LESSON TITLE: CHEMICAL AND PHYSICAL CHANGES (PART ONE)

TOTAL TIME: TWO 50-MINUTE PERIODS (WITH THE SECOND BEING A WORK PERIOD)

BRIEF DESCRIPTION

In the first class, students will watch *The House That STEM Built: Chemical and Physical Changes* video. Throughout the video, they will have a worksheet with a series of questions to answer. All answers can be found directly in the video. In the second class, students will create their own infographic outlining the differences and examples of chemical and physical changes.

CURRICULUM OUTCOMES

Taken from the pre-2019 New Brunswick Grade 5 Science curriculum. Content in this video and lesson plan also applies to Chemistry 11 and 12.

GENERAL CURRICULUM OUTCOMES

Understanding a variety of scientific changes.

SPECIFIC CURRICULUM OUTCOMES

301-9: Identify changes that can be made to an object without changing the properties of the material of which it is made.

301-10: Identify and describe changes to materials that are reversible and some which are not.

301-11: Describe changes that occur in the properties of materials when materials interact with each other.

301-12: Identify examples of interactions between materials that result in the production of gas.

300-11: Relate the mass of a whole object to the sum of the mass of its parts.

NEW BRUNSWICK GLOBAL COMPETENCIES ACHIEVED[1]

- Critical Thinking and Problem-Solving
    - Learners formulate and express questions to further their understanding, thinking, and problem-solving.
- Innovation, Creativity, and Entrepreneurship
    - Learners enhance concepts, ideas, or products through a creative process.

LEARNING OBJECTIVES

The learner will be able to

- define physical change,
- define chemical change,
- identify examples of physical change, and
- identify examples of chemical change.

MATERIALS

- Pencil or pen.
- Loose leaf paper.
- Handout titled “Grade 5 Video Questions for *Chemical and Physical Changes*”.
- Whiteboard.

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1 https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/competencies/NBCompetencies.pdf?fbclid=IwAR1ldrZs1gFgiNm8rC4oz7Fmx6mSn-6t_QJkenev0eD33rZ-foYYn6bmdmc *also available at* https://tinyurl.com/nb-competencies

BEFORE CLASS

Print one copy of the handout titled "Grade 5 Video Questions for *Chemical and Physical Changes*" for each student.

WARM-UP: 10 MINUTES

Ask students what they think of when they hear the term "physical changes". Write this term on the whiteboard so students can see it and reflect on it. Give students adequate time to reflect on the term.

Ask students to share some of the key things they thought of when hearing "physical changes". As students are sharing, write their responses on the whiteboard.

Now, ask students what they think of when they hear the term "chemical changes". Write this term on the whiteboard so students can see it and reflect on it. Give students adequate time to reflect on the term.

Ask students to share some of the key things they thought of when hearing "chemical changes". As students are sharing, write their responses on the whiteboard.

Tell students that, today, they will be learning about what these two terms mean, and they will be learning different examples of each change that is in their homes.

Pass out the worksheet titled "Grade 5 Video Questions for *Chemical and Physical Changes*". Go over the directions of the worksheet with students. As students are watching *The House That STEM Built: Chemical and Physical Changes*, they are responsible for answering the ten questions. All the answers are directly in the video. Teachers can use this worksheet as marks or as a formative assessment tool. This decision is up to the teacher.

ACTIVITY: 30 MINUTES

Start watching *The House That STEM Built: Chemical and Physical Changes*. The video will be played more than once. Therefore, no pauses are necessary. As students are watching the video, the teacher should be circulating to make sure students are focusing on the video,

staying quiet, and answering the questions.

Once the video has finished playing through once, give students **5 minutes** to fill in answers and check which answers they still need.

Start playing the video again. This will be the second time they have viewed the video.

After the video has finished the second time, provide approximately **5 minutes** for students to finish writing their answers.

The teacher will determine if the video needs to be played a third time based on the number of students who have not completed all ten questions on the worksheet.

