayon in a mystery bag (a paper bag with a question mark on it will do just fine). Tell students that you have a mystery item in the bag, and give them some clues about the item: It is red, you can draw with it, and so on. Allow students to guess after each clue. When they have guessed correctly, pull out the crayon and show it to them. Say, "You may think this crayon is ordinary, but by the end of this lesson, you will think that crayons are extraordinary!"

The Day the Crayons Came Home Read-Aloud

Connecting to the Common Core
Reading: Literature
Key Ideas and Details: K.1, 1.1, 2.1

Determining Importance

Show students the cover of *The Day the Crayons Came Home.* Introduce the author, Drew Daywalt, and illustrator, Oliver Jeffers. Tell students that as you read the book, you would like them to notice all of the different things that happen to the crayons and the ways the crayons in the book are changed. Then, read the book aloud, using a different voice for each crayon (you will be discussing point of view later).

Questioning

After reading, *ask*

- ? Is this book fiction or nonfiction? (fiction)
- ? How can you tell? (It's a pretend story with characters, dialogue, setting, plot, etc. It doesn't have any of the features of nonfiction, such as a table of contents, headings, bold print words, an index, etc.)

Connecting to the Common Core
Reading: Literature
Craft and Structure: K.6, 1.6, 2.6

Ask

- ? Who's telling the story? (The story opens and closes with a narrator, but each page in between is told from the points of view of the crayons.)
- ? How does the text show the crayons' points of view? (The first page of each two-page spread is a postcard written by a different color of crayon. The postcard is written using words such as *I, we, my,* and *me,* which tells us that the crayon wrote it.)
- ? Why do you think the author, Drew Daywalt, wrote the book this way? (It's funny, it gives the reader a different perspective on crayons, etc.)
- ? How does the illustrator, Oliver Jeffers, help tell the story? (One page of each two-page spread features a handwritten postcard in the actual color of the crayon speaking. Each crayon has a different kind of handwriting to help show that a new character is being introduced. The other page is a drawing or collage illustrating the crayon's adventures.)

You may want to have students view the video "Oliver Jeffers: Picture Book Maker" to get a fascinating (and very funny!) behind-the-scenes view of how he writes and illustrates picture books (see "Websites" section).

Together, recount some of the ways the crayons were changed in the book: broken, melted by the Sun, chewed by a dog, sharpened, melted in the dryer, and so on. Tell students they are going to learn both science and engineering concepts by observing crayon properties, exploring how crayons can be changed, and learning how crayons are made.

Observing and measuring crayons

explore

Crayon Observations

Connecting to the Common Core
Mathematics
Measurement and Data: 2.MD.1

First, hold up a crayon and *ask*

? After reading the book *The Day the Crayons Came Home,* what are you wondering about crayons? (Answers will vary.)

? What properties of this crayon could we observe? (color, length, shape, etc.)

Then, give each student a crayon, a ruler, and a Crayon Observations student page. Using the crayon, students should first draw a detailed picture of the crayon. Next, have them remove the wrapper from the crayon, and ask them to use all of their senses (except taste!) to make and record observations of the crayon. Observations should include the color, shape, odor (smell), and texture (feel) of the crayon. Review how to measure objects with a ruler, and have students measure and record the length of the crayon. Then, have them list some ways that they could change the crayon. *Ask*

? Do you think your crayon is a solid, a liquid, or a gas?" (solid) Why do you think so? (Answers will vary, but students may mention that a solid keeps its shape.)

? What are some ways you could change your crayon? (breaking, melting, sharpening, etc.)

Have students break the crayon into three or four smaller pieces. Then, *ask*

? How is your crayon different now? (more pieces, shorter lengths, different shapes, etc.)

? How it is the same? (still draws, same color, same odor, etc.)

? Is your crayon still a solid? (yes)

? Is it possible to change a crayon from a solid to a liquid? (Answers will vary.)

? How do you think you could change your crayon from a solid to a liquid? (Answers will vary.)

(*Note:* Each student should save his or her own crayon pieces, because students will be using the pieces in the elaborate activity.)

Crayon Questions

Questioning

Next, show students a box of crayons. *Ask*

? Now, what are you wondering about crayons? (Answers will vary.)

