



Connected Chemistry

Modeling Matter Unit

Lesson 5: Chemical Changes

Student's Lesson at a Glance

Lesson Summary

Students begin the exploration of chemical changes by discussing what changes occur when a candle burns. Teachers may briefly extend the opening to explore the products of the reaction. Students investigate macroscopic and submicroscopic observations as hydrogen peroxide is cooled or heated. Students should be able to gain more insight into chemical changes by observing this phenomenon through the simulation.

SWBAT (Students Will Be Able To):

Define what a chemical change is

Distinguish between a chemical and physical change

Describe what happens at the submicroscopic level during chemical change

Essential Vocabulary

Keep a list of all important words from this lesson. This list, in addition to the lists from other lessons, will make studying easier and improve scientific communication skills. The essential vocabulary from the unit is in bold. Additional words that will expand your scientific vocabulary are in italics.



CCC Reminder

- Follow the sketching and observation protocol; the more you practice these skills, the more accurate you will become.
- Use the vocabulary section and note section to take good notes so that studying for tests and quizzes is easier.
- Supporting your claims with evidence is not only a skill that scientists use, but a skill that will help you in other classes and everyday life.
- Draw a key when you are sketching. Keys can help you and others decode your sketches at a later time.
- In the simulations in this lesson, you will adjust the heat to change the temperature. The temperature of a system is changed by adding or removing heat energy. In later units, you will learn more about why temperature and heat are not the same thing.

Notes

Homework

Upcoming Quizzes/ Tests



Activity 1: Connecting

The human body takes food and converts it into energy to fuel all body systems. This biological process involves both **physical changes** and **chemical changes**. Biting and chewing food are considered physical changes. Like water changing between the states of liquid, ice, and steam, tearing off pieces of food does not change the composition of molecules in food. However, digesting food is a chemical change. The body uses unique enzymes and acids in the mouth and stomach to change the composition and structure of molecules in food to release **energy**, which helps to keep us alive.



Digestion is a very complex process. In this activity you will look at a simpler example of a process that includes both a physical and chemical change. Your teacher will light a candle and let it burn for a few minutes. A candle burning is an example of both a physical and chemical change.

1. Explain how a candle burning is both an example of a chemical and physical changes.

2. What happens at the submicroscopic level to distinguish a physical change from a chemical change?

3. Fill in the chart below. List three or more things that you think are physical changes and three or more things that you think are chemical changes.

Physical change	Chemical change



Activity 2: Chemical Changes

Student Simulation: Use Simulation 4, Set 1

Step 1: Reset the simulation you were using for water with hydrogen peroxide.

Submicroscopic sketch of hydrogen peroxide	Observations
	Simulation Temperature
	Motion
	Appearance
	Interactions
	Location
Key	

Step 2: Heat the hydrogen peroxide.

Submicroscopic sketch of hydrogen peroxide after you increase temperature	Observations
	Simulation Temperature
	Motion
	Appearance
	Interactions
	Location
Key	



4. On the submicroscopic level, did the shape and composition of hydrogen peroxide molecules change after heating? *Support your claim with evidence.*
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5. Is heating hydrogen peroxide a physical or chemical change? Support your claim with two pieces of evidence from the simulations.
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6. Consider the following claim: "Heating a substance always produces new substances." *Provide evidence from your observations or drawings to either support or reject your claim.*
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Lesson Reflection Questions

7. Recall that you were asked about what you thought the difference was between chemical and physical change. How have your ideas changed about what chemical and physical change are? *Explain.*
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8. When water boils, does it undergo a chemical or physical change? *Explain your answer using evidence.*
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Activity 3: Putting It All Together

Applying what you know about models, matter, and physical and chemical changes

You are asked to teach a 6th grade class using a model. The model can be of any type we use in class: simulations, physical models, or symbolic sketches. Create a five- to seven-minute lesson that includes:

- How to use your model
- An explanation of the components of your model with correct scientific language
- An explanation of the benefits and limitations of your model
- A simple explanation of matter and the states we discussed
- How you know if matter undergoes physical or chemical changes
- Definitions for physical and chemical change