CONCLUSION: 10 MINUTES

Introduce the following project to the students. A suggested rubric is provided.

Students will create an infographic outlining chemical and physical changes. The infographic must include the following:

- A definition/description of physical change.
- A definition/description of chemical change.
- Four examples of a physical change.
- Four examples of a chemical change.
- Minimum of two pictures/drawings.

DIFFERENTIATION

CONTENT

Some students may struggle to keep up with the video and reading the questions on their handout. The teacher can turn on the subtitles for

the video to help students follow along.

PRACTICE

Some students may not be able to answer all ten questions in the time given. Therefore, the teacher can assign half the questions if needed.

PRODUCT

Some students may want to create their posters digitally while others will want to create their posters on paper. A recommended user-friendly platform for students is Canva: https://www.canva.com/.

EXTENSION

Now that students have a greater understanding of chemical and physical changes, take the students to a different environment. The new environment could be outdoors or in a different room such as the gym. Once the students are in the new environment, ask them to identify chemical and physical changes.

GRADE 5 VIDEO QUESTIONS FOR
CHEMICAL AND PHYSICAL CHANGES

Name: _____ Class: _____ Date: _____

DIRECTIONS

While watching *The House That STEM Built: Chemical and Physical Changes*, answer the following questions. Hand this sheet into the teacher at the end of class.

1. What is an example of a physical change when building a house?

2. What are two examples of a chemical reaction when building a house? A reaction occurs when one or more substances combine to change into one or more different substances.

3. How do the workers ensure that the curing process is taking place while working with concrete?

4. What large industrial structure was discussed as an example of what happens when the wrong ingredients are used to create concrete? Where is this structure located?

5. What is needed to create a silica gel?

6. What are the main ingredients used in paint? Hint: there are 3.

7. What is another name used for a binder?

8. What is another name used for a solvent?

9. What is the definition of a binder?

10. When having a fire, what substances react to create carbon dioxide? Hint: there are 3.

GRADE 5 VIDEO QUESTIONS FOR
CHEMICAL AND PHYSICAL CHANGES ANSWER KEY

Name: _____ Class: _____ Date: _____

ANSWERS

1. What is an example of a physical change when building a house?

   Using wood to make walls, roof trusses, and cabinets.

2. What are two examples of a chemical reaction when building a house? A reaction occurs when one or more substances combine to change into one or more different substances.

   Concrete and paint.

3. How do the workers ensure that the curing process is taking place while working with concrete?

   The workers spray water on the concrete while smoothing it out.

4. What large industrial structure was discussed as an example of what happens when the wrong ingredients are used to create concrete? Where is this structure located?

   The Mactaquac Hydroelectric Dam. This example is located along the St. John River in New Brunswick.

5. What is needed to create a silica gel?

   Silica + alkali = silica gel.

6. What are the main ingredients used in paint? Hint: there are 3.

   Pigments, binder, and solvent.

7. What is another name used for a binder?

   Resin.

8. What is another name used for a solvent?

   Thinner.

9. What is the definition of a binder?

   Binder is the substance used to make the paint stick to the wall.

10. When having a fire, what substances react to create carbon dioxide? Hint: there are 3.

    Carbon, oxygen, and hydrogen.

LESSON TITLE: CHEMICAL AND PHYSICAL CHANGES (PART TWO)

TOTAL TIME: TWO 50-MINUTE PERIODS (WITH THE SECOND CLASS BEING A WORK PERIOD)

BRIEF DESCRIPTION

In this second class, time will be provided for students to complete their infographic outlining the differences and examples of chemical and physical changes.

CURRICULUM OUTCOMES

Taken from the pre-2019 New Brunswick Grade 5 Science curriculum. Content in this video and lesson plan also applies to Chemistry 11 and 12.

