Eagen

Science 7

Potential & Kinetic Energy

Potential Energy - stored energy

$PE = \underline{m}g\underline{h}$

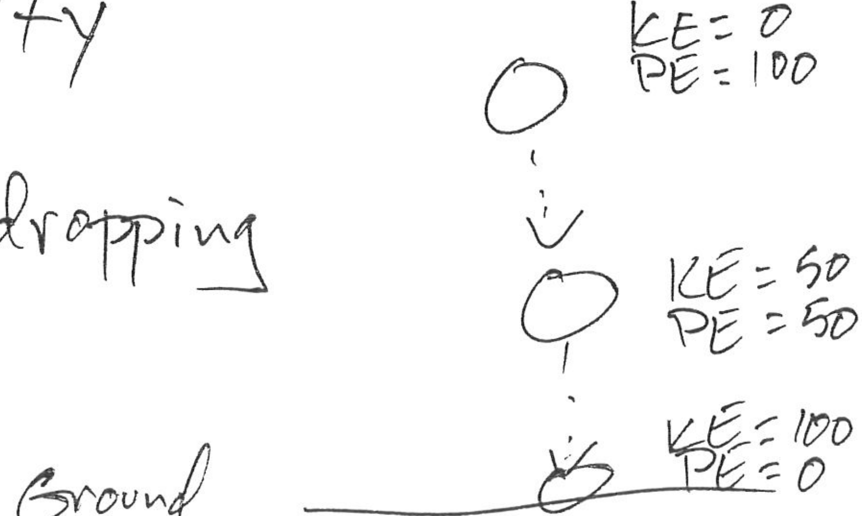
↳ based on Mass or Height

Kinetic Energy - moving energy

$KE = \frac{1}{2} mv^2$

↳ based on Mass or Velocity

Ball dropping



Name ______________________________ Date ________________ Period _____

Potential vs. Kinetic Energy

Potential Energy is stored energy. It can be released or harnessed to do work. Kinetic energy is the energy possessed by an object as a result of its motion. Label each description as an example of kinetic energy or potential energy.

1. ________________ A skier is poised at the top of a steep slope.

2. ________________ A concrete dam holds back a large reservoir of water.

3. ________________ An archer has pulled back the string of his bow, ready to release the arrow at the distant target.

4. ________________ A woman swings her golf club down toward the golf ball sitting on the tee.

5. ________________ A man swings an axe toward a log.

6. ________________ A flowerpot is falling from a windowsill.

7. ________________ A catapult is loaded with a boulder and pulled back into position. It is ready to be launched.

8. ________________ A fast-moving stream runs toward the mill.

9. ________________ The baseball player swings her bat.

10. ________________ A roller coaster has reached the top of the highest hill.

11. ________________ A marble rolls across the table.

12. ________________ A child is about to let go of a yo-yo.

Name Key Date ______________ Period _____

Potential vs. Kinetic Energy

Potential Energy is stored energy. It can be released or harnessed to do work. Kinetic energy is the energy possessed by an object as a result of its motion. Label each description as an example of kinetic energy or potential energy.

1. Potential A skier is poised at the top of a steep slope.

2. Potential A concrete dam holds back a large reservoir of water.

3. Potential An archer has pulled back the string of his bow, ready to release the arrow at the distant target.

4. Kinetic A woman swings her golf club down toward the golf ball sitting on the tee.

5. Kinetic A man swings an axe toward a log.

6. Kinetic A flowerpot is falling from a windowsill.

7. Potential A catapult is loaded with a boulder and pulled back into position. It is ready to be launched.

8. Kinetic A fast-moving stream runs toward the mill.

9. Kinetic The baseball player swings her bat.

10. Potential A roller coaster has reached the top of the highest hill.

11. Kinetic A marble rolls across the table.

12. Potential A child is about to let go of a yo-yo.

Heat Transfer

Conduction

Heat transfer when the objects are in physical contact

Touching

Convection

Heat transfer in liquids/gases.
Hot air rises
Cold air falls

Movement

Radiation

Heat transfer through electro-magnetic waves

Waves

St 4, ob 1c

Name: ____________________

Period: __________

Conduction, Convection, or Radiation

Objective: Students will know how to separate the different types of thermal energy.

Matching: Use these definitions to help you with the rest of the worksheet.

______Radiation	A. Heat transfer from a heat source through a solid.
______convection	B. Infrared heat waves like in the Electromagnetic spectrum.
______Conduction	C. Heated gas or liquid particles rise.

Label each example with the appropriate type of heat transfer: **radiation, convection, or conduction.** Explain why you think so for each example (**hint:** use the definitions above to help you).

