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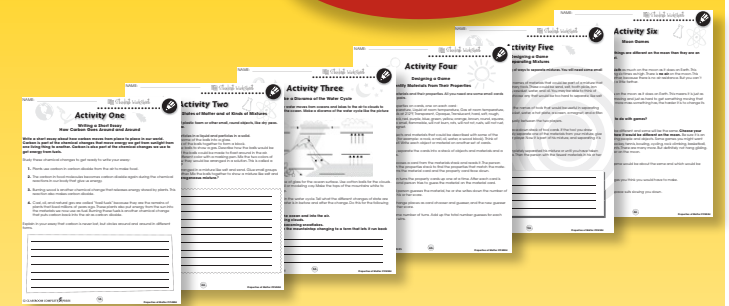
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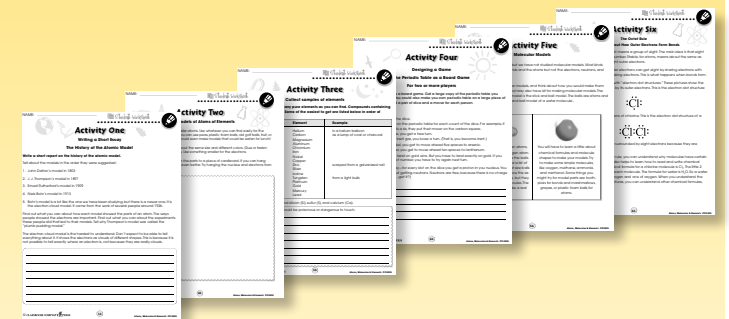
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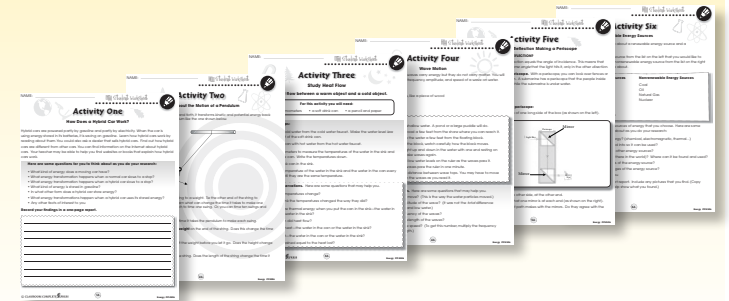
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Physical Changes vs. Chemical Changes

1. Some changes are described below. Write **P** beside the changes that are physical changes. Write **C** beside the changes that are chemical changes.

- _____ a) Water boils on a stove.
- _____ b) An old penny, lost in the grass, turns green.
- _____ c) Fireworks explode in the night sky.
- _____ d) Frost forms on a pumpkin.
- _____ e) An old Jack-O-lantern begins to rot.

2. Circle **T** if the statement is TRUE or **F** if it is FALSE.

- T** **F** a) Chemical changes happen only in things that are alive.
- T** **F** b) Physical changes happen only in things that are not alive.
- T** **F** c) The way atoms are fastened together changes during a chemical change.
- T** **F** d) Atoms and molecules are both particles.
- T** **F** e) If a material changes color, it is proof that a chemical change is happening.



Physical Changes vs. Chemical Changes

We learned that **chemical changes** cause new materials to be formed.

What do we mean by new? Earlier, we read that particles, called **atoms**, sometimes fasten together to form larger particles, called **molecules**. Sometimes atoms get **rearranged** and fastened in a new way to form different molecules. This is a chemical change. In a physical change, the particles are the same before and after the change.



When clouds begin to form in a clear, blue sky, it looks like a new material is being formed. This is not true. The air is full of many water molecules that we cannot see. They are the gas called water vapor. When they come together to form tiny drops, a cloud appears. This is a physical change because the water molecules did not change. They just went from the gas state to the liquid state.

When hydrogen gas burns, it **combines** with oxygen gas to form water. This is a chemical change because a new material is formed. Atoms in hydrogen and oxygen molecules come apart. Then they fasten together in a new way and form water molecules.

Another example of a chemical change is rust forming on an iron nail. First, oxygen molecules come apart. Then the oxygen atoms fasten onto iron atoms and form a new material. The new material is rust. Rust has the chemical name, iron oxide.

These two examples are both chemical changes because atoms have been rearranged to form new molecules.



Physical Changes vs. Chemical Changes

1. Put a check mark next to the answer that is most correct.

- a) Which is the best sign that a chemical change is happening?
- A bubbles
- B flames
- C heat
- D sound
- b) How many of these changes are chemical changes?
- clouds forming
- a tomato rotting
- plants making food
- A none
- B one
- C two
- D three
- c) What kind of change or changes are happening when water goes over a waterfall?
- A neither a chemical change nor a physical change
- B a physical change only
- C a chemical change only
- D both a physical change and a chemical change

2. Write a word in each blank to complete the sentences.

- a) Flames show a _____ change is taking place.
- b) Hydrogen and Oxygen react to form _____.
- c) Chemical changes always change the way _____ are stuck together in molecules.
- d) Adding heat causes a material to change. If removing heat causes the material to return to the way it was, the change was probably a _____ change.



Physical Changes vs. Chemical Changes

3. Use the words "atoms" and "molecules" to explain what happens when a new material is formed during a chemical change.

4. Describe a change you could see that could be either a chemical change or a physical change.

Extensions and Applications

5. Change In the Kitchen

Look around a kitchen for ways that materials could change or be made to change using the tools and appliances you see.

List **three physical changes** that could happen in the kitchen. Explain why they are physical changes and not chemical changes. For each change tell whether the material that changes could be returned to the way it was.

List **three chemical changes** that could happen in the kitchen. Explain why they are chemical changes and not physical changes. For each change tell what new material was formed. For each change tell whether the material that changes could be returned to the way it was.

NAME: _____

After You Read 



Light Energy



Answer the questions in complete sentences.

3.

a) Which colors are reflected by a white shirt?

b) Which colors are absorbed by a black shirt?

c) Which colors are reflected by a red shirt?

4. What is the law of reflection?

Extension & Application

5. It takes approximately 1 second for light to travel from the moon to Earth. Suppose there was a large mirror on the moon. Now, a bright light flashes on Earth. How long would it take for you to see the light reflected by the mirror? Explain how you got your answer.

6. Sound travels one mile in 5 seconds. Light travels much, much faster. When there is a lightning strike, we see the flash and then hear the thunder later. Explain how you could tell how far away you were from a lightning strike.

3.

a) all colors

b) all colors

c) red light

4.

The angle of incidence equals the angle of reflection.

5.

Approximately 2 seconds because the light had to travel to the moon and back

6.

Count the seconds between the flash and the sound and divide by 5. The result is the number of miles away the lightning struck.

1.

a) potential energy

b) nuclear

c) photosynthesis

d) fossil fuels

e) nonrenewable (accept reversal of d) and e)

2.

a) F

b) T

c) T

d) F

e) F

120

Chemical for food, fuel. Answers will vary.

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1.

a) fossil

b) elastic

c) nuclear

d) chemical

e) hydroelectric

f) solar

2.

a) B

b) c

c) c

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3.

If we use all the coal there will be no more for millions of years. Answers will vary.

4.

The sun will keep sending energy for many millions of years. Answers will vary.

5.

a) Renewable: hydroelectric, solar, wind, wood
Non-renewable: coal, oil, natural gas, nuclear

b) Answers will vary

c) Answers will vary

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EASY MARKING ANSWER KEY