Name: _____

Physical Science 8 Midterm Information

Your midterm will on 1/28. It will consist of multiple choice questions and short answer questions. It will cover the units we have completed from September to January. See Ms. Williams' website – **Midterm Review Binder** - for a complete list of midterm readings, review packets, quizlets and other helpful information. Study a little each night and good luck!

Energy Unit:

- Identify different types of energy and provide examples
- Determine the factors needed to increase/decrease KE and PE levels
- Be able to identify and explain how kinetic energy and potential energy levels can increase/decrease as an object moves (example – pendulum swing)
- Identify and provide examples of energy transformations

Matter Unit:

- Define matter and its phases
- Compare/Contrast similarities and differences between the 3 phases
  - Volume
  - Shape
  - Molecular movement/arrangement
- Identify phases changes
- What happens when heat is added/removed to substances
- Freezing/Melting Point
- Boiling Point
- Identify and define the 2 parts that substances are composed of
- Define mixture and explain how mixtures can be separated
- Explain the difference between physical and chemical properties
- Explain the difference between physical and chemical change
- Describe the forces of attraction between water molecules
- Explain how to weaken the forces of attraction between molecules.
- Explain why objects are able to "stand" on water?

Review 1-6 ★ starred

Heat Unit:

- Define Conduction, Convection and Radiation and provide examples for each
- Explain how heat flows
- Explain why things feel hot/cold and how heat flow is related
- Explain the impact of increasing or decreasing heat has on molecular movement and kinetic energy
- Explain what occurs in a convection current
- Explain what happens to the density of a substance as is it heated
- Identify insulators and conductors and how ~~they~~ conductors transfer heat

TURN OVER for Scientific Method

Name: _____

Scientific Method Unit:

- ✓ Identify and explain steps in scientific method
- ✓ Read data table and make conclusion based on information presented
- ✓ Based on a scenario
  - State a hypothesis
  - Identify experimental group and control group
  - Identify independent, dependent, and control variables
  - Analyze data collected and make a reasonable conclusion and support with evidence
  - Identify reasons for scientific errors and how to improve reliability of an experiment
  - Lab safety procedures and rules

Name: For questions 1-8 Matter Midterm Review Packet

What is Matter? Some statements below may have more than one answer.

1. Food coloring spreads out faster in hot water than in cold water. This is mainly because:

a) The water molecules in hot water move more quickly

b) The molecules in hot water are larger

c) The food coloring molecules are small

d) Hot water is less dense ← debateable

2. When you heat a sample of a solid, the particles that make up the solid:

a) Get bigger

b) Loose mass

c) Move faster

d) Slow down

3. To describe a liquid, you could say:

a) The particles of a liquid are attracted to one another

b) The particles of a liquid are in motion

c) The particles of a liquid are able to move past one another

d) A liquid has mass and takes up space

4. To describe a solid, you could say:

a) The particles of a solid are attracted to each other

b) The particles of a solid can move past one another

c) The particles of a solid vibrate but do not move past one another

d) A solid has mass and takes up space

5. To describe a gas, you could say:

a) The particles are very attracted to each other

b) The particles are not very attracted to each other

c) The particles are close together like a liquid

d) The particles of a gas are further apart than the particles in a liquid or solid

6. Any sample of matter has mass and takes up space. The main reason for this is because:

a) All matter is heavy

b) Matter can be a gas

c) Matter is made up of tiny particles that have mass and take up space

d) The Earth is made of matter

7. When you heat a sample of a solid, the sample gets a little bigger. This is mainly because:

a) The particles move faster and get a little further apart

b) Heat helps the particles grow

c) Heating the sample makes it lighter

d) Heating helps the particles slide past each other

8. When you heat a sample of gas, what happens to the particles that make up the gas?

a) The particles move faster

b) The particles break apart

c) The particles get smaller

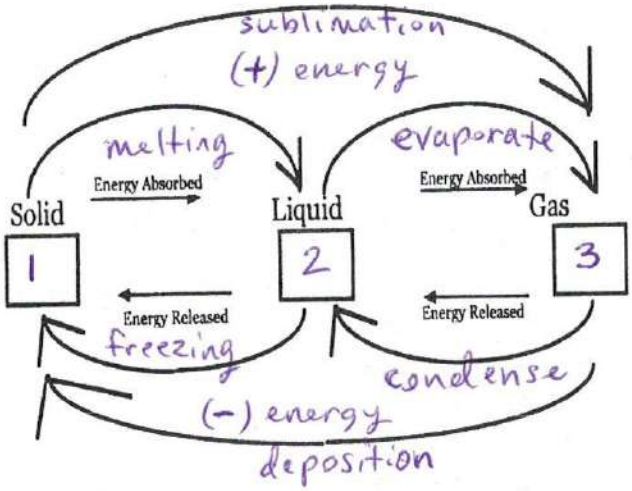
d) The particles become more dense

9. Complete the table below on what you know about the phases of matter.

	Solid	Liquid	Gas
Attraction Choose- High medium Low	high	medium	low
Movement Choose- vibrations moderate collisions strong collisions	vibrations	moderate collisions	strong collisions
Volume Choose high med Low	low	med	high
Shape Choose definite indefinite	def	indef	indef.

