



# Distinguishing Between Physical & Chemical Changes

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**Target Grade:** 8<sup>th</sup> Grade Science

**Time Required:** 120 minutes (2 Days)

## Standards

*Next Generation Science Standards:*

- MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

## Lesson Objectives

Students should:

- Review physical and chemical properties of matter.
- Record observations of changes in matter.
- Use evidence to distinguish between physical and chemical changes.

## Central Focus

This 2-day lesson should allow students to review their understanding of physical and chemical properties and emphasize the difference between physical and chemical changes. Specific real-world examples of changes in matter should allow students to apply criteria that are used to differentiate between the changes. Students should then have the opportunity to assess their own level of understanding. This lesson should leave students knowing that physical and chemical changes *matter!*

Key Terms: react, reaction, change, phase, property, oxidation, flammable, element, reactivity

## Background Information

Some changes in matter are physical while others are chemical. Physical changes do not involve chemical bonding that results in the formation of a completely new substance. Physical changes include changes in states of matter (melting, freezing, evaporation and condensation). In a physical change, the substances involved retain their original properties. A new substance is not formed. A physical change can be reversed.



Chemical changes happen on a molecular level when two or more substances chemically bond together. When a chemical change occurs, atoms recombine to form new substances. The elements involved in the chemical chain do not retain their original properties. A chemical change cannot be reversed without extraordinary means. The following are some of the criteria that may be used to determine if a chemical change has occurred:

- Energy is either given off or taken in.
- Color change occurs.
- A precipitate (solid) forms when two solutions are mixed together.
- A gas is formed.

### Materials

- Properties of Matter Rap <https://www.youtube.com/watch?v=EeWzyR1xap4>
- *Matter: Properties and Change* PowerPoint
- Optional: Below are listed chemical and physical properties and chemical changes video clips that may be used for activating prior knowledge or to use as examples.
  - <https://www.youtube.com/watch?v=oFOIN0jZYx0> Properties of Matter
  - <https://www.youtube.com/watch?v=tA9tqvfWQ7I> Surface tension of mercury
  - <https://www.youtube.com/watch?v=R5dwdZCKBZM> Graphene melting ice
  - <https://www.youtube.com/watch?v=kMR5KbNZ7b8> Freezing of mercury
  - [http://www.youtube.com/watch?v=mjkuSm\\_G7s](http://www.youtube.com/watch?v=mjkuSm_G7s) Phosphorus reacting with oxygen
  - <https://www.youtube.com/watch?v=HvVUtpdK7xw&sns=em> Explosive reaction of alkali metals
  - <http://www.youtube.com/watch?v=Jy1DC6Euqj4> Potassium reaction in water
  - <http://www.youtube.com/watch?v=MTcgo46nxNE> Sodium reaction in water
  - <http://www.youtube.com/watch?v=1bJBueGSC9M> Calcium reactivity with oxygen
- Student Devices
- *How are physical and chemical changes distinguished?* Online virtual lab [http://www.glencoe.com/sites/common\\_assets/science/virtual\\_labs/E03/E03.html](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E03/E03.html) Adobe Flash Player should be needed to run this online simulation.
- *How are physical and chemical changes distinguished?* Observation Checklist Student Sheet
- Compare and Contrast Physical and Chemical Changes Student Sheet
- Optional: Brain Pop Chemical and Physical Changes program with quiz <http://glencoe.mcgraw-hill.com/sites/dl/free/0078617650/160350/00044680.html>
- Optional: Name That Change game materials
  - Game cards
  - Student response sheets

### Instruction

*Day 1: What is evidence of physical and chemical changes?*

- Activation of Prior Knowledge (10 Minutes):
  - Students should have prior knowledge of physical and chemical properties prior to this lesson.



- The teacher should show the video <https://www.youtube.com/watch?v=EeWzyR1xap4> Properties of Matter rap 3:30 to review the concept of physical and chemical properties.
- The teacher may then use slides 2 -10 of the Matter: Properties and Change PowerPoint to review types of physical and chemical properties and the criteria for each.
- Launch (15 minutes):
  - The teacher should use the *Matter: Properties and Change* PowerPoint to introduce chemical and physical changes (slides 11 – 12).
  - Students should sort the changes on slide 13 on a piece of paper. The teacher will review the correct responses at the end of class.
  - Optional: The teacher may choose to show additional videos when going through the *Matter: Properties and Change* PowerPoint. When a video is used to show evidence of a chemical change, the teacher may pause the program when evidence is shown.
    - Energy is either given off or taken in.
    - Color change occurs.
    - A gas is formed.
    - Light is produced.
    - The formation of a precipitate is not shown on these mini-programs.
- Guided Practice/Student Participation (30 minutes):

*\*Note: students should begin this activity on Day 1 and complete the activity on Day 2.*

  - Students should conduct online simulations of events that show both physical and chemical changes in matter. Detailed instructions are provided on-line and with the *How are physical and chemical changes distinguished?* [http://www.glencoe.com/sites/common\\_assets/science/virtual\\_labs/E03/E03.html](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E03/E03.html) and with the lesson resources.
  - After each student has entered his/her data using the online observation checklist, he/she should record the data on the observation checklist student sheet before checking the answer.
  - Adobe Flash Player should be needed to run this online simulation. Sound is needed for students to hear the explanations and to determine if their answers are correct. The teacher should instruct students to wear ear buds, headphones or turn the sound down as low as possible.
- Closure (5 minutes):
  - Students should make corrections to their answers from slide 13 based on what they have learned.
  - The teacher should review the student responses and provide additional explanations, as necessary.

*Day 2: What is evidence of physical and chemical changes?*

- Activation of Prior Knowledge (10 minutes):
  - The teacher should use slides 15 and 16 of the *Matter: Properties and Change* PowerPoint should be used to review physical and chemical changes.
  - Each student should number 1 – 6 on a piece of notebook paper.



