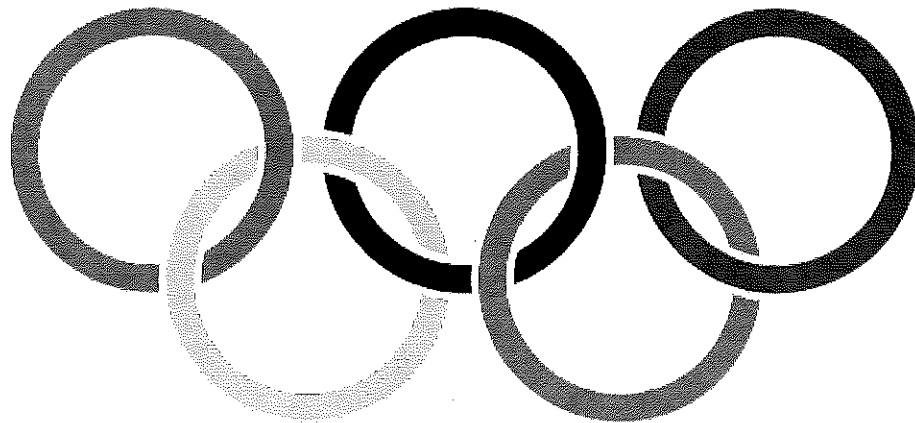


Your Guide to Surviving the 2016 STAAR Review Olympics!

* WORK & PRACTICE PACKET *



Your personal guide to the 2016 Hill Country Science STAAR Review

Name: _____

Period: _____

Reporting Category 1: Matter and Energy

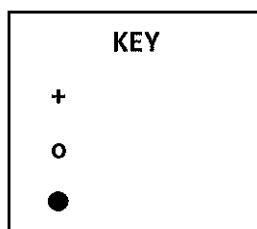
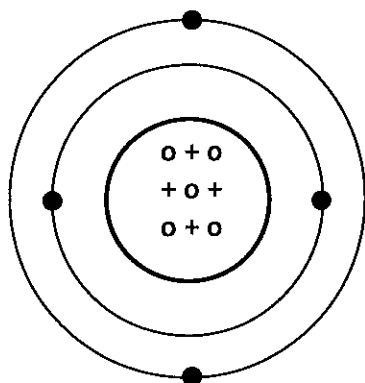
Atoms

Fill in the missing information to summarize what you know about atomic structure.

Name of Subatomic Particle	Location within the Atom	Electrical Charge	Relative Mass
proton	the nucleus		1 amu
neutron	the nucleus		1 amu
electron	the nucleus		1/1836 amu

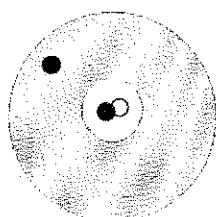
Bohr Model –

Draw an atom that has four protons, five neutrons, and four electrons. Complete the key to identify the three major subatomic particles.

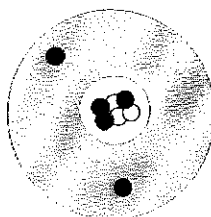


What determines the identity of an element? **# of protons**

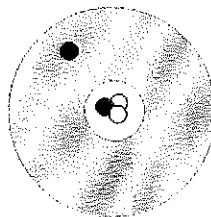
The diagram below shows models of four different atoms. Use the models to answer the following questions:



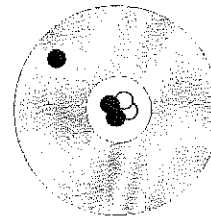
A



B



C



D

Which atom has the greatest mass?

Which atom(s) have a neutral electrical charge?

Which atom(s) have a positive electrical charge?

Which atom(s) have a negative electrical charge?

Periodic Table

Atomic number =

Atomic Mass =

*** Electrons are not included in the atomic mass

	Metals	Non-Metals	Metalloids
Where located	left of stair step	right of stair step	along stair step
Luster	shiny	dull	shiny to dull
Conductivity	good	poor	some good, some poor
Malleability	yes	no - brittle	some yes, some no
Most Reactive found where	far left (Group 1)	far right (Group 17)	depends

Group 18 – Noble Gases – unreactive (inert) – full set of valence electrons

Period – horizontal rows (\longleftrightarrow) – different properties – same # energy levels

Family/group # – vertical columns (\updownarrow) – same properties – same # valence electrons

On the Periodic Table below:

Shade in the group of elements that are called the Noble Gases red.