1. ________________ Heat we feel from the sun.
   a. Why? ____
2. ________________ The heat you feel when you touch a hot stove.
   a. Why? ____
3. ________________ Heat you feel when you put your hands above a fire.
   a. Why? ____
4. ________________ My spoon is hot after leaving it on the pot that was on the stove.
   a. Why? ____
5. ________________ This is responsible for making macaroni rise and fall in a pot on the stove.
   a. Why? ____
6. ________________ The heat my snake feels from the heat lamp above him.
   a. Why? ____
7. ________________ Transfer of heat by the actual movement of the warmed matter (i.e. gas or liquid).
   a. Why? ____

St 4, ob 1c

Name: ______________________

Period: ________

8. ______________ The reason heating vents are usually placed on the floor of a home.

   a. Why? ____

9. ______________ Insulation is used to prevent this type of heat transfer.

   a. Why? ____

10. ______________ This type of heat transfer is trapped by green houses.

   a. Why? ____

11. ______________ Why the dog lays down next to the wood stove.

   a. Why? ____

12. ______________ Why the cat sits on a stove above the stove.

   a. Why? ____

13. ______________ Why the kettle on the stove gets hot.

   a. Why? ____

14. ______________ Why you use a pot holder when getting the cookie sheet out of the oven.

   a. Why? ____

15. ______________ Heat you feel when you sit next to a campfire.

   a. Why? ____

16. ______________ Heat you feel from your electric blanket.

   a. Why? ____

St 4, ob 1c

Name: Key Period: ________

Conduction, Convection, or Radiation

Objective: Students will know how to separate the different types of thermal energy.

Matching: Use these definitions to help you with the rest of the worksheet.

B Radiation	A. Heat transfer from a heat source through a solid.
C convection	B. Infrared heat waves like in the Electromagnetic spectrum.
A Conduction	C. Heated gas or liquid particles rise.

Label each example with the appropriate type of heat transfer: **radiation, convection, or conduction.** Explain why you think so for each example (**hint:** use the definitions above to help you).

1. R Heat we feel from the sun.
   a. Why? ________
2. Cond. The heat you feel when you touch a hot stove.
   a. Why? ________
3. Conv. Heat you feel when you put your hands above a fire.
   a. Why? ________
4. Cond. My spoon is hot after leaving it on the pot that was on the stove.
   a. Why? ________
5. Conv. This is responsible for making macaroni rise and fall in a pot on the stove.
   a. Why? ________
6. ~~Conv~~ Rad The heat my snake feels from the heat lamp above him.
   a. Why? ________
7. Conv. Transfer of heat by the actual movement of the warmed matter (i.e. gas or liquid).
   a. Why? ________

St 4, ob 1c

Name: ______________________

Period: __________

8. Conv. The reason heating vents are usually placed on the floor of a home.

   a. Why? ______________________

9. Conv. Radiation Insulation is used to prevent this type of heat transfer.

   a. Why? ______________________

10. Rad Conv. This type of heat transfer is trapped by green houses.

   a. Why? ______________________

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14. Cond. Why you use a pot holder when getting the cookie sheet out of the oven.

   a. Why? ______________________

15. Rad. Heat you feel when you sit next to a campfire.

   a. Why? ______________________

16. Cond. Heat you feel from your electric blanket.

   a. Why? ______________________

Chem./Physical Properties & Changes Notes

Physical Properties - describe the appearance or something we can measure

Ex. Color, shape, M.P., B.P, volume

Chem. Prop. - describe how it reacts w/ other chemicals

Ex. Reactivity, Combustion, flammable

Chem. Change - creates new chem.

3 Signs
1.) Bubbles 2.) Color change - we didn't add 3.) Heat/Light

Phys. Change - Does not create new chem.
- changes the appearance only

Chem & Phys. Change Notes

<u>Chem. change</u> - creates a new substance

3 Signs
1.) Bubbles
2.) Heat/light
3.) color change - we didn't add

<u>Physical change</u> - doesn't create a new substance
↳ only changes appearance

PHYSICAL AND CHEMICAL PROPERTIES AND CHANGES

Name ___________________________

PHYSICAL PROPERTY	CHEMICAL PROPERTY
1. observed with senses 2. determined without destroying matter	1. indicates how a substance reacts with something else 2. matter will be changed into a new substance after the reaction

Identify the following as a chemical (C) or physical property (P):

______1. blue color
______2. density
______3. flammability (burns)
______4. solubility (dissolves)
______5. reacts with acid
______6. supports combustion
______7. sour taste
______8. melting point
______9. reacts with water
______10. hardness
______11. boiling point
______12. luster
______13. odor
______14. reacts with air

PHYSICAL CHANGE	CHEMICAL CHANGE
1. a change in size, shape, or state 2. no new substance is formed	1. a change in the physical and chemical properties 2. a new substance is formed

Identify the following as physical *(P)* or chemical *(C)* changes.