Phase Changes

1. Label the diagram below with the phase changes



2. Hot water evaporates faster than room temperature water. This is mainly because:

a) Molecules of hot water are lighter
b) More water molecules move fast enough to break away from other water molecules
c) Room temperature water has more mass
d) The molecules in room temperature water are moving faster

3. When water freezes, liquid water turns to solid ice mainly because

a) The water molecules get harder
b) The molecules move slowly enough that their attractions keep them in fixed positions
c) All liquid water eventually becomes ice
d) Ice can float on water

4. If you compare ice and liquid water on the molecular level, you could say that

a) The molecules in liquid water are closer together
b) The molecules in ice are closer together
c) The molecules in ice slide past each other
d) The molecules in liquid water are smaller

5. In order to change from a liquid to a gas

a) energy must be added
b) energy must be removed
c) energy must remain constant
d) energy does not make changes

6. The phase with the greatest amount of kinetic energy is

a) solid
b) liquid
c) gas

7. The phase changes that require the addition of energy (heat) are

a) melting and freezing
b) vaporization and condensation
c) freezing and condensation
d) vaporization and melting

8. The temperature at which a substance changes from a liquid to a solid is called

a) melting point
b) vaporization point
c) freezing point
d) no temperature exists

Use the table below to answer the questions that follow

Table II Examples of metal melting points

	Melting point (°C)
Germanium	938
Antimony	631
Tellurium	450
Lead	328
Bismuth	272
Indium	156
Bi-Pb alloy	126
Rose's alloy	97
Anatomical alloy	61

9. What substances will be a liquid at 600°C?

Likely all of the * however

10. What substances will be a solid at 100°C?

Bi-Pb alloy → Germanium

based on the info provided & knowing nothing else "Anatomical alloy" could be a gas at 600°C

Properties of Matter:

(4) ⭐

For each example, check if it is a physical or chemical change.

Example	*Physical Change*	*Chemical Change*
1. crushing a can	X	
2. burning toast		X
3.ice melting	X	
4. cutting an apple into pieces	X	
5. Foaming of vinegar and baking soda when mixed		X
6. Production of heat given off		X
7. A car roof dents	X	

8. Substances are composed of two things

a. mass and speed
(b.) elements and compounds
c. physical and chemical changes
d. kinetic and potential energy

Composition of Matter

9. A substance that contains two or more different types of matter is called _____.

a. an organic sample
(b.) mixture
c. formula
d. an element

10. Explain why phase changes are physical changes?

No new composition of matter is created when a substance under goes a change in state. The chemical properties remain the same.

11. You have been given a mixture that includes the following substance

Iron Filings	Salt
Dried Beans	Water

Write a detailed procedure that explains how you would separate this mixture into the 4 individual substances. Be sure to include what tools you would use to help you and why they worked.

(1) Use a magnetic to seperate iron.
(2) Use a filter to remove beans and/or other mechanical means)
(3) Add heat to the salt-water mixture to accelerate evaporation.
(4) you are left w/ salt.
(5) Oh yeah--- I guess collect water vapor on a surface by condensation---
"Now you have all four ⭐ 's"

Forces of Attraction:

1. **The strong water bonds are weaken by**
   a. cohesion
   b. surface tension
   (c.) adding soap or a surfactant
   d. adding more water

2. **Forces of attraction between water molecules** are ~~were~~ **demonstrated**
   a. between weak water molecules
   (b.) between strong water molecules
   c. between weak soap and weak water molecules

3. **The strong attraction of water molecules cause the surface molecules to form a "skin" like layer called**
   a. adhesion
   b. surfactant
   (c.) surface tension

Name: _____

Heat Midterm Review Sheet

What kind of material that allows heat to move through it easily?

A. Conductor
B. Thermometer
C. Friction
D. Insulator

What material does not allow heat to pass through it easily?

A. **Insulator**
B. **Insulation**
C. **Conductor**
D. **Friction**

What is the movement of heat within a solid or from one solid to another?