Turn and Talk

Have students share their wonderings with a partner, and then record some of their questions on a

"Crayon Questions" class chart. Ask students how each question could be answered (e.g., by doing research, asking an expert, or conducting an experiment). Then, add the following questions to the list (if they are not already on it):

- ? Where did this box of crayons come from?
- ? What are crayons made of?
- ? How do they get their shape?
- ? How do they get their wrappers?
- ? How did all of these colors end up in one box?

Discuss each question with your students, and allow them to share their ideas (responses will vary).

explain

Card Sequencing

Tell students that you have a book and a video that will answer many of their questions. But first, you would like them to try to put the steps of crayon-making in order.

Sequencing Before Reading

Give each group of two to four students a set of precut How Crayons Are Made Cards. Challenge them to put the cards in order to show the steps needed to manufacture, or make, crayons in a factory. Tell them that they will have an opportunity to reorder the cards as you read a book about the crayon-making process.

From Wax to Crayon Read-Aloud

Using Features of Nonfiction

Connecting to the Common Core
Reading: Informational Text
Craft and Structure: K.5, 1.5, 2.5

Have students compare their card sequences with those of other groups and explain their thinking. Then, show them the front cover of *From Wax to Crayon* and introduce the author, Robin Nelson. Share this brief biography of the author from the publisher's website (*www.lernerbooks.com/contacts/403/Robin-Nelson*): "Robin Nelson's jobs have always kept her surrounded by books—as an elementary teacher, working at a publishing company, and working in a library. But her favorite job is writing books for kids. She has written more than 140 nonfiction books for children. She lives with her family in Minneapolis."

Ask

- ? What are some clues that a book is nonfiction? (It has a table of contents, bold print words, a glossary, an index, etc.)

Flip through the book, pointing out that it does have many of the features of nonfiction (table of contents, photographs, bold print words, glossary, and index). Next, show students the back cover of the book. Explain that many books have a short summary on the back cover that can give the reader an idea of what the book is about. Read the description, and ask students if they think this book will be a good choice for answering some of their questions. Next, open to the table of contents, and explain that this feature also gives the reader an idea of what information a nonfiction book contains. By skimming the table of contents, they will see that the book begins with wax being melted and ends with a child using crayons to draw a picture, with many steps in between.

Connecting to the Common Core
Reading: Informational Text
Key Ideas and Details: K.1, 1.1, 2.1

Sequencing After Reading

Read the book aloud, giving students the opportunity to reorder their How Crayons Are Made Cards as you read. The cards should be sequenced in the following order:

1. Wax melts.
2. A worker adds color.
3. The wax is shaped.
4. The wax gets hard.
5. A worker checks the crayons for chips or dents.
6. A machine wraps the crayons.
7. A machine sorts the crayons.
8. The crayons are boxed.
9. The crayons are sent to stores.
10. I draw pictures with many colors.

Questioning

Then, revisit your class list of crayon questions and have the students use evidence from the text to answer the questions. Next, have students discuss the following questions, each time referring to the text for evidence to support their answers.

- How does the wax turn into a gooey liquid? (p. 4—it is heated in large tanks.)
- How is the wax made into the shape of a crayon? (p. 8—it is poured into a mold.)
- How does the wax become solid again? (p. 10—cold water flows under the mold.)
- When a worker finds a crayon with chips or dents, what does he or she do with it? (p. 12—melts it and molds it again.)

Tell students that melting wax is an example of a *reversible change.* Write "reversible change" on the board, and explain that many things can change from one state of matter to another and back again. For example, water can change from a solid (ice) to a liquid and then back to a solid. *Ask*

- What can you do to ice to change it to a liquid? (heat it or melt it)
- How can you reverse the change and make water become solid again? (cool it or freeze it)
- What can you do to solid wax to change it to a liquid? (heat it or melt it)
- How can you reverse the change and make wax become solid again? (cool it or freeze it)

Explain that liquid wax differs from water in that it becomes a solid at room temperature: You don't have to put it in a freezer to make it solid. In the book, cooling with water makes the wax harden into a solid.