_____1. NaCl (Table Salt) dissolves in water.
_____2. Ag (Silver) tarnishes.
_____3. An apple is cut.
_____4. Heat changes H_2O to steam.
_____5. Baking soda reacts to vinger.
_____6. Fe (Iron) rusts.
_____7. Alcohol evaporates .
_____8. Ice melts.
______9. Milk sours.
______10. Sugar dissolves in water.
______11. Wood rots.
______12. Pancakes cook.
______13. Grass grows.
______14. A tire is inflated.
______15. Food is digested.
______16. Paper towel absorbs water.

Physical and Chemical Changes

Part A

Can you recognize the chemical and physical changes that happen all around us? If you change the way something looks, but haven't made a new substance, a **physical change** (P) has occurred. If the substance has been changes into another substance, a **chemical change** (C) has occurred.

1.		An ice cube is placed in the sun. Later there is a puddle of water. Later still the puddle is gone.
2.		Two chemical are mixed together and a gas is produce.
3.		A bicycle changes color as it rusts.
4.		A solid is crushed to a powder.
5.		Two substances are mixed and light is produced.
6.		A piece of ice melts and reacts with sodium.
7.		Mixing salt and pepper.
8.		Chocolate syrup is dissolved in milk.
9.		A marshmallow is toasted over a campfire.
10.		A marshmallow is cut in half.

PHYSICAL AND CHEMICAL PROPERTIES AND CHANGES

Name Kel

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P 2. density
C 3. flammability (burns)
P 4. solubility (dissolves)
C 5. reacts with acid
C 6. supports combustion
P 7. sour taste
P 8. melting point
C 9. reacts with water
P 10. hardness
P 11. boiling point
P 12. luster
P 13. odor
C 14. reacts with air

PHYSICAL CHANGE	CHEMICAL CHANGE
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Identify the following as physical *(P)* or chemical *(C)* changes.

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C 9. Milk sours.
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C 11. Wood rots.
C 12. Pancakes cook.
C 13. Grass grows.
P 14. A tire is inflated.
C 15. Food is digested.
P 16. Paper towel absorbs water.

Physical and Chemical Changes

Part A

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1.	P	An ice cube is placed in the sun. Later there is a puddle of water. Later still the puddle is gone.
2.	C	Two chemical are mixed together and a gas is produce.
3.	C	A bicycle changes color as it rusts.
4.	P	A solid is crushed to a powder.
5.	C	Two substances are mixed and light is produced.
6.	C	A piece of ice melts and reacts with sodium.
7.	P	Mixing salt and pepper.
8.	P	Chocolate syrup is dissolved in milk.
9.	C	A marshmallow is toasted over a campfire.
10.	P	A marshmallow is cut in half.

Identifying Forces Notes

<u>Balanced forces</u> -
Forces cancel out

Net force = 0 Generally, results in no motion

$\xleftarrow{5N} \quad \xrightarrow{5N}$

<u>Unbalanced forces</u> -
Forces do not cancel

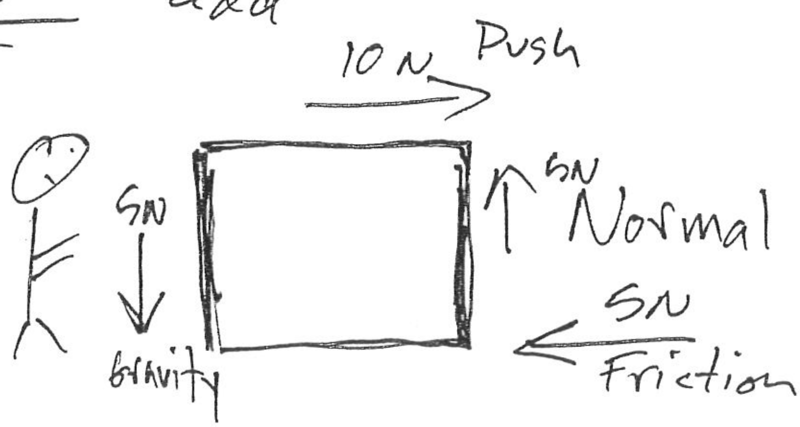
$\xleftarrow{10N} \quad \xrightarrow{5N}$ Net force = 5N left

$\leftarrow \quad \rightarrow$ subtract

$\rightarrow \quad \leftarrow$ subtract

$\rightarrow \quad \rightarrow$ add

$\leftarrow \quad \leftarrow$ add



Name ____________________ Date ____________

Net Force Worksheet

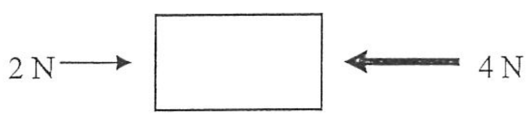
What causes objects to move? For each problem, complete the questions using your notes and what you have learned so far in this Forces Unit.

1. Write the definition of each term in the definition column. Then decide whether that force produces motion and write either yes, no or it depends in the motion column.