- Beside each number, students should put the type of change (physical or chemical) shown on slide 15 of the PowerPoint.
- The teacher should go through student responses and review correct answers on slide 16. Students should be instructed to mark through incorrect answers without erasing them. The teacher should collect the papers in order to determine the level of student understanding. The teacher should explain the evidence of chemical changes for those that are chemical changes.
- Guided Practice/Student Participation (35 minutes):
  - Students should complete the online simulation they started on Day 1 of this lesson: *How are physical and chemical changes distinguished?*  
[http://www.glencoe.com/sites/common\\_assets/science/virtual\\_labs/E03/E03.html](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E03/E03.html).
  - After each student has entered his/her data using the online observation checklist and on his/her observation checklist student sheet, the teacher should provide correct responses for each of the events/changes.
  - The teacher should conduct a class discussion allowing students to ask questions or to get clarification on any of the events that were simulated. The teacher should collect the student observation checklist papers so that he/she may review the student responses and determine the level of student understanding. The teacher may review the information with students who had a high number of incorrect responses.
  - *Note: Students will not all finish the online simulations at the same time.* As students finish the online simulation activity, they should use the compare and contrast physical and chemical changes student sheet. This allows students to demonstrate their understanding of how physical changes and chemical changes are similar and how they are different. This assignment can be paused when all students have completed the online simulations. Students may complete this after the teacher has reviewed the online simulation activity and provided correct responses.
- Reflection/Assessment (10 minutes):
  - After students have completed the compare and contrast physical and chemical changes student sheet, students should come to the board and fill in the diagram that the teacher has drawn on the board. The teacher should allow students to provide their rationale for how they determined how physical and chemical changes are alike and how they are different. The class discussion should allow all students to provide feedback. The teacher should address any misconceptions that arise.
- Closure (5 minutes):
  - Students should partner with another student. They should face each other and take turns sharing one thing they learned about physical and chemical changes. They only share one thing at a time. This continues until the teacher says stop.
- Optional Follow-Up/Extension:
  - Brain Pop Video and Chemical and Physical Changes quiz: <http://glencoe.mcgraw-hill.com/sites/dl/free/0078617650/160350/00044680.html>
    - When a student answers a question online, he/she should also answer the question on the paper quiz. This should be done before checking the answer. If an answer is incorrect, the



- student should not change their answer. He/she should put an X over their incorrect answer and circle the correct answer. The teacher should collect and review the student answer sheets and review them to determine types of changes students may be having difficulty understanding.
- Know That Change Game:
    - To make the game, the teacher should cut out each strip. Fold each strip so that the image is on one side and the type of change is on the other. Glue the sides together to keep them from coming unfolded. This makes the actual game cards. The teacher may choose to laminate the cards to increase durability.
    - Each team should receive a set of Know That Change game cards, one instruction card and one score card for each student.
    - The game cards should be stacked in the middle of the table with the images facing up.
    - On the score card, column 1 has an image depicting a type of change. When play begins, in column 2, each player records on his/her score card the type of change, physical or chemical, the image depicts.
    - One player then turns the card over to show the correct response. Students who answered incorrectly should mark through their answer and write the correct answer above the incorrect answer. It is important that students not erase their incorrect answers so that the teacher should know which changes may need to be reviewed. Students who answered correctly get 5 points. Each player should record the points earned in the lower right of the block as shown in the example.
    - At the end of the round, each student tallies up his/her points and records the points in the “Total Points Earned” column. This is done before students go to the next game card.

### Differentiation

- The *How are physical and chemical changes distinguished?* activity allows students to enter a question mark for information of which they are unsure. It should not count the response as incorrect. Having students enter their responses on a paper copy of the observation checklist allows the teacher to view their responses and provide additional instruction and review for students who are in need of it.
- Multiple videos are provided for the teacher to use. This should help students who may need additional visual examples demonstrating chemical changes.
- Optional Extension Activity: When students are playing the Know That Change Game, the teacher may choose for students to complete information in a reduced number of columns. For example, the teacher may instruct students to complete only column 2 identifying the type of change and column evidence of a chemical change. This activity can also be divided into more than one day based on the information students have learned. The teacher may also allow groups of students to do this activity while he/she is review information with students who have not yet mastered the content.



## Assessment

Formative Assessment:

- As students are conducting the *How are physical and chemical changes distinguished?* online simulation, the teacher should monitor progress by viewing the observation checklist student sheets. Students should be instructed to mark through incorrect answers and write the correct answer above the incorrect answer, the teacher should be able to determine the physical and chemical changes with which students are having difficulty. (Days 1 and 2)
- Students should sort the physical and chemical changes on slide 13 of the *Matter: Properties and Change* PowerPoint. The teacher should review the correct answers on slide 14. (Day 1)
- Students should determine if a physical or chemical change has occurred in the pictures on slide 15. The teacher should review correct answers on slide 16. (Day 2)
- Students should compare and contrast physical and chemical changes based on what they have learned through the slideshow and activities. (Day 2)



## Chemical and Physical Properties and Changes

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Properties are characteristics of elements that are unique to the element or group.

### Physical Property

can be observed and measured without changing the kind of matter being studied; can be used to identify substances

- melting point
- boiling point
- specific heat
- malleability
- ductility
- luster
- magnetism
- conductivity
- density
- color

### Chemical Property

any of a material's properties that becomes evident during a **chemical reaction**; that is, any quality that can be established only by changing a substance's chemical identity

- **reactivity** (forms relationships, bonds, etc.)
- ability of an element to chemically bond with another element
- flammable, toxic, corrosive, oxidizes, explosive, combustible

<https://www.youtube.com/watch?v=EeWzyR1xap4> Properties of Matter rap 3:30



<b>Physical Properties of Metals and Nonmetals</b>	
<a href="https://www.youtube.com/watch?v=IA9tqvFWQ7I">https://www.youtube.com/watch?v=IA9tqvFWQ7I</a> surface tension of mercury 2:56	
<b><u>Metals</u></b>	<b><u>Non-metals</u></b>
<ul style="list-style-type: none"> <li>- Good conductors of heat and electricity</li> <li>- Malleable: can be pounded into thin sheets</li> <li>- Ductile: can be stretched into a wire</li> <li>- Have luster (shiny)</li> <li>- Solid at room temperature (except mercury)</li> </ul>	<ul style="list-style-type: none"> <li>- Poor conductors of heat and electricity</li> <li>- Brittle (breakable): if solid</li> <li>- Non-ductile</li> <li>- Not lustrous (shiny)</li> <li>- Solids, liquids or gasses at room temperature</li> </ul>

<b>Physical Properties: can be observed and measured without changing the kind of matter being studied; can be used to identify substances</b>
<p><b><u>Melting Point:</u></b></p> <ul style="list-style-type: none"> <li>- The temperature at which a solid can change to a liquid.</li> <li>- The temperature at which a pure substance melts is unchanging under constant conditions.</li> </ul> <p><b><u>Boiling Point:</u></b></p> <ul style="list-style-type: none"> <li>- The temperature at which a liquid boils.</li> <li>- A substance changes from a liquid to a gas.</li> <li>- Boiling temperature is unchanging under constant conditions for a given substance.</li> </ul> <p><b><u>Density:</u></b></p> <ul style="list-style-type: none"> <li>- a property that describes the relationship between the mass of a material and its volume</li> <li>- Substances that have higher densities contain more matter in a given volume.</li> <li>- The density of a substance will stay constant/the same.</li> </ul> <p><b><u>Color:</u></b> may be used to identify substances but not always</p>