Melting crayons demonstration

Melting Crayons Demonstration

Tell students that you can show them how wax can change from a solid to a liquid and back again. Hot glue several colors of unwrapped crayons to a piece of cardstock. Have students watch and make observations as you use a blow-dryer on high heat to melt the crayons. After the wax has cooled and dried (wait about 30 sec.), have students feel the hardened wax.

Ask

- What changes did you observe? (The solid wax slowly started dripping down the paper as the crayons melted and turned into a liquid. Then, more and more of the wax melted and dripped down the paper. Finally, the wax hardened after the blow-dryer was taken away.)
- How does this demonstration show a reversible change? (Heat melted the solid wax into a liquid, but the change was reversible because the liquid wax hardened back into solid wax when it cooled.)

Challenge the students to work with a partner and think of a change that is *not* reversible. For example, when you boil a raw egg (which contains mostly liquid material), it becomes a solid. Cooling the egg will not reverse the change; it remains solid.

"How People Make Crayons" Video

Connecting to the Common Core
Reading: Informational Text
Key Ideas and Details: K.1, 1.1, 2.1

Making Connections: Text to World

Tell students that you have another resource to help them better understand how crayons are made. Show students the PBS Kids Daniel Tiger's Neighborhood video "How People Make Crayons" in which a young girl gives a tour of a crayon factory (see "Websites" section). As they listen and watch, have them think about the information from the video and how it relates to what they learned in the book *From Wax to Crayon.*

Connecting to the Common Core
Reading: Informational Text
Integration of Knowledge and Ideas: K.9, 1.9, 2.9

After watching, discuss how the video compares with the book. *Ask*

? What is the same? (The video and the book feature many of the same steps in the crayon-making process, such as melting wax into a liquid, adding pigment, pouring wax into molds, hardening wax into a solid, wrapping crayons, boxing crayons, etc.)

? What is different? (The video ends in the factory, whereas the book shows a truck transporting the crayons to stores. In the video, we can see all the steps in action and get a better look at the machinery. The book is divided into sections, but the video is one continuous stream of information that is narrated and set to music.)

? Does the video provide any new information? (In the video, a "secret ingredient" [white powder] is stirred into the vat to help harden the wax before the pigment is added. We also see how all the different-colored crayons are brought in big boxes to one giant room in the factory, where they are placed into the machine that puts them into smaller boxes.)

Challenge the students to think about all of the science and engineering involved in making an ordinary crayon! *Ask*

? How do you think scientists and engineers might be involved in making crayons? (Answers will vary, but students may mention that scientists test different types of wax and pigments, and engineers use that information to figure out how to turn the raw materials into the best crayons possible. Engineers design every step of the crayon-manufacturing process, from the tanks that heat and melt the wax to the packing machines that put the crayons into boxes.)

? How do you think new crayon colors are invented? (Answers will vary, but explain that the first box of crayons sold by Crayola contained the colors red, orange, yellow, green, blue, violet, brown, and black. Now, there are 120 colors of Crayola crayons. Crayola has a team of chemists and chemical engineers who are in charge of developing new crayon colors. Their laboratory holds the unique, top-secret formula to every crayon color! The engineers experiment with different color combinations to come up with new shades. When they discover a promising new color, they test it on hundreds of kids to see how well the children like it. After a lot more testing and the invention of a catchy, descriptive name, a new crayon is ready for the box.)

? What is your favorite crayon color? (Answers will vary.)

Connecting to the Common Core
Mathematics
Measurement and Data: 2.MD.10

Favorite Crayon Colors Graph

Next, have students write their favorite crayon color on a sticky note or color a sticky note with their favorite color. Have them place their sticky notes on a whole-class bar graph with "Favorite Colors" on the *x*-axis and "Number of Votes" on the *y*-axis. Analyze the results together. Then, share with students that most kids around the world choose blue or red as their favorite crayon color. *Ask*

? How do our results compare with the favorite crayon colors of kids around the world? (Answers will vary.)

elaborate

Crayon Recycling Design Challenge

Connecting to the Common Core
Reading: Literature
Key Ideas and Details: K.1, 1.1, 2.1