GENERAL CURRICULUM OUTCOMES

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SPECIFIC CURRICULUM OUTCOMES

301-9: Identify changes that can be made to an object without changing the properties of the material of which it is made.

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2 https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/competencies/NBCompetencies.pdf?fbclid=IwAR1ldrZs1gFgiNm8rC4oz7Fmx6mSn-6t_QJkenev0eD33rZ-foYYn6bmdmc *also available at* https://tinyurl.com/nb-competencies

MATERIALS

- Pencil or pen.
- Loose leaf paper.
- Whiteboard.
- 8.5″ × 11″ white paper.
- Pencil crayons.
- Markers.
- Rulers.

WARM-UP: 15 MINUTES

Show the students *The House That STEM Built: Chemical and Physical Changes* video without any pauses. This will be the third time they have viewed the video. Ask students if there are any questions about chemical and physical changes. Explain the requirements for the chemical and physical infographic project again. A suggested rubric is provided.

- Students will create an infographic outlining chemical and physical changes. This can be done either physically or digitally. A user-friendly online platform that students can use is Canva: https://www.canva.com/.
- The infographic must include the following:
    - A definition/description of physical change.
    - A definition/description of chemical change.
    - Four examples of a physical change.
    - Four examples of a chemical change.
    - Minimum of two pictures/drawings.

Hand out one piece of plain white 8.5″ × 11″ paper.

ACTIVITY: 30 MINUTES

Students will be using this time to work on their project. Students should be allowed to use resources such as textbooks, notes, and their personal devices if they would like to rewatch the video.

While students are working, the teacher should be circulating the room ensuring that students are staying on task and answering any questions.

If students are finishing early, they can find another student who is also finished, and they can quietly present their infographic to each other.

CONCLUSION: 5 MINUTES

Collect any work that is completed. Ask students if there are any final questions.

Provide students with the due date of the teacher's choosing.

DIFFERENTIATION

CONTENT

Some students may struggle to keep up with the video and reading the questions on their handout. The teacher can turn on the subtitles for the video to help students follow along.

PRACTICE

The teacher can choose whether some students only focus on physical changes for their poster or chemical change for their poster.