Shade all of the elements in Period 4 blue.

Circle three elements that are classified as metals.

Draw triangles around three elements that are classified as metalloids.

1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt									

How many groups or families of elements are on the table?

How many periods of elements are on the table?

Fill in the missing information to complete the chart.

Substance	Check One		Check One		# of Elements	# of Atoms	# of Molecules
	Chemical Symbol	Chemical Formula	Element	Compound			
H ₂ O							
O ₃							
CaCO ₃							
He							
Ag							
2 CO							

Organic Compounds – contain **carbon** and other elements such as hydrogen, oxygen, phosphorus, nitrogen, or sulfur

Substance	Formula	Organic	Inorganic
sugar	C ₆ H ₁₂ O ₆		
salt	NaCl		
methane	CH ₄		
water	H ₂ O		

Digestion

Structure	Physical	Chemical
Mouth		
Esophagus		
Stomach		
Small Intestine		

Valence Electrons – outermost electrons, determine

Elements have similar properties because? They have the same # of valence electrons

Reactivity – how easily elements combine to form compounds; elements with 1 or 7 valence electrons are the most reactive

Molecule – 2 or more atoms combined

Compound – 2 or more different elements combined

Physical Change – change in appearance without a change in properties

Chemical Change – change in properties – new substance formed

Chemical Reaction – same as chemical change

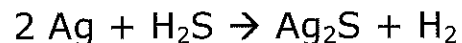
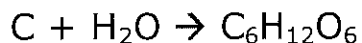
Evidence of Chemical Reaction – unexpected color change, precipitate forms, gas production (bubbles, fizzes), change in temperature, change in odor, change in properties

Chemical Equation – combination of symbols and formulas that describe a chemical reaction

What does a coefficient tell you? # of

What does a subscript tell you? # of

Are they balanced?



E	R	P

E	R	P

Conservation of mass – # atoms in reactants = # atoms in products
mass of reactants = mass of products

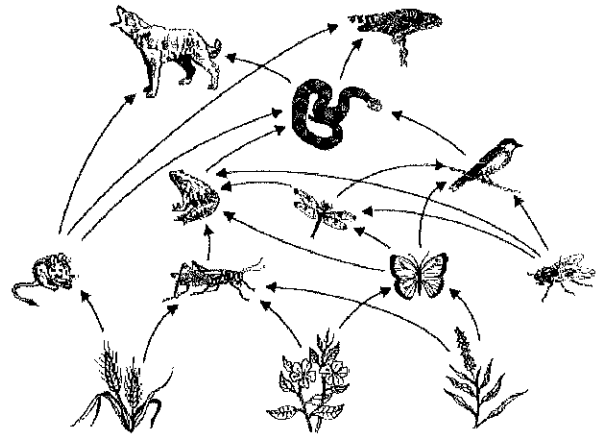
How can we show conservation of mass?

Energy Flow through Living Systems

Highlight one complete food chain on the food web.

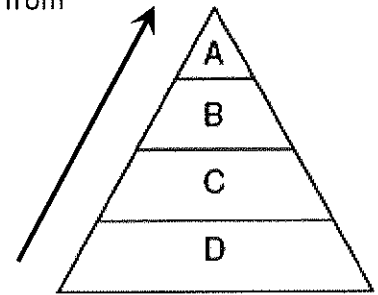
What organisms on the food web have the most available energy?

What organisms on the food web have the least available energy?



Draw arrows on the energy pyramid to show the direction of energy flow from greatest to least.

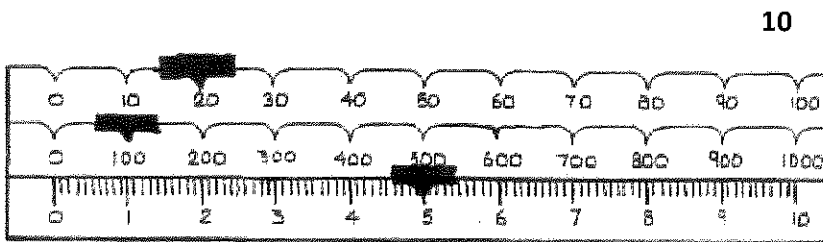
Color producers green, herbivores yellow, and carnivores red.