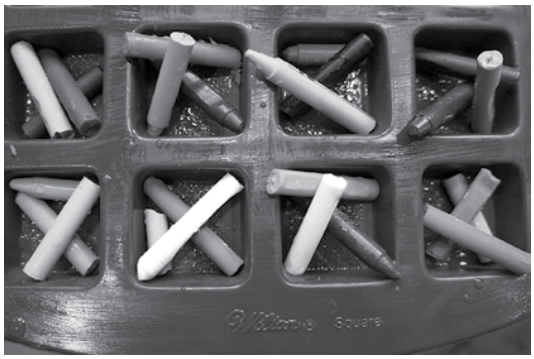
Tell students that you have an exciting challenge for them, but first you want to revisit *The Day the Crayons Came Home*.

Questioning

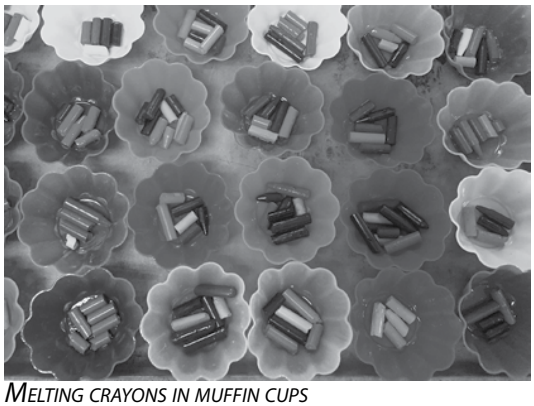
Refer to the pages of *The Day the Crayons Came Home* where the crayons melted. Reread pages 27–28 about the turquoise crayon that melted in the dryer. *Ask*

? Why would a crayon melt in a dryer? (It is hot in the dryer.)

? How did the turquoise crayon get in the dryer?" (Duncan left it in his pocket.)



Melting crayons in a mold



Melting crayons in muffin cups

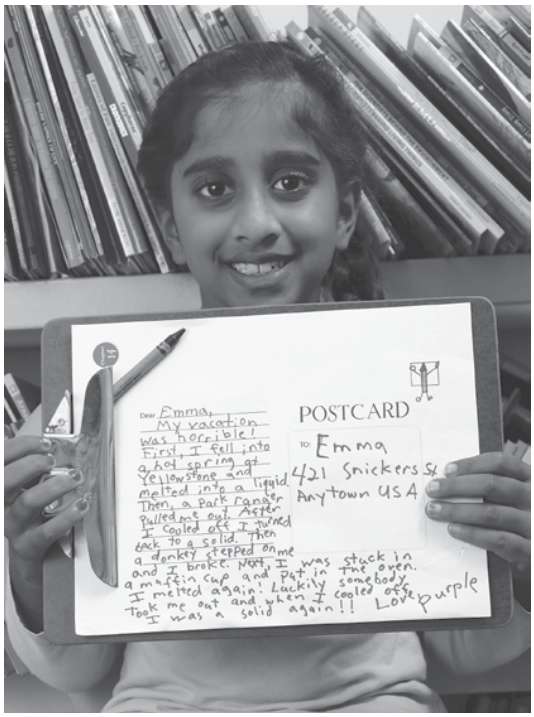
? Why it is a bad thing if a crayon gets in the dryer? (It melts and gets stuck in the clothes.)

Next, revisit pages 13–14 about the orange and red crayons that melted together. *Ask*

? Why did the red and orange crayons melt? (They were left in the heat of the Sun.)

Students should realize that because crayons are made of wax, they will turn to liquid when heated and become solid again when they are cooled.

Next, have students look at the crayons they broke during the explore phase of the lesson. Tell them that broken crayons aren't very useful, which is why we often discard them. But perhaps there is a way to recycle the broken crayons! Tell students that you have a design challenge for them: Come up with a simple and safe way to recycle the crayons into new crayons. Remind students that engineers designed every component of the crayon-making process—from the tanks that heat and melt the wax



Postcard from a crayon

to the packing machines that put the crayons into boxes. Tell them students you would now like for them to think like engineers and brainstorm ways to turn their broken crayons into multicolored crayons of different shapes.

Turn and Talk

Once engineers understand a problem, they think about all of the possible solutions. There are often many different solutions to a problem. Brainstorming is a good way to share ideas with others. Have students turn and talk to share their initial ideas with each other. Remind students that at this point in the design process, all ideas are acceptable.

Next, explain that you have some tools to share that might give them some ideas for designing their process. Show students the nonstick or silicone baking or candy molds or muffin cups, and tell them that you will also be using an oven or toaster oven.

Then, let pairs or small groups of students discuss how they might design a step-by-step process for recycling the crayons into crayons with new shapes and colors. For example, students could exchange unwrapped crayon pieces with each other to mix up the colors, and then place their broken pieces into the molds (pretreated with nonstick spray). The molds can then be heated to melt the pieces together. After pairs or groups have discussed different design process possibilities, discuss the variations as a class and come up with one way to try together. Write each step on the board. Detailed instructions for recycling crayons can be found on the PBS Parents website Melted Crayon Art (see "Websites" section).

Take the trays home to melt the crayons if you do not have an oven or toaster oven at school. It is important that you use oven-safe, nonstick or silicone molds (placed on a cookie sheet) and low heat (250°F for about 20 min.) when melting the crayons. Use nonstick spray on the molds before adding the crayons so the recycled crayons will be easier to pop out once they have cooled and hardened (if they don't pop out easily, you can place them in the freezer for about 20 min. first). After cooling, give each student a new crayon. Have students compare the properties of the new crayon with those of the original crayon.

Ask

- How are the crayons the same as they were before being recycled? (They are solid and can be used to write and color.)
- How are they different after being recycled? (They have mixed colors and a different shape.)
- Do you think this change could be reversed? (yes, but not easily)
- How well did our recycling process work? (Answers will vary.)
- What would you change to make the process work better? (Answers will vary.)

You may want to have students test their recycled crayons by drawing a picture.

Recycled crayons

evaluate

Postcard From a Crayon

Connecting to the Common Core

Writing

Text Types and Purposes: K.3, 1.3, 2.3

Reading: Literature

Craft and Structure: 1.6, 2.6

Writing

Give each student a template, copied on cardstock, for the postcard from a crayon activity. Tell them that they are going to be writing a friendly letter using the postcard template, written from the point of view of the crayon they observed at the beginning of the lesson. They will be using first person (*I, we, my,* and *me*) just as the author did in *The Day the Crayons Came Home*. Reread the first postcard in the book (from Maroon Crayon) as an example. Explain that, rather than describing an imaginative adventure the way Maroon Crayon did, they will be describing all of the things that happened to their crayon during the recycling process. Students can, however, think of a creative way their crayon may have been broken and begin their postcard with that event. They should end with the crayon being recycled into a new crayon with a new color and shape, with all of the steps of the recycling process described in between.

Encourage students to use temporal words such as *first* and *next* to signal event order. They should also use words such as *solid, liquid, heated,* and *cooled* in their writing. In the margins or on the back of the postcard template, they can draw a scene showing one or more things that happened to the crayon during the recycling process.

Use the completed postcards to evaluate their understandings of the core idea that heating or cooling a substance may cause changes that can be observed, and sometimes these changes are reversible. You may also want to evaluate English Language Arts objectives such as writing a friendly letter, expressing point of view, or using temporal words.

STEM at Home

Have students complete the "I learned that …" and "My favorite part of the lesson was …" portions of the STEM at Home student page as a reflection on their learning. They may choose to do the following at-home activity with an adult helper and share their results with the class. If students do not have access to the internet at home, you may choose to have them complete this activity at school.

"At home, we can watch a video called 'The Life of an American Crayon' about how Crayola crayons are made."

Search "Life of an American Crayon" to find the video at www.crayola.com/videos/video-category/the-life-of-an-american-crayon.aspx.

"After we watch the video together, we can test different kinds of crayons to see how Crayola crayons compare with other brands!"

For Further Exploration

This section is provided to help you encourage your students to use the science and engineering practices in a more student-directed format. This box lists questions and challenges related to the lesson that students may select to research, investigate, or innovate. Students may also use the questions as examples to help them generate their own questions. After selecting one of the questions in the box or formulating their own questions, students can individually or collaboratively make predictions, design investigations or surveys to test their predictions, collect evidence, devise explanations, design solutions, or examine related resources. They can communicate their findings through a science notebook, at a poster session or gallery walk, or by producing a media project.