PRODUCT

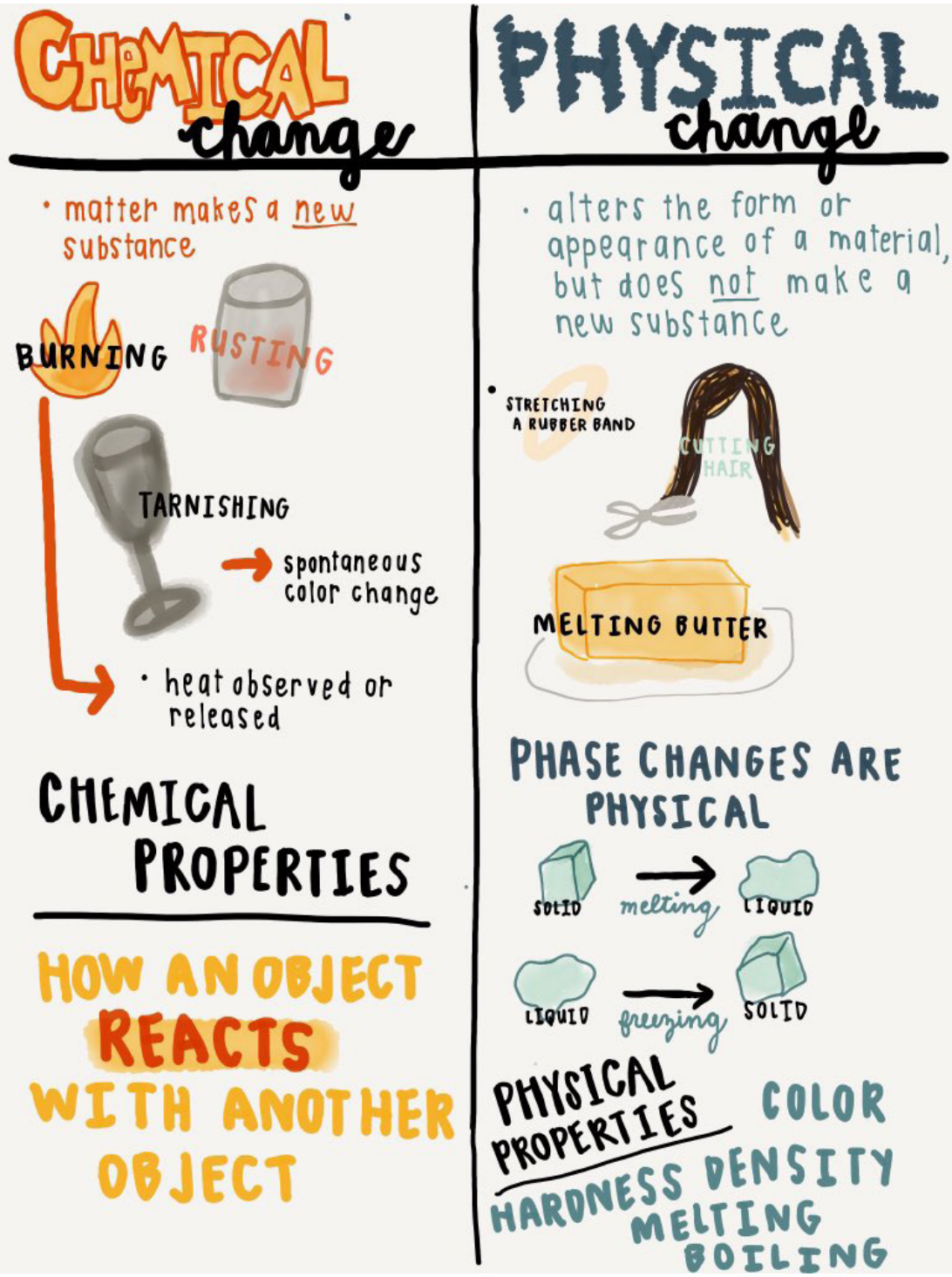
Some students may not be comfortable drawing or writing for their infographic. The teacher can provide students with the option to

complete their infographics using digital technology. A user-friendly platform for students is Canva: https://www.canva.com/.