Vocabulary term	Definition	Change in motion? (yes, no or it depends)
Net force		
Balanced forces		
Unbalanced forces		

2. For each of diagram, determine the net force acting on the object. Follow the format for showing your work shown in (a). Then, write whether or not there will be a change in motion. If yes, write the direction the object will move in.

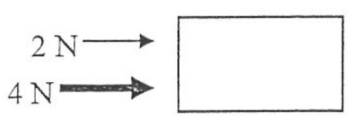
a.



Net force: *4 N – 2 N = 2 N to the left.*

Change in motion: The box will move to the left.

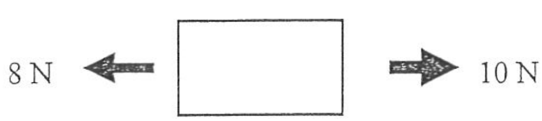
b.



Net force:

Change in motion:

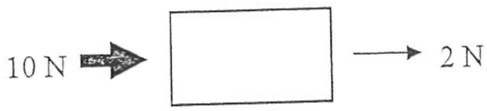
c.



Net force:

Change in motion:

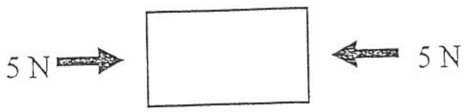
d.



Net force:

Change in motion:

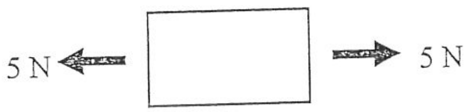
e.



Net force:

Change in motion:

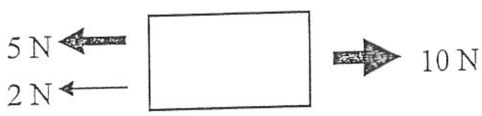
f.



Net force:

Change in motion:

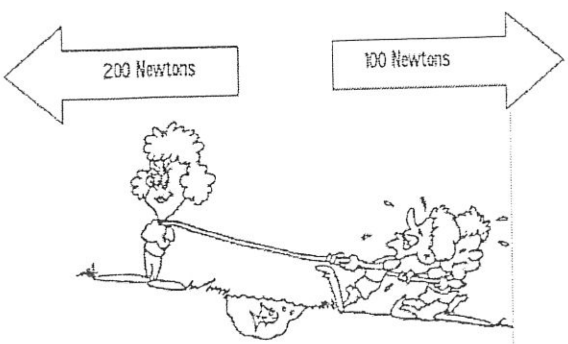
g.



Net force:

Change in motion:

Below is a diagram of a tug-a-war. Write a short paragraph to describe what will happen, using the terms *net force, balanced OR unbalanced forces, AND change in motion.*



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____

____

Name Key Date ____________

Net Force Worksheet

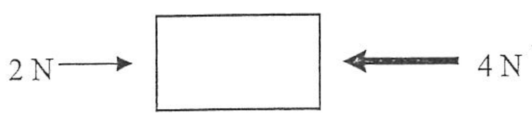
What causes objects to move? For each problem, complete the questions using your notes and what you have learned so far in this Forces Unit.

1. Write the definition of each term in the definition column. Then decide whether that force produces motion and write either yes, no or it depends in the motion column.

Vocabulary term	Definition	Change in motion? (yes, no or it depends)
Net force	Sum of all forces	Depends
Balanced forces	Equal forces that cancel	No
Unbalanced forces	unequal forces	Yes

2. For each of diagram, determine the net force acting on the object. Follow the format for showing your work shown in (a). Then, write whether or not there will be a change in motion. If yes, write the direction the object will move in.

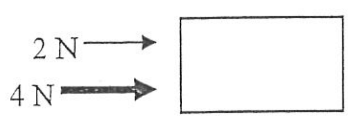
a.



Net force: *4 N – 2 N = 2 N to the left.*

Change in motion: The box will move to the left.

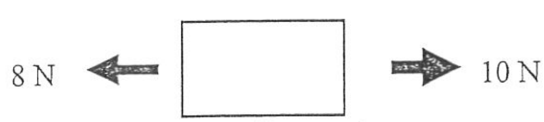
b.



Net force: 6N

Change in motion:

c.



Net force: 2 N

Change in motion:

d.

10 N ⇒ ☐ → 2 N

Net force: 12 N

Change in motion: →

e.

5 N ⇒ ☐ ⇐ 5 N

Net force: 0 N

Change in motion:

f.