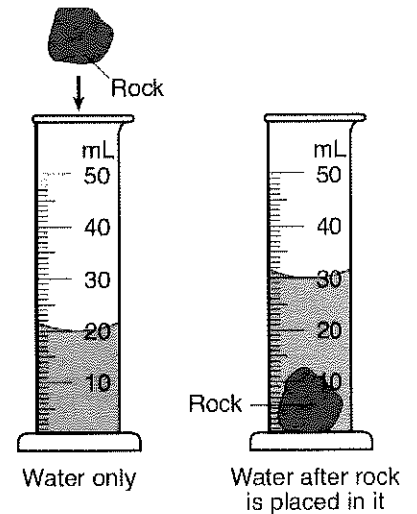
Density = $\frac{\text{mass}}{\text{volume}}$

Use the pictures of the triple beam balance and graduated cylinder to find the density of the rock.

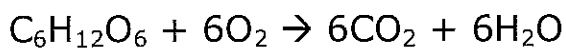
Density =



$$\begin{array}{r} 12.5 \\ 10 \\ 25 \\ 20 \\ 50 \\ 50 \\ 0 \end{array}$$



- Which two elements are most similar?
 - Fe and Co
 - Li and F
 - Cu and Ag
 - H and O
- What are metalloids?
 - The metal elements with small atomic numbers
 - The elements between metals and nonmetals on the periodic table
 - Chunks of metal ore
 - Nonreactive metal elements
- Which of the following elements is a liquid at room temperature?
 - N
 - B
 - Br
 - Si
- Which of the following elements is the least reactive metal?
 - K
 - Ca
 - Mn
 - Zn
- Which of the following is a noble gas?
 - Ne
 - N
 - O
 - H
- Which of the following is the better conductor?
 - Ge
 - S
 - Au
 - C
- What elements are contained in the compound LiBr?
 - Lithium, Iodine, and Boron
 - Lithium and Bromine
 - Lithium and Boron
 - It is a compound, so it does not contain elements.



- During cell respiration, sugar ($\text{C}_6\text{H}_{12}\text{O}_6$) reacts to form carbon dioxide (CO_2) and water (H_2O). Which of the following best explains what happens during cell respiration?
 - Single atoms are formed into different elements.
 - Atoms are rearranged into different compounds.
 - A molecule is broken down into its pure elements.
 - Two elements are formed into one compound.

Reporting Category 2: Force, Motion, and Energy

A _____ is a push or a pull in a specific direction.

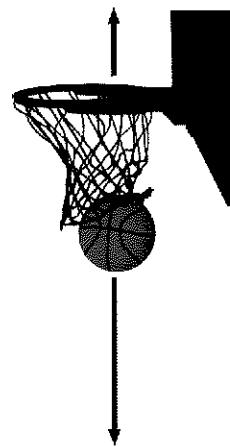
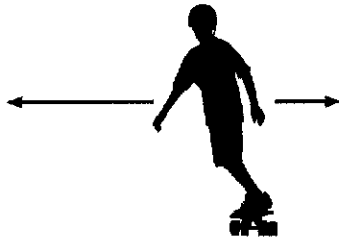
The combination of all forces acting on an object is called _____.

What are balanced forces? **forces that are equal in strength but act in opposite directions, canceling each other out resulting in no movement**

What are unbalanced forces? **forces that are either unequal in strength or are working in the same direction, resulting in movement**

What direction will each move? Why?

moves to



ball moves

The unit of force is the _____.

Force = _____ X _____

A 50 gram object is accelerating at a rate of 5 m/s. Calculate the force needed to produce this acceleration.

mass =

acceleration =

$F = m \times a$

F =

F =

F =

What is speed?

the distance an object moves in a period of time

Average speed = $\frac{\text{total}}{\text{total}}$

What is velocity?

What is acceleration?