Research

Have students brainstorm researchable questions:

- ? Where do the raw materials for crayons come from?
- ? What improvements has the Crayola company made to the crayon?
- ? What does a chemical engineer do?

Investigate

Have students brainstorm testable questions to be solved through science or math:

- ? Find out the price of a box of Crayola crayons and the price of the same-sized box of another brand. Which brand is more expensive? How much more does it cost? Can you design a test to compare the brands?
- ? Survey your friends and family: What is your favorite crayon color? Graph the results, then analyze your graph. What can you conclude?
- ? When you mix salt and water, the salt seems to disappear. Is this a reversible change? How could you get the salt back to its original form? Try it!

Innovate

Have students brainstorm problems to be solved through engineering:

- ? Can you design a new crayon color by mixing different colors together? Can you come up with a catchy and descriptive name for your new color?
- ? What happens if you add glitter to the crayon pieces before melting? How well do the glitter crayons work after melting and cooling?
- ? Can you design a crayon-recycling program for your school?

Websites

"Oliver Jeffers: Picture Book Maker" (video)
www.youtube.com/watch?v=5KZu0X82I7k

PBS Kids, Daniel Tiger's Neighborhood: "How People Make Crayons"
http://cet.pbslearningmedia.org/resource/959d7d86-78fa-44e1-91a1-dcfa163ce7a0/how-people-make-crayons

PBS Parents: Melted Crayon Art
www.pbs.org/parents/crafts-for-kids/arts-and-crayons

"The Life of an American Crayon" (video)
www.crayola.com/videos/video-category/the-life-of-an-american-crayon.aspx

More Books to Read

Daywalt, D. 2013. *The day the crayons quit.* New York: Philomel Books.
Summary: Poor Duncan just wants to color. But when he opens his box of crayons, he finds only letters, all saying the same thing: His crayons have had enough. They quit! Beige Crayon is tired of playing second fiddle to Brown Crayon. Black Crayon wants to be used for more than just outlining. Blue Crayon needs a break from coloring all those bodies of water. Orange Crayon and Yellow Crayon are no longer speaking—each believes he is the true color of the Sun.

Hall, M. 2015. *Red: A crayon's story.* New York: Greenwillow Books.
Summary: A blue crayon mistakenly labeled as "red" suffers an identity crisis until a new friend offers a different perspective. Red discovers what readers have known all along … he's blue! This witty and heartwarming book is about finding the courage to be true to your inner self.

Hansen, A. S. 2012. *Melting matter.* Vero Beach, FL: Rourke Publishing.
Summary: Simple text and full-color illustrations help explain what happens when everyday items such as ice cream and candles melt. This brief introduction to melting also introduces the idea that something that changes its state by melting or freezing remains matter and compares melting with dissolving and burning.

Name: _____

Crayon Observations

1. Using your crayon, draw a picture of your crayon.

2. Write down observations about your crayon. Do not taste it!

Color	Shape	Odor	Texture	Length

3. List some ways you could change your crayon.

_____

_____

_____

_____

How Crayons Are Made Cards

A worker adds color.	The crayons are sent to stores.
I draw pictures with many colors.	The crayons are boxed.
Wax melts.	A machine sorts the crayons.
A machine wraps the crayons.	The wax gets hard.
A worker checks the crayons for chips or dents.	The wax is shaped.

POSTCARD

To:

Dear _____,

Name: _____

Name: _____

STEM at Home

Dear _____,

At school, we have been learning about **crayons**—how they are made and how they can be changed.

I learned that:

_____

_____

My favorite part of the lesson was:

_____

_____

At home, we can watch a video together called "The Life of an American Crayon" about how Crayola crayons are made.

Search "Life of an American Crayon" to find the video at ***www.crayola.com/videos/video-category/the-life-of-an-american-crayon.aspx.***

After we watch the video, we can test different kinds of crayons to see how Crayola crayons compare with other brands!

Brand	Crayon Observations
1. Crayola	
2.	
3.	

Our conclusion:

_____

_____

_____