A. **Transfer of Energy**
B. **Conduction**
C. **Insulation**
D. **Conductor**

What is the way heat moves through liquids and gases called?

A. **Convection**
B. **Conduction**
C. **Radiation**
D. **Thermal Energy**

Which of the examples below is an example of Convection?

A. **Rubbing your hands together**
B. **Heating a fish tank**
C. **Basking in the sun**
D. **Striking a match**

What is the movement of energy by waves called?

A. Thermal Energy
B. Conduction
C. Radiation
D. Solar Energy ← not a bad choice either really

Being warmed by fire is an example of which type of energy?

A. Radiation
B. When you cool down your hot chocolate by putting cold milk in it.
C. Rubbing sticks
D. Clapping your hands

which are conductors?

A. **styrofoam, glass, plastic**
B. copper, aluminum bar
C. **glass, wood, liquid**
D. **Wood, plastic, paper**

What colors reflect solar energy better?

A. **Light colors, example: snow**
B. **Dark colors: A black shirt**
C. **Neon colors**
D. **Primary colors, the color blue**

What keeps thermal (heat) energy from moving?

A. **When one item is hot and the other is cold**
B. **When the items are the same temperature**
C. **When one item is glass and the other is plastic**

Why does the liquid in a thermometer rise on a hot day and drop down on a cold day?

A. On a hot day, the particles in the liquid move slow and take up less space. On a cold day the particles in the liquid move fast and take up more space.

B. On a hot day, the particles in the liquid move fast and take up more space. On a cold day the particles in the liquid move slowly and take up less space.

C. On a hot day, the particles in the liquid move slow and take up less space. On a cold day the particles in the liquid don't move and take no space.

Name: _____

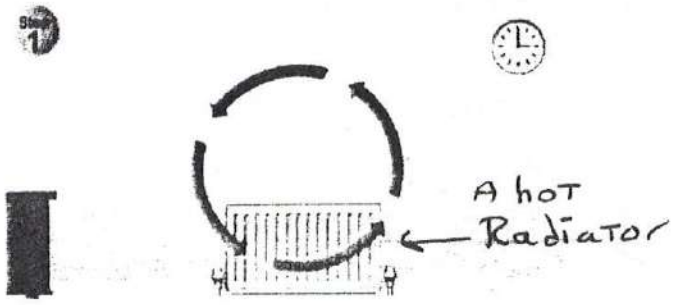
What happens when a hot thing touches a cold thing and the heat from the hot thing makes the cold particles speed up?

A. Convection
B. Conduction
C. Radiation

What happens when heat warm up the air particles around it and the hot air rises and pushes the cold air down?

A. Radiation
B. Conduction
C. Convection

Use the diagram below to answer the questions that follow.



What is happening in the diagram above?

A convection current has formed

What do the arrows represent?

Hot air rises & cool air cycling back through to be heated again.

How is heat being transferred in the diagram above?

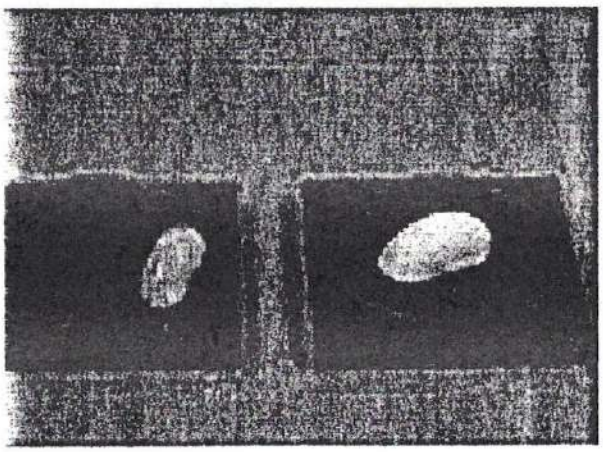
Convection (mainly) radiant energy is also present

Where is the density of the air the lowest?

At high noon on the circle.

Use the picture below to answer the following questions.

Ice Cube Melt



If both of these blocks are at the same temperature, why does the ice melt faster on one block?

One block is some sort of metal & a conductor. Here the ice melts faster.

The block on the right is some sort of wood & an insulator.

How Energy is Transferred from One Form to Another

As is stated in the Law of Conservation of Energy, Energy can neither be created or destroyed, only changed from one form to another. So how does this happen?

Some examples of transferring energy are:

The sun gives energy in the form of light energy (EMR), this is taken in by plants and changed by photosynthesis into chemical energy, which is then eaten by animals. We then eat the plants or the animals, and the chemical energy becomes kinetic energy through our movement.