EXTENSION

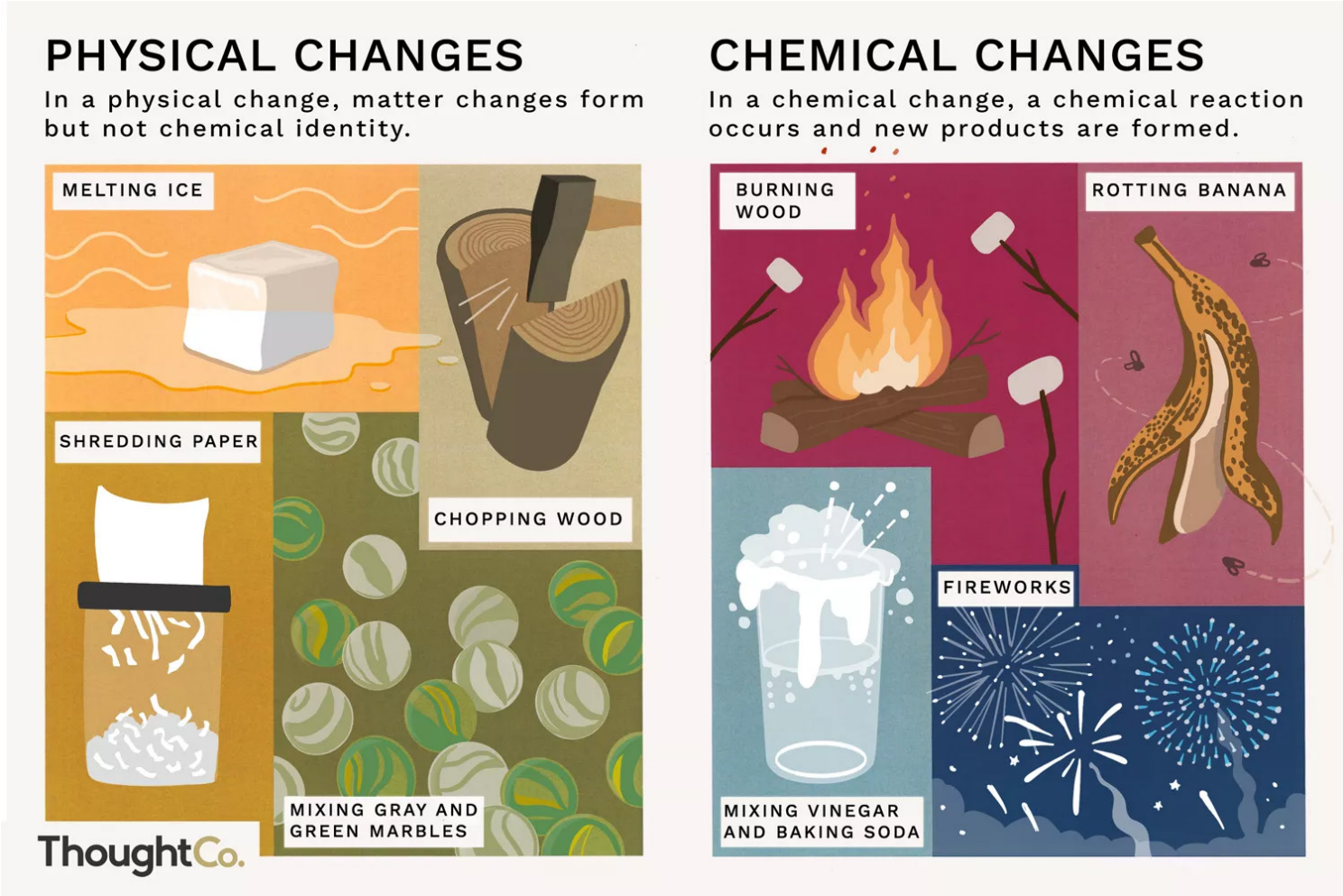
Once students have completed their chemical and physical changes infographic, the teacher could host an "infographic fair" for the younger grades. The students can have their posters hanging around the classroom. Teachers of younger grades, such as Grade 3 and 4, can bring their students to see the posters. The Grade 5 students can talk about their posters to the younger students and teach them about chemical and physical changes.

This example was posted on Twitter by @mrshypke on November 13, 2018.[3]



3 https://twitter.com/mrshypke/status/1062417135962652672?lang=zh-Hant

This example is from Helmenstine, Anne Marie, Ph.D. “Examples of Physical Changes and Chemical Changes.” ThoughtCo, Mar. 22, 2022.[4]



4 https://www.thoughtco.com/physical-and-chemical-changes-examples-608338

CHEMICAL AND PHYSICAL CHANGE INFOGRAPHIC RUBRIC

This is a suggested rubric. Teachers may create their own if they choose.

	1	2	3	4
DESIGN	Infographic has no drawings or pictures.	Infographic has below the minimum amount of drawings or pictures.	Infographic has the minimum amount of drawings or pictures.	Infographic has above minimum drawings or pictures.
CONTENT	Infographic does not have the required definitions or the required amount of examples.	Infographic has the required definitions but has below the required amount of examples for each change.	Infographic has all the required definitions and examples.	Infographic has the required definitions and more than the required amount of examples for each change.
ORGANIZATION	The information appears to be disorganized.	Information is organized but titles and subheadings are missing or do not help the reader understand.	Information is organized with titles and subheadings.	Information is very organized with clear titles.

Comments: