

SCIENCE FINAL STUDY GUIDE

1. **CHEMICAL CHANGE**: Any change in matter in which a new and different substance forms
2. **CHEMICAL ENERGY**: Energy that can be released by a chemical change
3. **CHEMICAL PROPERTY**: A characteristic that describes how a substance will interact with another substance
4. **CHEMICAL REACTION**: Another name for a chemical change
5. **CONDUCTION**: The transfer or movement of heat between two objects that are touching
6. **CONDUCTOR**: A material that allows heat to move through it easily
7. **CONVECTION**: The transfer of heat within a liquid or a gas
8. **ELECTRICAL ENERGY**: Energy that comes from electric current
9. **ENERGY**: the ability to cause change in matter. Everything that moves has energy
10. **HEAT**: The energy that moves between objects of different temperatures
11. **INSULATOR**: A material that does not let heat move through it easily
12. **KINETIC ENERGY**: The energy of motion
13. **MECHANICAL ENERGY**: the total Potential and Kinetic energy of an object
14. **MATTER**: anything that has mass and takes up space
15. **MASS**: the amount of matter or “stuff” in a certain object
16. **MIXTURE**: A combination of two or more different substances in which the substances KEEP their OWN properties
17. **PHYSICAL CHANGE**: A change in matter in which a new substance is **NOT** formed
18. **POTENTIAL ENERGY**: The energy something has because of its position or condition
19. **PROPERTY**: A characteristic, or trait, that you can use to describe matter by observation, measurement or combination
20. **RADIATION**: The movement of heat without matter to carry it

21. **SOLUTION**: A mixture that has the same composition throughout because all the parts are mixed evenly
22. **VOLUME**: The amount of space an object takes up

PHYSICAL CHANGE

- A change in state is a PHYSICAL CHANGE that takes place when heat energy is added or removed from matter.
- MELTING is a change in state from solid to liquid.
- EVAPORATION is a change in state from liquid to gas.
- Ice, Frozen pop or ice cream + heat energy = melting (Physical change because no new substances are formed)
- Liquid juice – heat energy = freezing (Physical change because no new substances are formed)
- Water boiling, melting or freezing is a PHYSICAL CHANGE
- Lemonade is a SOLUTION made up of water, which is a SOLVENT, and lemon juice and sugar, which are both solutes.

CHEMICAL CHANGES

- Chemical property is a property that describes how a substance interacts with other substances
- Chemical properties: 1)the ability to RUST 2)the ability to TARNISH 3)the ability to BURN
 - The ability to Rust is a Chemical Property of Iron
 - The ability to Burn is a Chemical Property of Wood and Gasoline.
 - The ability to Tarnish is a Chemical Property of Silver and Copper.
 - Resistance to Burning (not burning) is a Chemical Property of Gold and Water
- Remember the Rusting Car left in the woods (page 408 & 409)

- The broken glass and bent metal are Physical Changes
 - The rust is a Chemical Change
 - Over time, the metal reacted with Oxygen to form rust.
 - NO NEW MATTER WAS CREATED. The SAME amount of matter, or mass, is present BEFORE and AFTER substances react.
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- CLUES of Chemical Changes:
 - ODOR
 - COLOR CHANGE
 - LIGHT
 - HEAT
 - GAS BUBBLES
 - A fried egg shows a chemical change has taken place by its change in color and odor
 - Toast shows a chemical change by the color change and odor
 - A matchstick shows chemical change by color change, light and/or heat while burning and it produces smoke and ash
 - A rusty nail shows chemical change in the color change of the metal
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- A Chemical Reaction is another name for Chemical Change. REACTION is how something responds or acts to something.
 - **EXAMPLES of Physical changes in making a pizza:**
 - Mixing flour and water
 - Kneading the dough
 - Slicing ingredients
 - Crushing tomatoes and mixing spices for the sauce
 - Grating cheese
 - Slicing the pizza
 - Chewing the pizza

- **EXAMPLES of Chemical changes in making a pizza:**

- The yeast breaks down the sugar
- Carbon dioxide gas is given off
- The gas makes the dough rise
- The dough turns golden brown from baking
- The cheese and toppings are cooked
- The pizza is digested by the body

- **3 STATES OF MATTER:**

- SOLID
- LIQUID
- GAS

- **FORMS OF ENERGY:**

- KINETIC ENERGY
- POTENTIAL ENERGY
- MECHANICAL ENERGY
- CHEMICAL ENERGY
- ELECTRICAL ENERGY
- SOUND ENERGY (vibrations / sound waves)
- LIGHT ENERGY

- **ENERGY CHANGING FORMS:**

- Electrical energy changes to light energy when you turn on a light switch
- Heat energy can be felt by some light bulbs or from a fire
- Chemical energy in gasoline changes to mechanical energy when a driver presses the gas pedal to drive
- Batteries change chemical energy to electrical energy to move the car

- **HEAT:**

- **CONDUCTION:** the transfer of heat between tow objects that are touching
 - a metal spoon in hot liquid will turn hot
 - the burner of a stove transfers heat to a metal pan
 - warmth is transferred from a floor to feet

- grilling a sandwich in a sandwich press- the heat is transferred from the grill to the bread to toast it
- CONVECTION: the transfer of heat within a liquid or gas
 - The heat from a fire will warm the cooler air above it
 - In a boiling pot of water: when the water at the bottom of the pot heats, it travels up through the cooler water heating it
- RADIATION: the transfer of heat without matter to carry it
 - Heat from the sun warming your face
 - Heat from a lightbulb
 - Heat from a fire
 - Heat from anything else which is warmer than its surroundings.

- **CONDUCTORS AND INSULATORS**

- Conductor: A material that allows heat to move through it easily
 - Solids are better conductors of heat than liquids or gases
 - Metals are great conductors
 - Glass and marble do not conduct heat well
- Insulator: A material that do not allow heat to move through it easily
 - Oven mitts (gloves) are good insulators and will protect your hands from the hot oven
 - Rubber is a great insulator
 - Gases can be good insulators:
 - A thin layer of trapped air
 - The air between the hair/fur of an animal
 - Body heat : clothing can trap in body heat to keep people warm
 - Soil acts as an insulator
 - Insulation is material put in a house to keep heat from escaping.