A car travels 2.5 hours in a northerly direction for 300 km. Determine the car's speed and velocity.

time =
 distance =
 direction =

$s = d / t$
 $s = 300 \text{ km} / 2.5 \text{ hrs}$
 $s = 120 \text{ km/hr}$
 $v = 120 \text{ kph north}$

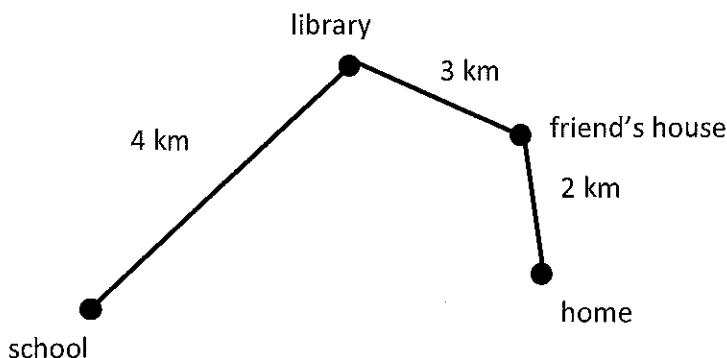
$$\begin{array}{r} 120 \\ 2.5 \overline{) 300.0} \\ \underline{25} \\ 50 \\ \underline{50} \\ 0 \end{array}$$

Study the diagram below. A student rides a bike 2 hours from school to home, making stops along the way. What is the average speed at which the student travels? Did the student accelerate during the ride home?

time = 2 hrs
 distance = 4 km + 3 km + 2 km = 9 km

$s = d / t$
 $s = 9 \text{ km} / 2 \text{ hrs}$
 $s = 4.5 \text{ km/hr}$

the student did accelerate because she changed directions



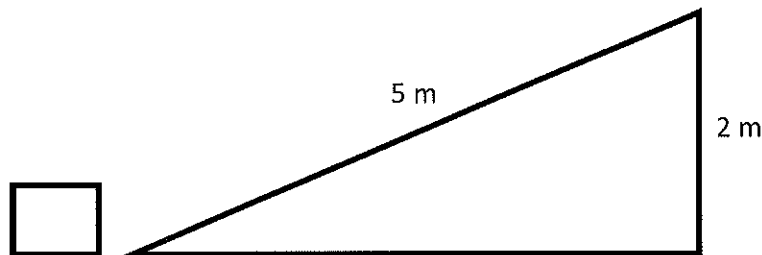
Example of Motion	Speed	Velocity	Acceleration
A greyhound dog can run about 40 mi/hr.			
Monarch butterflies fly 12 mi/hr south as they migrate.			
A car slows from 60 mi/hr to 25 mi/hr.			
A car turns left while maintaining the same speed.			
A trip from Austin to Dallas takes about 3 hours going 65 mi/hr north.			
Canadian geese can fly approximately 75 miles in 3 hours.			
A car increases speed from 30 mi/hr to 65 mi/hr.			

The transfer of energy from one object to another is called work.

Work = _____ X _____

Use the information and diagram below to answer the questions.

A student needs to move the box onto a table that is 2 meters high. She uses 10 newtons of force to move the box.



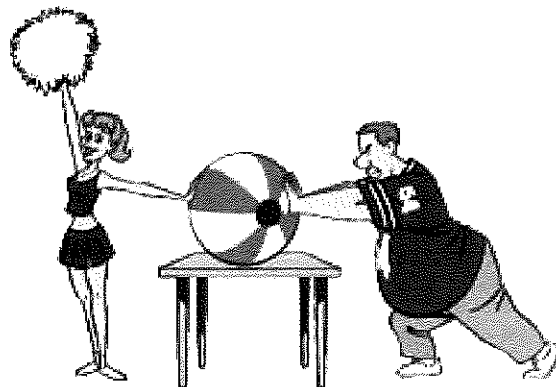
How much work is done if she pushes the box up the incline?

distance = 5 m	$W = F \times d$
force = 10 N	$W = 10 \text{ N} \times 5 \text{ m}$
	$W = 50 \text{ Nm}$
	$W = 50 \text{ J}$

How much work is done if she lifts the box straight up onto the table?

distance =	$W = F \times d$
force =	$W =$
	$W =$

The boy in the picture is pushing against the beach ball with 20 newtons of force. The ball does not move. How much work is he doing?