We burn a candle (chemical energy), to give light (EMR Energy).

We put on a CD, chemical energy that was being potential energy starts turning into electrical energy. The electrical energy travels through some wires to the electric motor that spins the disc and becomes mechanical energy. An electrical signal then travels through some more wires into the speakers and becomes sound energy!

A tennis racquet hitting a ball is a transfer of kinetics energy from one object to another, involving some stored energy in the strings of the racquet.

Renewable and Non-Renewable Energy

Types of Renewable Energy:

Sun - The sun is one of our most valuable sources of energy, it can be used to create energy for many things, such as heating water and solar electricity. As well as, providing energy to plants and animals.

Wind - Blowing wind can be used to create and store energy by spinning the blades on big wind turbines.

Water (Hydro) - Moving or falling water can be used to create energy through water mills, which are turned by moving water. Or through Hydro Dams, where water is collected in a big dam and filtered through a pipe that spins a turbine, the turbine spins a generator creating electricity.

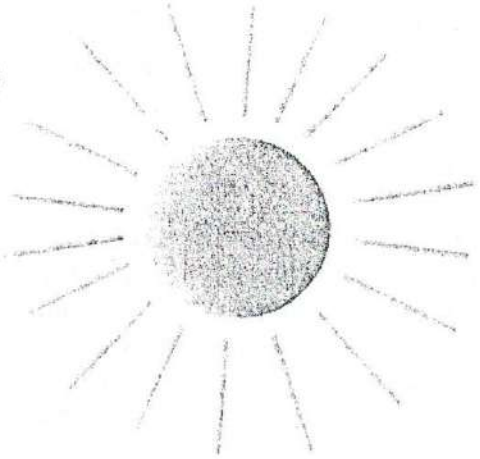
Bio-Mass - This is matter usually thought of as garbage. It is made up of such things as dead trees, branches, lawn clippings, wood chips, saw dust and livestock manure. Bio-mass is fed into a furnace and burned. The heat is used to boil water, creating steam, the energy in the steam is used to turn turbines and power generators.

Geo-Thermal - "Geo" means earth, and "Thermal" means heat. So geo-thermal means earth heat.

Types of Non-Renewable Energy are Fossil Fuels, coal, oil and natural gas, that are burned to create energy. Fossil Fuels were formed around 300 million years ago and once they are gone they are gone!

Unlike fossil fuels, which also dirty the atmosphere, renewable energy also has less impact on the environment.

What is Energy?



Energy is defined as "The ability to do work"

Energy is what causes things to happen in the world around us. Look out of your window.

The sun gives out light and heat energy during the day; and at night, street lamps use electrical energy to light our way.

When a car drives by, it is being powered by petrol, a type of stored energy.

The food we eat contains energy. We use that energy to work and play.

Law of Conservation of Energy - Energy can neither be created nor destroyed, only changed from one form to another. However, in most energy transformations some energy is 'lost' in the form of wasted heat.

Energy Definition

"The ability to do work"

Different Forms of Energy

Potential Energy - This is energy that is stored and has the potential to do work. It can be a form of tension, such as a spring or rubber band.

Kinetic Energy - This is movement energy, when something is moving, doing work it is using kinetic energy.

Heat Energy - Vibrations make atoms and molecules move faster, heating up the air around them – often released in an energy transformation into the atmosphere.

Light Energy - (Electromagnetic Radiation) Travels in the form of waves, such as heat waves from the sun.

Sound Energy - Travels through waves that compress and stretch (like a slinky), the material through which they pass.

Electrical Energy – this is energy made available by the flow of electric charge through a conductor.

Chemical Energy - The energy stored in the bonds between atoms and molecules. When chemicals react the energy can be released or absorbed. Example – batteries, wood.

Nuclear Energy - The energy that is stored in the bonds between the particles within the atoms. When a nucleus splits (fission) or smaller nuclei combine (fusion) lots of energy is released.

Gravitational Potential Energy - This is the energy a body has available due to its height.

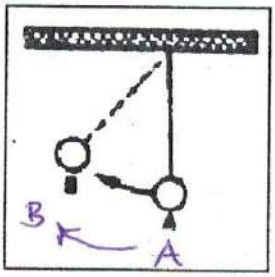
Elastic Potential Energy – energy stored in bent springs, compressed objects or stretched bands

Mechanical Energy - This can be either potential or kinetic.