5 N ⇐ ☐ ⇒ 5 N

Net force: 0 N

Change in motion:

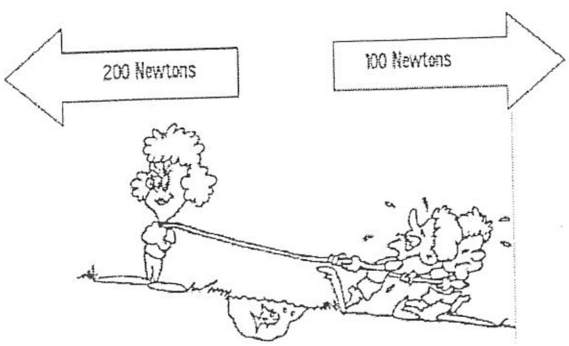
g.

5 N ⇐
2 N ← ☐ ⇒ 10 N

Net force: 3N →

Change in motion:

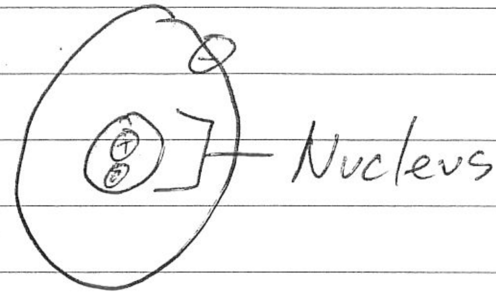
Below is a diagram of a tug-a-war. Write a short paragraph to describe what will happen, using the terms *net force, balanced OR unbalanced forces, AND change in motion.*



The net force is equal to 100 N to the left. This is an unbalanced force. This force will cause a change in motion to the left.

Charge
location
Mass

Parts of Atom notes



Proton - Positive charge, inside the nucleus, 1 amu

Neutron - Neutral, inside, 1 amu

Electron - Negative, outside, 0 amu

1 ← Atomic Number

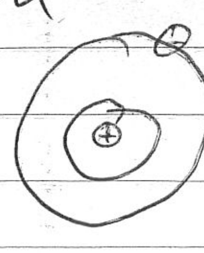
H
Hydrogen
1.00794 ← Atomic Mass

Atomic # = P, E

Mass
\- A. #
\# Neutrons

Hydrogen

$1P^+$
$1e^-$
$0n^0$



Identifying P, N, E

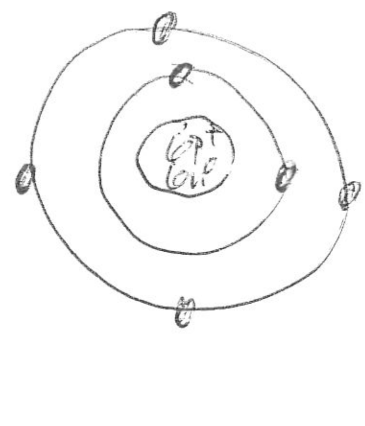
Element box	
1	← Atomic #
H	← Symbol
Hydrogen	← Name
1.00	← Atomic Mass

APE
MAN

APE **A**tomic # = **P**rotons = **E**lectrons

MAN **M**ass
− **A**tomic #
= **N**eutrons

Carbon



The Periodic Table of Elements

6 ← **Atomic Number** = Number of Protons = Number of Electrons

C ← **Chemical Symbol**

CARBON ← **Chemical Name**

12 ← **Atomic Weight** = Number of Protons + Number of Neutrons*

METALS | NON-METALS

1 H HYDROGEN 1																	2 He HELIUM 4
3 Li LITHIUM 7	4 Be BERYLLIUM 9											5 B BORON 11	6 C CARBON 12	7 N NITROGEN 14	8 O OXYGEN 16	9 F FLUORINE 19	10 Ne NEON 20
11 Na SODIUM 23	12 Mg MAGNESIUM 24											13 Al ALUMINUM 27	14 Si SILICON 28	15 P PHOSPHORUS 31	16 S SULFUR 32	17 Cl CHLORINE 35	18 Ar ARGON 40
19 K POTASSIUM 39	20 Ca CALCIUM 40	21 Sc SCANDIUM 45	22 Ti TITANIUM 48	23 V VANADIUM 51	24 Cr CHROMIUM 52	25 Mn MANGANESE 55	26 Fe IRON 56	27 Co COBALT 59	28 Ni NICKEL 59	29 Cu COPPER 64	30 Zn ZINC 65	31 Ga GALLIUM 70	32 Ge GERMANIUM 73	33 As ARSENIC 75	34 Se SELENIUM 79	35 Br BROMINE 80	36 Kr KRYPTON 84
37 Rb RUBIDIUM 85	38 Sr STRONTIUM 88	39 Y YTTRIUM 89	40 Zr ZIRCONIUM 91	41 Nb NIOBIUM 93	42 Mo MOLYBDENUM 96	43 Tc TECHNETIUM 98	44 Ru RUTHENIUM 101	45 Rh RHODIUM 103	46 Pd PALLADIUM 106	47 Ag SILVER 108	48 Cd CADMIUM 112	49 In INDIUM 115	50 Sn TIN 119	51 Sb ANTIMONY 122	52 Te TELLURIUM 128	53 I IODINE 127	54 Xe XENON 131
55 Cs CESIUM 133	56 Ba BARIUM 137		72 Hf HAFNIUM 178	73 Ta TANTALUM 181	74 W TUNGSTEN 184	75 Re RHENIUM 186	76 Os OSMIUM 190	77 Ir IRIDIUM 192	78 Pt PLATINUM 195	79 Au GOLD 197	80 Hg MERCURY 201	81 Tl THALLIUM 204	82 Pb LEAD 207	83 Bi BISMUTH 209	84 Po POLONIUM 209	85 At ASTATINE 210	86 Rn RADON 222
87 Fr FRANCIUM 223	88 Ra RADIUM 226		104 Rf RUTHERFORDIUM 267	105 Db DUBNIUM 268	106 Sg SEABORGIUM 271	107 Bh BOHRIUM 272	108 Hs HASSIUM 277	109 Mt MEITNERIUM 276	110 Ds DARMSTADTIUM 281	111 Rg ROENTGENIUM 280	112 Uub UNUNBIUM 285	113 Uut UNUNTRIUM 284	114 Uuq UNUNQUADIUM 289	115 Uup UNUNPENTIUM 288	116 Uuh UNUNHEXIUM 291	117 Uus UNUNSEPTIUM NOT YET OBSERVED	118 Uuo UNUNOCTIUM 294