<https://www.youtube.com/watch?v=R5dwdZCKBZM>  
1:22 graphene melting ice  
<https://www.youtube.com/watch?v=kMRSKbNZ7b8>  
freezing of mercury

**Chemical Property:** any of a material's properties that becomes evident during a **chemical** reaction; that is, any quality that can be established only by changing a substance's **chemical** identity

1. Can be used to help identify a substance
2. Usually involves the substance's ability to **react or not react** with another specific substance

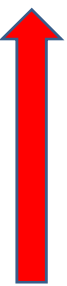
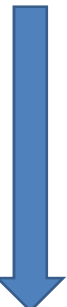



#### Examples

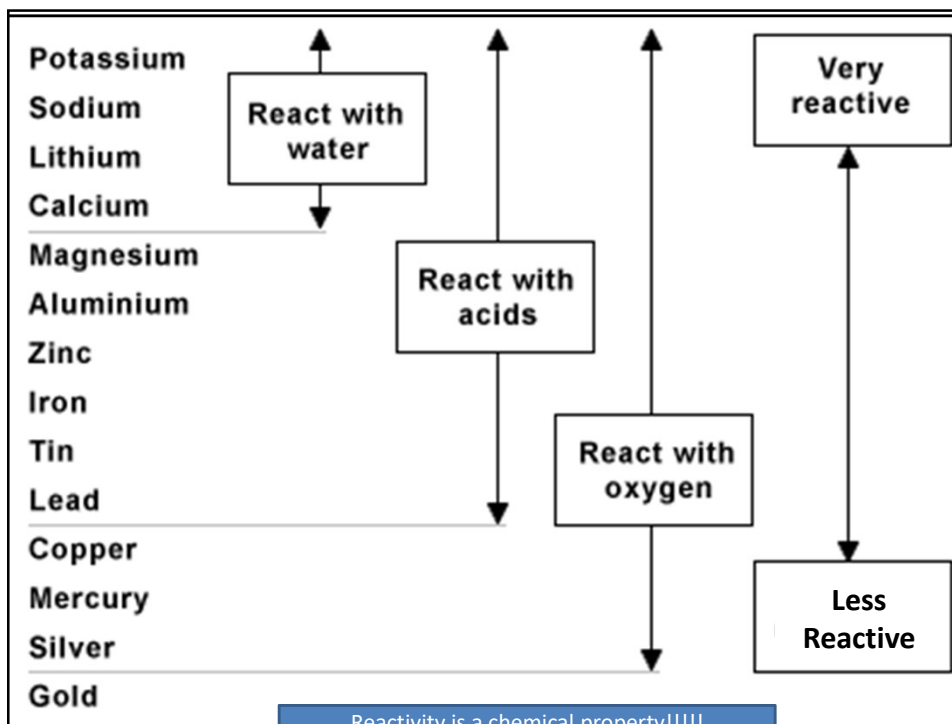
**Reacting with Oxygen (oxidation):** The ability of a substance to burn is a chemical property that involves a substance reacting quickly with oxygen to **produce light and heat or a color change** (i.e. iron rusts or apples turn brown).

[http://www.youtube.com/watch?v=mjku5m\\_G7s](http://www.youtube.com/watch?v=mjku5m_G7s) phosphorus reacting with oxygen .18 sec.

**Reacting with Acids:** The ability of a substance to react with an acid is a chemical property. Some metals react with various acids to form compounds. All metals do not react with all acids. Bases react with acids to form water and neutralize the acid.

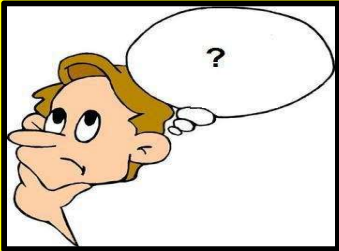
**Toxicity:** is the degree to which a substance can damage an organism.

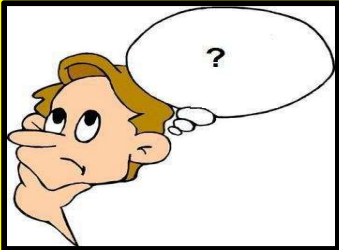
<b>Reactivity:</b> the tendency of a substance to undergo chemical reaction, either by itself or with other materials.; reactivity is a <b>chemical property</b> of an element <a href="https://www.youtube.com/watch?v=HvVUtPdK7xw&amp;sns=em">https://www.youtube.com/watch?v=HvVUtPdK7xw&amp;sns=em</a> Explosive reaction of alkali metals 3:15			
 <p><b>Most Reactive</b></p> <p>potassium sodium calcium magnesium aluminum zinc iron tin lead copper silver gold platinum</p>  <p><b>Least Reactive</b></p>	<p><a href="http://www.youtube.com/watch?v=jy1DC6Euqj4">http://www.youtube.com/watch?v=jy1DC6Euqj4</a> potassium reaction in water 20 sec.</p>		<p>19 <b>K</b> 39.10</p>
	<p><a href="http://commons.wikimedia.org/wiki/Potassium">http://commons.wikimedia.org/wiki/Potassium</a></p> <p><a href="http://www.youtube.com/watch?v=MTcgo46nxNE">http://www.youtube.com/watch?v=MTcgo46nxNE</a> sodium reaction in water 48 sec.</p> <p>These soft, silvery sodium chunks were cut with a knife and stored under oil. In air they turn white in seconds; exposed to water they generate hydrogen gas and explode in flaming balls of molten sodium.</p> <p><a href="http://commons.wikimedia.org/wiki/Sodium">http://commons.wikimedia.org/wiki/Sodium</a></p> <p><a href="http://www.youtube.com/watch?v=1bJBueGSC9M">http://www.youtube.com/watch?v=1bJBueGSC9M</a> calcium reactivity with oxygen 27 sec.</p>		<p>11 <b>Na</b> 22.99</p>
	<p><a href="http://commons.wikimedia.org/wiki/Calcium">http://commons.wikimedia.org/wiki/Calcium</a></p>		<p>20 <b>Ca</b> 40.08</p>



Physical & Chemical Properties of Common Substances		
Substance	Physical Property	Chemical Property
Helium	Less dense than air	Nonflammable
Wood	Grainy texture	Flammable/combustible
Baking Soda	White powder	<u>Reacts</u> with vinegar to form bubbles (CO <sub>2</sub> )
Powdered Sugar	White powder	Does not <u>react</u> with vinegar
Rubbing Alcohol	Clear liquid	Flammable/Combustible
Red Food Coloring (demonstration)	Red color	<u>Reacts</u> with bleach and loses color
Iron	Malleable	<u>Reacts with oxygen</u> (oxidation) to form iron oxide (rust) Fe <sub>2</sub> O <sub>3</sub>
Tin	Malleable	<u>Reacts with oxygen</u> to form tin dioxide

<https://www.youtube.com/watch?v=oF0IN0jZYx0> Properties of Matter 2:28

Physical or Chemical Property... What do you think?	
<p>Number 1 – 11 on your paper. Beside each number record the property as either a “physical” or “chemical” property.</p> <ol style="list-style-type: none"> <li>Shape</li> <li>Density</li> <li>Acidity (below 7 pH)</li> <li>Solubility</li> <li>Basicity (above 7 pH)</li> <li>Combustibility</li> <li>Odor</li> <li>Melting point</li> <li>Reactivity</li> <li>Boiling point</li> <li>Color</li> </ol>	 <p><b>Points to Consider</b></p> <p>If the property changes, is a new substance formed? If not, it is a physical property. ☺</p> <p>If you still have the same substance after changing the property, it is a physical property.</p> <p><a href="https://www.youtube.com/watch?v=9Z75QzXSNWw">https://www.youtube.com/watch?v=9Z75QzXSNWw</a> Which property are you observing? 5:08</p> <p><a href="https://commons.wikimedia.org/w/index.php?search=thinking+cartoons&amp;title=Special:Search&amp;go=Go#/media/File:Free-clip-art-thinking.jpeg">https://commons.wikimedia.org/w/index.php?search=thinking+cartoons&amp;title=Special:Search&amp;go=Go#/media/File:Free-clip-art-thinking.jpeg</a></p>

Physical or Chemical Property... What do you think? <span style="float: right;">✓</span>	
<ol style="list-style-type: none"> <li>(P) Shape</li> <li>(P) Density</li> <li>(C) Acidity (below 7 pH)</li> <li>(C) Solubility</li> <li>(C) Basicity (above 7 pH)</li> <li>(C) Combustibility</li> <li>(P) Odor</li> <li>(P) Melting point</li> <li>(C) Reactivity</li> <li>(P) Boiling point</li> <li>(P) Color</li> </ol>	 <p><b>Points to Consider</b></p> <p>If the property changes, is a new substance formed? If not, it is a physical property. ☺</p> <p>If you still have the same substance after changing the property, it is a physical property.</p> <p><a href="https://commons.wikimedia.org/w/index.php?search=thinking+cartoons&amp;title=Special:Search&amp;go=Go#/media/File:Free-clip-art-thinking.jpeg">https://commons.wikimedia.org/w/index.php?search=thinking+cartoons&amp;title=Special:Search&amp;go=Go#/media/File:Free-clip-art-thinking.jpeg</a></p>

## Physical Changes

**Physical Change:** A new substance **IS NOT** formed

- The physical properties change but the type of substance stays the same.
- Matter changes its size, shape or form.
- There is no change in the chemical makeup of the substance(s) that are changed.
- Physical changes **can be reversed**.
- *Examples:* cutting, changes in states/phases of matter by melting, boiling, freezing, etc.

<http://glencoe.mcgraw-hill.com/sites/dj/free/0078617650/160350/00044680.html> Brain Pop Chemical and Physical Changes program w/quiz (note: Cooking an egg is a chemical change.)


## Chemical vs Physical Changes

**Chemical Change:** A new substance is **ALWAYS** formed!!!!


- properties change and a different substance is produced.
- **Chemical changes cannot be reversed.**
- *Examples:* iron reacts with oxygen and water to form iron oxide (rust);  
silver reacts with oxygen to form silver oxide (tarnish)

**Evidence of a chemical change:**

1. Change in energy: temperature **increase** = **exo**thermic chemical reaction  
temperature **decrease** = **endo**thermic chemical reaction
2. \*Color change: This is not when a color has been covered, for example dying, painting, etc. This is an unexpected change.
3. Formation of a gas: if in a solution, bubbles will often times be seen when the gas is formed
4. Formation of a precipitate: when two or more solutions are combined and a solid is formed



## Physical Change or Chemical Change



On your paper make two columns with one labeled “Physical Change” and the other labeled “Chemical Change”. Place each of the below changes in the correct category.

- dicing potatoes
- iron rusting
- whipping egg
- milk souring
- magnetizing a compass needle
- eggs cooking
- yeast bread rising
- water evaporating
- gasoline burning
- dissolving sugar in water

[https://commons.wikimedia.org/w/index.php?search=thinking+cartoons&title=Special:Search&go=Go#/media/File:Man\\_Thinking\\_Of\\_Career\\_Change\\_Cartoon.svg](https://commons.wikimedia.org/w/index.php?search=thinking+cartoons&title=Special:Search&go=Go#/media/File:Man_Thinking_Of_Career_Change_Cartoon.svg)  
[https://commons.wikimedia.org/w/index.php?search=thinking+cartoons&title=Special:Search&go=Go#/media/File:Thinking\\_Cartoon\\_Businessman\\_\(Flipped\).svg](https://commons.wikimedia.org/w/index.php?search=thinking+cartoons&title=Special:Search&go=Go#/media/File:Thinking_Cartoon_Businessman_(Flipped).svg)

## Check your responses. 😊







**Physical Changes**

- whipping egg whites (air is forced into the fluid, but no new substance is produced)
- magnetizing a compass needle (there is realignment of groups of iron atoms, but no chemical bonding within the iron atoms themselves).
- water evaporating (water molecules are forced away from each other when the liquid changes to vapor, but the molecules are still H<sub>2</sub>O.)
- dissolving sugar in water (sugar molecules are dispersed within the water, but the individual sugar molecules are unchanged.)
- dicing potatoes (cutting usually separates molecules without changing them.)




**Chemical Changes**

- iron rusting (iron oxide, Fe<sub>2</sub>O<sub>3</sub>, forms)
- gasoline burning (water vapor and carbon dioxide form)
- eggs cooking (fluid protein molecules uncoil and crosslink to form a network)
- yeast bread rising (yeast changes carbohydrates into carbon dioxide, CO<sub>2</sub>, gas)
- milk souring (sour-tasting lactic acid, C<sub>3</sub>H<sub>6</sub>O<sub>3</sub>, is produced)

**Is the change chemical or physical?**  
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 <p>1. cutting onions</p>	 <p>2. ripening banana</p>	 <p>3. Fireworks exploding</p>
 <p>4. water boiling</p>	 <p>5. Sodium reacting in water</p>	 <p>6. erosion</p>

**Is the change chemical or physical?**  
<http://commons.wikimedia.org/wiki/> copy write free images

 <p>1. cutting onions = P</p>	 <p>2. ripening banana = C</p>	 <p>3. fireworks exploding = C</p>
 <p>4. water boiling = P</p>	 <p>5. sodium reacting in water = C</p>	 <p>6. Erosion = P</p>

## How are physical and chemical changes distinguished?

[http://www.glencoe.com/sites/common\\_assets/science/virtual\\_labs/E03/E03.html](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E03/E03.html)

Adobe Flash Player is needed to run this on-line simulation activity.

**Background Information:** The following information is provided in the left margin when the simulation is loaded.

Chemistry is the study of matter and the changes it undergoes. These changes can be classified into two types: physical and chemical. In a physical change, one or more of the substance's physical properties – its size, shape, color, or state (phase) of matter – is altered. Grinding, melting, dissolving, and evaporating are all examples of physical changes. No new substances are formed as a result of a physical change, although substances may be broken into smaller pieces of the same substance.

A chemical change results in the formation of one or more new substances. The new substances differ in chemical properties and composition from the original substance. When a chemical change has taken place, many signs can indicate this. Some of these signs are: the release of energy in the form of light, heat, or sound; bubbles (due to the release of gas); odor changes; and color changes.

In this Virtual Lab, you will view videos of matter changing and determine whether the changes you observe are physical or chemical in nature. The ten changes included in this simulation are: shape change, color change, bubbles formed, odor production, heat given off, size change, change of state, new substance formed, sound production, light produced.

The image below shows the actual screen students will see when the How are physical and chemical changes distinguished? Simulation activity is loaded and ready to start.

**How are physical and chemical changes distinguished?**

Chemistry is the study of matter and the changes it undergoes. These changes can be classified into two types: physical and chemical. In a physical change, one or more of a substance's physical properties – its size, shape, color, or state (phase) of matter – is altered. Grinding, melting, dissolving, and evaporating are all examples of physical changes. No new substances are formed as a result of a physical change, although substances may be broken into smaller pieces of the same substance.

A chemical change results in the formation of one or more new substances. The new substances differ in chemical properties and composition from the original substance. When a chemical change has taken place, many signs can indicate this. Some of these signs are: the release of energy in the form of light, heat, or sound; bubbling (due to the release of gas); odor changes; and color changes.

In this Virtual Lab, you will view videos of matter changing and determine whether

Print

**EVENTS**

1  
2  
3  
4  
Reset

**Observation Checklist**

	Yes	No	?		Yes	No	?
Shape Change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Size Change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Color Change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Change of State	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bubble Formed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	New Substance Formed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Odor Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sound Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heat Given Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Light Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Physical Change      Chemical Change

### Procedure:

1. Select one of the four events and view the video. You can stop the video at any point and watch it as many times as you wish.



2. Click the Play/Pause button to play and pause the video.
3. Click the Rewind button to step back a few frames in the video.
4. Click the Fast Forward button to step ahead a few frames in the video.
5. Click the Stop button to rewind the video to the beginning.
6. Use your observations to check all the ten items on the Observation Checklist **online and on your student sheet**. Check the (?) for those you are unsure of. No boxes are allowed to be left blank.
7. When all items are checked, decide whether the changes you observed represent a physical or chemical change of matter. **First circle “Physical” or “Chemical” on your student sheet beside Event Conclusion. Then click “Physical Change” or “Chemical Change” at the bottom of the image.**

The sound will indicate whether or not your answer is incorrect.

8. Do not erase incorrect answers. Mark through all incorrect answers and write the correct answer above your incorrect answer.
9. Select another event to observe. Follow steps 6 – 7 above.
10. After observing the four events provided, click the Reset button to watch four new events. Follow steps 6 – 7 for each of the events.

Student Name \_\_\_\_\_ Class Period \_\_\_\_\_

### How are physical and chemical changes distinguished? Observation Checklist

[http://www.glencoe.com/sites/common\\_assets/science/virtual\\_labs/E03/E03.html](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E03/E03.html)

**Event: Steam is evaporating from water in the kettle. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**Event: The garbage is burning. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**Event: The water is freezing. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**Event: The steel screw is rusting. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

**How are physical and chemical changes distinguished? Observation Checklist  
continued**

**Event: A wrecking ball smashes the building. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**Event: The strong base dissolves fats, grease and hair. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**Event: The bananas are ripening. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**Event: Sodium hydroxide reacts with aluminum. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

**How are physical and chemical changes distinguished? Observation Checklist  
continued**

**Event: The water is boiling. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

---

**Event: Polymers/plastics are made by linking small molecules. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

---

**Event: The forest is burning. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

---

**Event: Baking soda neutralizes vinegar. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

## How are physical and chemical changes distinguished? Observation Checklist continued

**Event: Sulfuric acid reacts with zinc. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**\*Event: The match is burning. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

\*Note: The on-line answer will be incorrect.

**\*Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**Event: Butter is melting. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

-----

**\*Event: The metal is melting. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

\*Note: The on-line answer will be incorrect.

**\*Event Conclusion: Chemical or Physical Change Circle your answer.**

## How are physical and chemical changes distinguished? Observation Checklist

Answer Key: Correct responses are in **red**.

### Event: Steam is evaporating from water in the kettle.

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

1. Heat is not given off by a chemical reaction. It is released as a result of the water being heated.
2. Sound is produced by the steam pot, not by the change.

Event Conclusion: Chemical or **Physical Change** Circle your answer.

---

### Event 2: The garbage is burning.

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

1. While not evident, CO<sub>2</sub> is produced as a result of burning.

Event Conclusion: **Chemical** or Physical Change

---

### Event: The water is freezing.

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

Event Conclusion: Chemical or **Physical Change**

---

### Event : The steel screw is rusting.

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

1. After an extended period of time, the shape of the screw will change as more of the metal changes to rust.
2. While not observable unless monitored in a closed system, rusting does release heat.
3. The new substance formed is dependent on the metal that is rusting. For example, when iron rusts it forms iron oxide (Fe<sub>2</sub>O<sub>3</sub>).

Event Conclusion: **Chemical** or Physical Change

## How are physical and chemical changes distinguished? Observation Checklist

Answer Key: Correct responses are in **red**.

**Event: A wrecking ball smashes the building. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

1. Sound is produced by the wrecking ball hitting the building, not as a result of a chemical reaction.

**Event Conclusion: Chemical or Physical Change Circle your answer.**

---

**Event: The strong base dissolves fats, grease and hair. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

1. Even though the word “dissolves” is used, the strong base will chemically break down the substances.

**Event Conclusion: Chemical or Physical Change Circle your answer.**

---

**Event: The bananas are ripening. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

---

**Event: Sodium hydroxide reacts with aluminum. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

**Event Conclusion: Chemical or Physical Change Circle your answer.**

## How are physical and chemical changes distinguished? Observation Checklist

Answer Key: Correct responses are in **red**.

continued

**Event: The water is boiling. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

Event Conclusion: Chemical or **Physical Change** Circle your answer.

-----

**Event: Polymers/plastics are made by linking small molecules. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

Event Conclusion: **Chemical** or Physical Change Circle your answer.

-----

**Event: The forest is burning. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

Event Conclusion: **Chemical** or Physical Change Circle your answer.

-----

**Event: Baking soda neutralizes vinegar. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

1. Heat will be taken in, not given off, in this endothermic chemical reaction.

Event Conclusion: **Chemical** or Physical Change Circle your answer.



## How are physical and chemical changes distinguished? Observation Checklist

Answer Key: Correct responses are in **red**.

continued

**Event: Sulfuric acid reacts with zinc. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

Event Conclusion: **Chemical** or Physical Change Circle your answer.

---

**Event: The match is burning. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

Event Conclusion: **Chemical** or Physical Change Circle your answer.

---

**Event: Butter is melting. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

Event Conclusion: Chemical or **Physical Change** Circle your answer.

---

**Event: The metal is melting. Circle your answers.**

Shape Change	Yes	No	?	Size Change	Yes	No	?
Color Change	Yes	No	?	Change of State	Yes	No	?
Bubbles Formed	Yes	No	?	New Substance Formed	Yes	No	?
Odor Production	Yes	No	?	Sound Production	Yes	No	?
Heat Given Off	Yes	No	?	Light Produced	Yes	No	?

Event Conclusion: Chemical or **Physical Change** Circle your answer.



### Compare and Contrast

Chemical Change

Physical Change

How are the concepts alike?

Blank writing area for comparing similarities between chemical and physical changes.

How are the concepts different?

Chemical Change

Chemical Change

Blank writing area for describing differences between chemical and physical changes.

Blank writing area for describing differences between chemical and physical changes.

## Know That Change Game Teacher Information

To make the game, the teacher should cut out each strip. Fold each strip so that the image is on one side and the type of change is on the other. Glue the sides together to keep them from coming unfolded. This makes the actual game cards. The teacher may choose to laminate the cards to increase durability.

Note: All images are from copy write free sources. Sources are cited on each image.

1. Each team should receive a set of Know That Change game cards, one instruction card and one score card for each student. A timer may be provided if available.
2. The game cards should be stacked in the middle of the table with the images facing up.
3. On the score card, Column 1 has an image depicting a type of change. When play begins, in Column 2, each player records on his/her score card the type of change, physical or chemical, the image depicts.
4. One player then turns the card over to show the correct response. Students who answered incorrectly should **mark through their answer and write the correct answer above the incorrect answer**. It is important that students not erase their incorrect answers so that the teacher will know which changes may need to be reviewed. Students who answered correctly get 5 points. Each player should record the points earned in the lower right of the block as shown in the example.
5. Students then complete column 3 by identifying physical properties of anything depicted in the image. To do this, students take turns naming the physical properties they observe. 2 points is awarded for each correct response.
6. Team members then complete columns 4 and 5 **only if the image is showing a chemical change**. As in #5, students take turns identifying chemical properties (column 4) and evidence of a chemical change (Column 5). 2 points is awarded for each correct response.
7. At the end of the round, each student tallies up his/her points and records the points in the "Total Points Earned" column. This is done before students go to the next game card.
8. Students continue the game using the next physical/chemical change card. Play continues until the teacher calls time.
9. Students should be encouraged to serve as peer teachers to assist students who have written incorrect responses.
10. The teacher should circulate the room to assist when needed. At the end of the game, or when the teacher calls for time to end, he/she will conduct a group discussion and provide correct responses.

### Differentiation:

- The teacher may choose for students to complete information in a reduced number of columns. For example, the teacher may instruct students to complete only column 2 identifying the type of change and column 5 evidence of a chemical change.
- This activity can be divided into more than one day based on the information students have learned.

## Know That Change Game Instructions

1. Each team should receive a set of Know That Change cards, one instruction card and one score card for each student. A timer may be provided if available.
2. The stack of cards should be stacked with the images facing up.
3. On the score card, Column 1 has an image depicting a type of change. When play begins, in Column 2, each player records on his/her score card the type of change, physical or chemical, the image depicts. Do not allow other students to see what you have written.
4. One player then turns the card over to show the correct response. Students who answered incorrectly should **mark through their answer and write the correct answer above the incorrect answer**. It is important that students not erase their incorrect answers. Students who answered correctly get 5 points. Each player should record the points earned in the lower right of the block as shown in the example.
5. Students then complete column 3 by identifying physical properties of anything depicted in the image. To do this, students take turns naming the physical properties they observe. 2 points is awarded for each correct response.
6. Team members then complete columns 4 and 5 **only if the image is showing a chemical change**. As in #5, students take turns identifying chemical properties (column 4) and evidence of a chemical change (Column 5). 2 points is awarded for each correct response.
7. At the end of the round, each student tallies up his/her points and records the points in the Total Points Earned column. This is done before students go to the next game card.
8. Students continue the game using the next physical/chemical change card. Play continues until the teacher calls time.
9. If a member of the team does not understand why his/her answer is correct, team members should explain and use resources to increase student understanding. The teacher is available to provide additional clarification.

# Physical Change

<http://commons.wikimedia.org/w/index.php?search=crushing+a+can&title=>



Crushing a can

# Physical Change

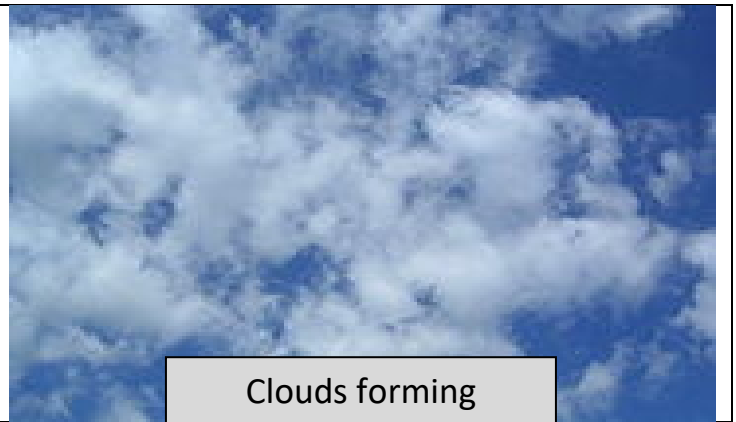
<http://commons.wikimedia.org/wiki/File:USMC-081114-M-7590G-020.jpg>