Practice Questions:

1. What kind of energy is stored in a battery?
   A. Chemical
   B. Kinetic
   C. Nuclear
   D. Electrical

2. As the pendulum swings from A to B the kinetic energy
   A. Increases
   B. Decreases
   C. Stays the same

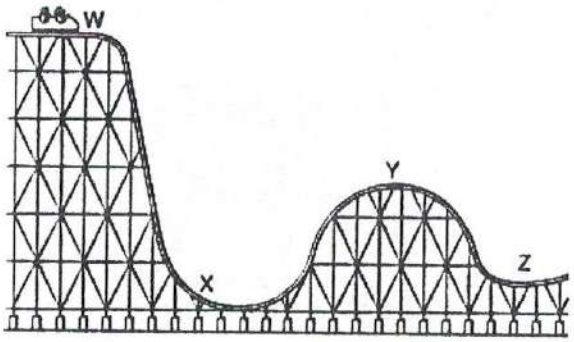


3. Kinetic Energy is
   A. Energy of motion
   B. Stored energy
   C. Energy in atomic bonds
   D. None of the above

4. The amount of Kinetic Energy in an object is determined by
   A. Mass and Height
   B. Speed and Volume
   C. Shape and Density
   D. Mass and Speed

5. Natural Gas is an example of
   A. Electrical Energy
   B. Nuclear Energy
   C. Chemical Energy
   D. Kinetic Energy

The picture below shows a rollercoaster in different positions as it moves on the track. Answer the questions based on the diagram.



6. At which point does the rollercoaster cart have the greatest amount of potential energy?
   A. W
   B. X
   C. Y
   D. Z

7. At which point does the rollercoaster cart have the least amount of potential energy?
   A. W
   B. X
   C. Y
   D. Z ← Now think about Z. Why is it not Z?

8. Potential Energy is known as
   A. Energy of motion
   B. Stored Energy
   C. Energy of Volume
   D. Energy of Conservation

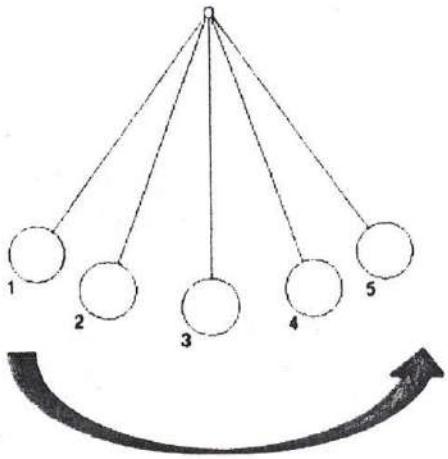
9. When energy changes from one to another this is usually released to the atmosphere
   A. Light
   B. Sound
   C. Heat
   D. Electricity

10. As a fire burns what energy transformations occur?
    A. Chemical to Light and Heat
    B. Chemical to Electrical and Heat
    C. Nuclear to Mechanical and Heat
    D. Electrical to Light and Heat

11. An example of an object with gravitational potential energy is
    A. A rock on the bottom of a hill
    B. A rock on the edge of a cliff
    C. A rock rolling down a hill
    D. A rock rolling on the ground

12. An example of an object with elastic potential energy is
    A. A string
    B. A burning candle
    C. A stretched rubber band
    D. A rock on a cliff

The diagram below shows a pendulum swinging. Use the diagram to answer the questions that follow.



13. As the pendulum swings from point 1 to point 3 the kinetic energy
    A. Increases
    B. Decreases
    C. Remains the same

14. As the pendulum swings from point 1 to point 3 the potential energy
    A. Increases
    B. Decreases
    C. Remains the same

15. At which point in the pendulum swing would the bob have the most force to knock something down?
    A. Point 1
    B. Point 3
    C. Point 4
    D. Point 5

16. Energy is defined as
    A. The ability to release heat
    B. The ability to do work
    C. The ability to conserve
    D. The ability to create light

17. An example of renewable energy is
    A. Oil
    B. Coal
    C. Water
    D. Natural Gas

    Hydroelectrical or Hydropower

18. This says that energy cannot be created or destroyed only changes form
    A. The Law of Changing Energy
    B. The Law of Conservation of Energy
    C. The Law of Transforming Energy
    D. None of the Above

19. A problem with using non-renewable energy sources is
    A. They are very expensive and only a few people can afford them
    B. They cause pollution and will run out
    C. They can be replaced very quickly
    D. They don't work with most of the appliances or cars in the United States

20. All energy comes from
    A. Food
    B. Nuclear reactions
    C. Space
    D. The Sun

21. Give a real life example when chemical energy is transformed to light and heat energy.

    Flashlight / lighter

22. Give an example of Potential Energy transforming to Kinetic Energy

    Roller coaster

Use the quizlets posted on the website and other unit reviews to help you do your best on the midterm!