57 La LANTHANUM 139	58 Ce CERIUM 140	59 Pr PRASEODYMIUM 141	60 Nd NEODYMIUM 144	61 Pm PROMETHIUM 145	62 Sm SAMARIUM 150	63 Eu EUROPIUM 152	64 Gd GADOLINIUM 157	65 Tb TERBIUM 159	66 Dy DYSPROSIUM 163	67 Ho HOLMIUM 165	68 Er ERBIUM 167	69 Tm THULIUM 169	70 Yb YTTERBIUM 173	71 Lu LUTETIUM 175
89 Ac ACTINIUM 227	90 Th THORIUM 232	91 Pa PROTACTINIUM 231	92 U URANIUM 238	93 Np NEPTUNIUM 237	94 Pu PLUTONIUM 244	95 Am AMERICIUM 243	96 Cm CURIUM 247	97 Bk BERKELIUM 247	98 Cf CALIFORNIUM 251	99 Es EINSTEINIUM 252	100 Fm FERMIUM 257	101 Md MENDELEVIUM 258	102 No NOBELIUM 259	103 Lr LAWRENCIUM 262

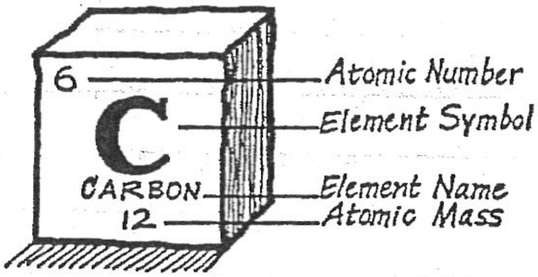
KEY

- = **Solid** at room temperature
- = **Liquid** at room temperature
- = **Gas** at room temperature
- = **Radioactive**
- = **Artificially Made**

* The atomic weights listed on this Table of Elements have been rounded to the nearest whole number. As a result, this chart actually displays the **mass number** of a specific isotope for each element. An element's complete, unrounded atomic weight can be found on the It's Elemental web site: http://education.jlab.org/itselemental/index.html

A WORLD-FAMOUS TABLE

There is a table (not one for dinner) that's probably the most famous table of science. (You can find it in your physical science book or on page 52 of this book.) If you learn how to read it, you'll have quick access to important stuff about elements. It's called the Periodic Table (because it's written in rows, called periods). Build your skill at reading the Periodic Table by finding the missing information in the samples below. You can get more practice with the Periodic Table on pages 11, 13, 14, and 15 of this book.



REMEMBER:
atomic mass = protons + neutrons
atomic number = # protons
protons = # electrons

1
H
Hydrogen
1

1. a. atomic number ________
   b. atomic mass ________

12
Mg
Magnesium
24

2. a. element name ________
   b. atomic number ________

26
Fe
Iron
56

3. a. # protons ________
   b. element symbol ________

5
B
Boron
11

4. a. atomic number ________
   b. element name ________

79
Au
Gold
197

5. a. # electrons ________
   b. # protons ________
   c. atomic number ________
   d. name of element ________

28
Ni
Nickel
59

6. a. atomic mass ________
   b. element symbol ________

11
Na
Sodium
23

7. a. element symbol ________
   b. # neutrons ________
   c. element name ________

78
Pt
Platinum
195

8. a. atomic number ________
   b. # neutrons ________

82
Pb
Lead
207

9. a. element name ________
   b. # protons ________

40
Zr
Zirconium
91

10. a. # electrons ________
    b. atomic mass ________

88
Ra
Radon
226

11. a. atomic number ________
    b. # neutrons ________

29
Cu
Copper
64

12. a. atomic mass ________
    b. # neutrons ________

Name ____________________

Element Calculations

Name ______________________ Date ______________ Period ____

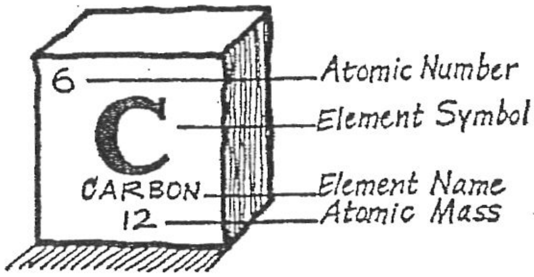
Complete the following chart with the correct information.

ELEMENT	SYMBOL	PROTONS	NEUTRONS	ELECTRONS	ATOMIC MASS #	ATOMIC #
sodium						
	Cu					
Iodine			74			
		15				
				7		
potassium						
		56				
	Fe					
	W					
				50		
			0			
		35				
Magnesium						
Mercury			121			
	Cr					
				17		
		30				
Arsenic						
Oxygen			8			
	Si					

Key

A WORLD-FAMOUS TABLE

There is a table (not one for dinner) that's probably the most famous table of science. (You can find it in your physical science book or on page 52 of this book.) If you learn how to read it, you'll have quick access to important stuff about elements. It's called the Periodic Table (because it's written in rows, called periods). Build your skill at reading the Periodic Table by finding the missing information in the samples below. You can get more practice with the Periodic Table on pages 11, 13, 14, and 15 of this book.



REMEMBER:
atomic mass = protons + neutrons
atomic number = # protons
protons = # electrons

---

1 H Hydrogen 1

1. a. atomic number 1
   b. atomic mass 1

79 Au Gold 197

5. a. # electrons 79
   b. # protons 79
   c. atomic number 79
   d. name of element Gold

82 Pb Lead 207

9. a. element name Lead
   b. # protons 82

12 Mg Magnesium 24

2. a. element name Magnesium
   b. atomic number 12

28 Ni Nickel 59

6. a. atomic mass 59
   b. element symbol Ni

40 Zr Zirconium 91

10. a. # electrons 40
    b. atomic mass 91

26 Fe Iron 56

3. a. # protons 26
   b. element symbol Fe

11 Na Sodium 23

7. a. element symbol Na
   b. # neutrons 12
   c. element name Sodium

88 Ra Radon 226

11. a. atomic number 88
    b. # neutrons 138

5 B Boron 11

4. a. atomic number 5
   b. element name Boron

78 Pt Platinum 195

8. a. atomic number 78
   b. # neutrons 117

29 Cu Copper 64

12. a. atomic mass 64
    b. # neutrons 35

Name

Element Calculations

Name ______________________ Date ______________ Period ______

Complete the following chart with the correct information.

ELEMENT	SYMBOL	PROTONS	NEUTRONS	ELECTRONS	ATOMIC MASS #	ATOMIC #
sodium	Na	11	12	11	23	11
Copper	Cu	29	35	29	64	29
Iodine	I	53	74	53	127	53
Phosphorus	P	15	16	15	31	15
Nitrogen	N	7	7	7	14	7
potassium	K	19	20	19	39	19
Barium	Ba	56	81	56	137	56
Iron	Fe	26	30	26	56	26
Tungsten	W	74	110	74	184	74
Tin	Sn	50	69	50	119	50
Hydrogen	H	1	0	1	1	1
Bromine	Br	35	45	35	80	35
Magnesium	Mg	12	12	12	24	12
Mercury	Hg	80	121	80	201	80
Chromium	Cr	24	28	24	52	24
Chlorine	Cl	17	18	17	35	17
Zinc	Zn	30	35	30	65	30
Arsenic	As	33	42	33	75	33
Oxygen	O	8	8	8	16	8
Silicon	Si	14	14	14	28	14