Recycling paper

# Physical Change

<http://commons.wikimedia.org/wiki/Cloud>



Clouds forming

# Physical Change

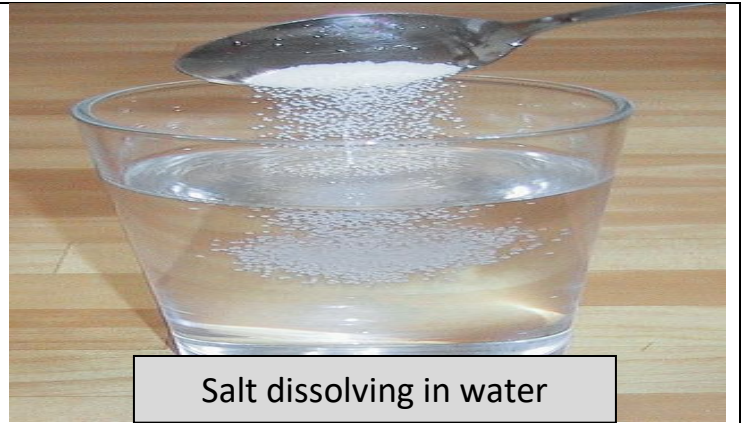
[http://commons.wikimedia.org/wiki/Category:Dry\\_ice](http://commons.wikimedia.org/wiki/Category:Dry_ice)



Dry ice ( $\text{CO}_2$ ) changing from solid to gas

# Physical Change

<http://commons.wikimedia.org/wiki/File:SaltInWaterSolutionLiquid.jpg>



Salt dissolving in water

# Physical Change

[http://commons.wikimedia.org/wiki/File:Soil\\_erosion.jpg](http://commons.wikimedia.org/wiki/File:Soil_erosion.jpg)



Soil Erosion

# Physical Change

[http://commons.wikimedia.org/wiki/File:Carving,\\_Killynether\\_Wood\\_\(1\)\\_-\\_geograph.org.uk\\_-\\_742046.jpg](http://commons.wikimedia.org/wiki/File:Carving,_Killynether_Wood_(1)_-_geograph.org.uk_-_742046.jpg)



Carving wood

# Physical Change

[http://commons.wikimedia.org/wiki/Category:Broken\\_glass#mediaviewer/File:%D8%B2%D8%AC%D8%A7%D8%AC\\_%D9%85%D9%83%D8%B3%D9%88%D8%B1\\_2.jpg](http://commons.wikimedia.org/wiki/Category:Broken_glass#mediaviewer/File:%D8%B2%D8%AC%D8%A7%D8%AC_%D9%85%D9%83%D8%B3%D9%88%D8%B1_2.jpg)



Breaking Glass

# Physical Change

[http://commons.wikimedia.org/wiki/Category:Melting\\_ice#mediaviewer/File:Eis\\_auf\\_St.\\_Moritzersee\\_\(4\).jpg](http://commons.wikimedia.org/wiki/Category:Melting_ice#mediaviewer/File:Eis_auf_St._Moritzersee_(4).jpg)



Melting Ice

# Physical Change

[http://commons.wikimedia.org/wiki/Category:Boiling\\_water#mediaviewer/File:Boiling\\_water.jpg](http://commons.wikimedia.org/wiki/Category:Boiling_water#mediaviewer/File:Boiling_water.jpg)



Boiling Water

# Physical Change

[http://commons.wikimedia.org/wiki/Painting#mediaviewer/File:Painting\\_Thanka\\_Lhasa\\_Tibet\\_Luca\\_Galuzzi\\_2006.jpg](http://commons.wikimedia.org/wiki/Painting#mediaviewer/File:Painting_Thanka_Lhasa_Tibet_Luca_Galuzzi_2006.jpg)



Painting

# Physical Change

[http://commons.wikimedia.org/wiki/File:Pane\\_di\\_triora.jpg](http://commons.wikimedia.org/wiki/File:Pane_di_triora.jpg)



Slicing Bread



# Chemical Change

[http://commons.wikimedia.org/wiki/Category:Burning\\_wood#mediaviewer/File:Burning\\_pile\\_of\\_multiflora\\_rose.JPG](http://commons.wikimedia.org/wiki/Category:Burning_wood#mediaviewer/File:Burning_pile_of_multiflora_rose.JPG)



Burning Wood

# Chemical Change

<http://commons.wikimedia.org/wiki/File:RoastingMarshmallow.jpg>



Roasting a marshmallow

# Chemical Change

[http://commons.wikimedia.org/wiki/File:Rust\\_old\\_metal.jpg](http://commons.wikimedia.org/wiki/File:Rust_old_metal.jpg)



Metal Rusting

# Chemical Change

[http://commons.wikimedia.org/wiki/Category:Leaves\\_in\\_autumn#mediaviewer/File:110.DullesCorner.HerndonVA.28October2012\\_\(8141422558\).jpg](http://commons.wikimedia.org/wiki/Category:Leaves_in_autumn#mediaviewer/File:110.DullesCorner.HerndonVA.28October2012_(8141422558).jpg)



Leaves changing color

# Chemical Change

[http://commons.wikimedia.org/wiki/File:A\\_ripened\\_banana.jpg](http://commons.wikimedia.org/wiki/File:A_ripened_banana.jpg)



Ripening bananas

# Chemical Change

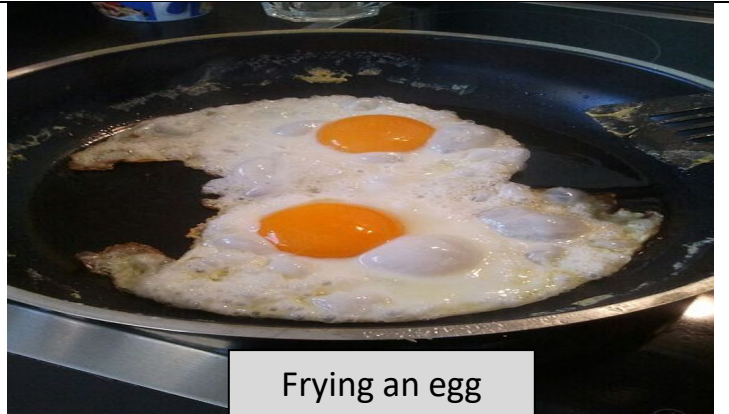
<http://commons.wikimedia.org/wiki/Fireworks>



Fireworks exploding

# Chemical Change

[http://commons.wikimedia.org/wiki/File:Fried\\_eggs.jpeg](http://commons.wikimedia.org/wiki/File:Fried_eggs.jpeg)



Frying an egg

# Chemical Change

<http://commons.wikimedia.org/wiki/File:Atomicfudge1.JPG>



Baking a cake

# Chemical Change

[http://commons.wikimedia.org/wiki/File:Baking\\_soda\\_and\\_vinegar.jpg](http://commons.wikimedia.org/wiki/File:Baking_soda_and_vinegar.jpg)



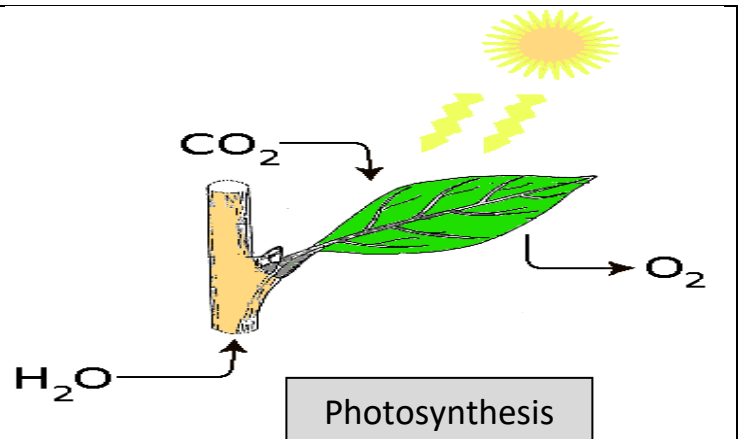
# Chemical Change

<http://commons.wikimedia.org/wiki/File:Streichholz.jpg>



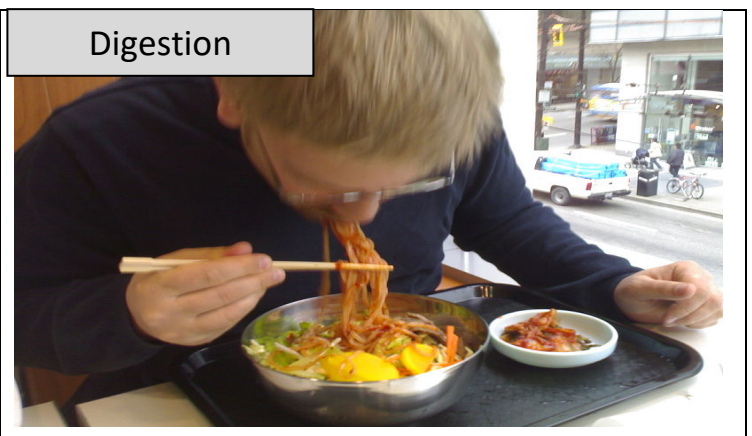
# Chemical Change

<http://commons.wikimedia.org/wiki/Category:Photosynthesis#mediaviewer/File:Fotosynthese3.png>



# Chemical Change

[http://commons.wikimedia.org/wiki/Category:People\\_eating#mediaviewer/File:Bibim\\_naengmyeon\\_by\\_roland\\_in\\_Vancouver.jpg](http://commons.wikimedia.org/wiki/Category:People_eating#mediaviewer/File:Bibim_naengmyeon_by_roland_in_Vancouver.jpg)



# Know That Change Scorecard

Name: \_\_\_\_\_ Class \_\_\_\_\_

1. Place the set of change cards in the middle of the table with the images facing up.
2. For each change, in column 2, write the type of change that is shown on the game card.
3. After recording the type of change, flip the card to check your answer. If you answered incorrectly, **mark through your answer and write the correct answer** before continuing with information in columns 2-4.
4. Chemical properties and evidence of chemical change information will only be included for chemical changes.

1	2	3	4	5	6
Change Shown on Card	Type of Change (physical or chemical) (5 pts.)	Physical Properties Shown (2 pts. Ea.)	Chemical Properties Shown (2 pts. Ea.)	Evidence of Chemical Change (2 pts. Ea.)	Total Points Earned (per round)
<b>Example:</b> Silver tarnishing (turning dark)	Chemical +5	- malleable metal - luster - solid +6	- reactivity of silver with oxygen +2	- new substance formed - color change +4	17
Crushing a can					
Recycling paper					
Clouds forming					
Dry ice forming a gas (sublimation)					
Salt dissolving in water					
Soil erosion					
Carving wood					
Breaking glass					
Melting ice					
Boiling water					

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Change Shown on Card</b>	<b>Type of Change (5 pts.)</b>	<b>Physical Properties Shown (2 pts. Ea.)</b>	<b>Chemical Properties Shown (2 pts. Ea.)</b>	<b>Evidence of Chemical Change (2 pts. Ea.)</b>	<b>Total Points Earned (per round)</b>
Painting					
Slicing bread					
Burning wood					
Roasting marshmallows					
Metal rusting					
Leaves changing color					
Ripening banana					
Fireworks exploding					
Frying an egg					
Baking a cake					
Mixing vinegar and baking soda					
Lighting a match					
Photosynthesis					
Digestion					

Brain Pop Chemical and Physical Changes program video and quiz  
<http://glencoe.mcgraw-hill.com/sites/dl/free/0078617650/160350/00044680.html>

Instructions: After viewing the Brain Pop Chemical and Physical Changes video, answer each of the questions on this quiz then enter them online. The correct answer will be given as soon as you enter your answer online. If you answered incorrectly, you are given the option to try again. Do not erase your original answer on this paper quiz. Mark it incorrect and circle the correct answer.

- When autumn leaves change from red to green to red, orange and yellow:
  - A chemical change has occurred.
  - A physical change has occurred.
  - A chemical change is about to happen.
- What type of change occurs when a nail rusts?
  - nuclear change
  - physical change
  - chemical change
- A physical change means that:
  - matter has changed from one substance into another
  - matter has changed size, shape or form
  - matter has morphed into anti-matter
- A chemical change means that:
  - there is a change in the size or shape of an object
  - one substance has changed into another
  - a bunch of glasses have changed all at once
- What kinds of chemical changes occur in your body?
  - Food is broken down by enzymes in your stomach.
  - bones breaking
  - your heart beating
- What type of change has occurred when an apple core turns brown?
  - physical
  - cellular
  - chemical
- What type of change is weathering?
  - physical change
  - chemical change
  - seasonal change
- How can salt be made?
  - in a chemical reaction between sodium and chlorine
  - by mixing pepper and sugar
  - by crushing a piece of salt cane into tiny pieces
- Which of these is a chemical change that takes place over a long period of time?
  - adding chlorine to the pool
  - making chocolate milk
  - the rusting of metal
- What type of change has occurred when a glass breaks?
  - a physical change
  - a chemical change
  - a physiological change

## Answer Key

Brain Pop Chemical and Physical Changes program video and quiz

<http://glencoe.mcgraw-hill.com/sites/dl/free/0078617650/160350/00044680.html>

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