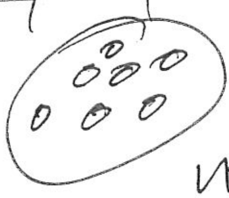
States of Matter Notes

Solid, liquid, Gas

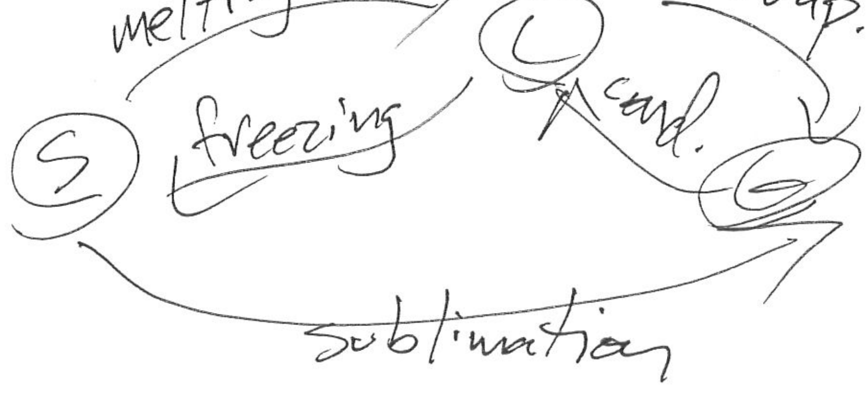
State = phase

<u>Solid</u>
- tightly packed
- vibrate in place
- Definite shape & volume

<u>Liquid</u>
- move around
- close together
- Definite volume but no def. shape



<u>Gas</u>
- move quickly
- No def. shape or volume



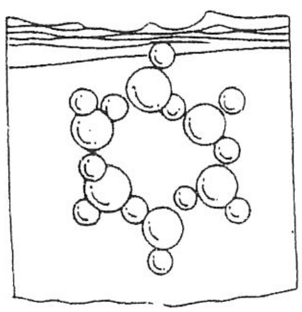
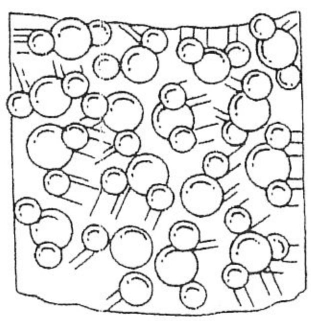
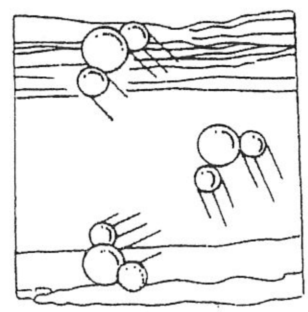
Name ______________________ Date ____________

Three States of Matter

Matter comes in three states: solid, liquid, and gas. The state of matter is determined by the strength of the bonds holding its molecules together. Matter can be changed from one state to another through the use of heat. Changes in the three states of matter are physical changes. Classify the phrases in the word box for each state of matter. Some phrases are used more than once.

molecule movement is greatest	has mass	has shape of its own
takes shape of container	has definite volume	has no definite volume
weak bonds between molecules	does not expand	hard to deform
spreads in all directions	expands	takes up space
virtually no bonds between molecules	spreads in direction of gravity	
molecule movement is smallest	strong bonds between molecules	

Solid Liquid Gas

Solid	Liquid	Gas
		

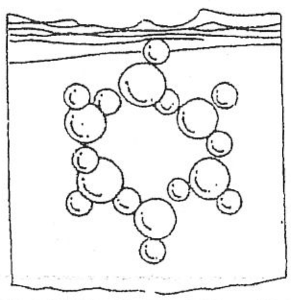
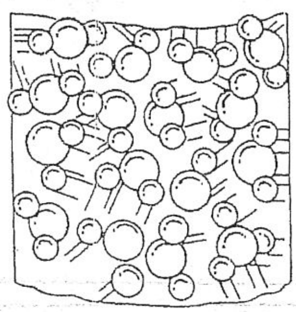
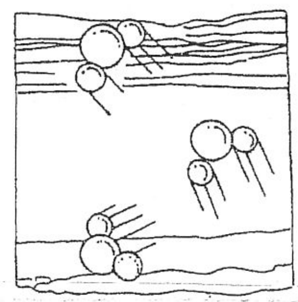
Name Key Date ______

Three States of Matter

Matter comes in three states: solid, liquid, and gas. The state of matter is determined by the strength of the bonds holding its molecules together. Matter can be changed from one state to another through the use of heat. Changes in the three states of matter are physical changes. Classify the phrases in the word box for each state of matter. Some phrases are used more than once.

~~molecule movement is greatest~~	~~has mass~~	has ~~shape of its own~~
takes ~~shape of container~~	~~has definite volume~~	~~has no definite volume~~
weak ~~bonds~~ between molecules	~~does not expand~~	~~hard to deform~~
~~spreads in all directions~~	~~expands~~	~~takes up space~~
~~virtually no bonds between molecules~~	~~spreads in direction of gravity~~	
~~molecule movement is smallest~~	strong ~~bonds between molecules~~	

Solid Liquid Gas

Solid	Liquid	Gas
		
molec. move small	takes shape of cont	molec. move greatest
has mass	spreads	~~weak bonds~~ virtually no bonds
Def. vol.	weak bonds	has mass
doesn't expand	has mass	expands
Strong bond	Def. vol.	No def. vol.
has own shape	expands	takes up space
hard to deform	spread w/ grav.	spreads in all direc
takes up space	takes up space	