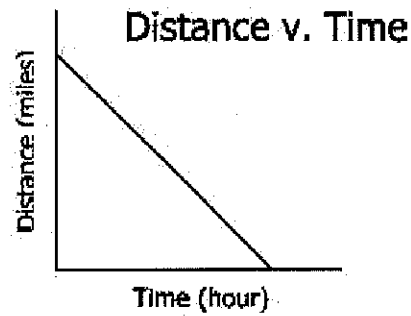
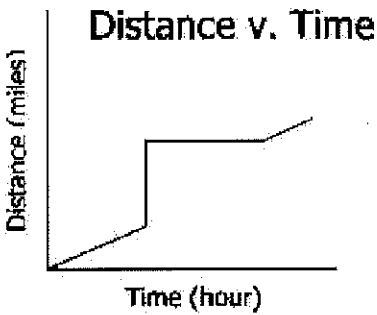
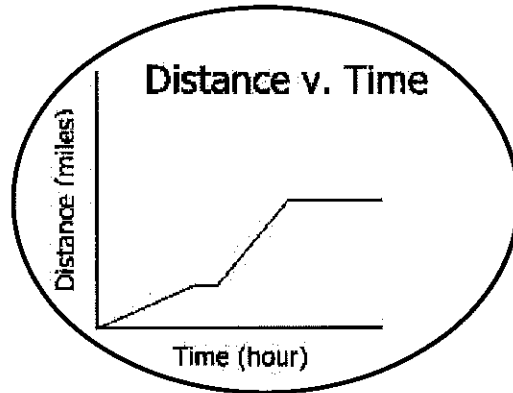
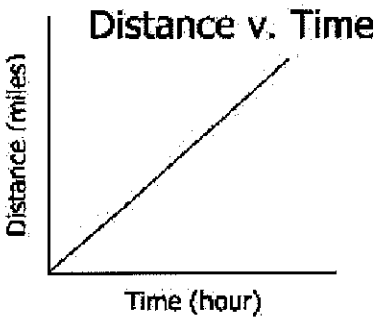
force =	$W = F \times d$
distance =	$W =$
	$W =$

_____ states that energy can never be created or destroyed only transferred.

Complete the chart using the types of energy:

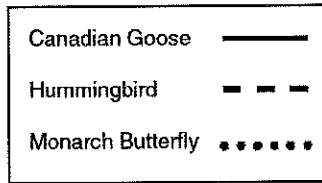
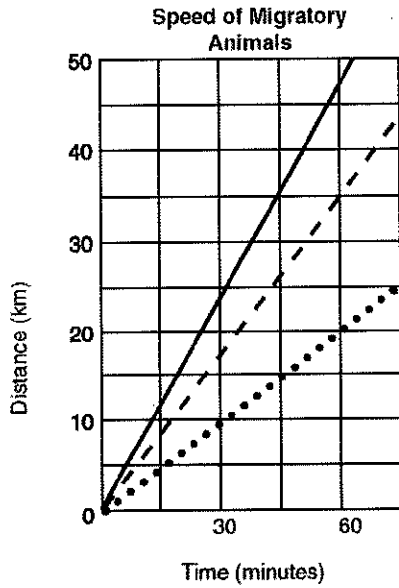
	Beginning Energy Type	Type of Energy Converted To
hair dryer		thermal
battery	chemical	
windmill	mechanical	electrical
glow stick	chemical	
piano	mechanical	

A woman drives to the grocery store. During the trip, the woman drives a constant speed of 35 mph for 5 minutes, then stops at a stop sign. After waiting for traffic, the woman drives an additional 20 minutes at 60 mph before parking in the grocery store parking lot. Circle the distance/time graph that best matches the woman's journey. Justify your answer.



The circled graph is the best answer choice because the graph indicates a slower speed, a brief stopping point, a faster speed, and then another stopping point.

Use the graph below to answer the following questions.

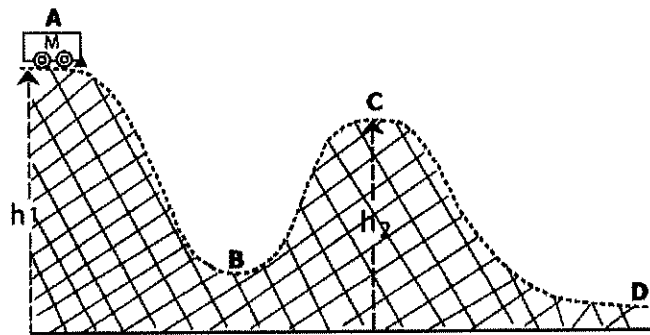


Which animal has the fastest speed?

How far does the hummingbird travel in 60 minutes?

What is the speed in km/hr of the monarch butterfly at 60 minutes?
20 km/hr

Analyze the diagram below.



As the cart moves from point A to point B, the cart's potential energy _____ as its kinetic energy _____.

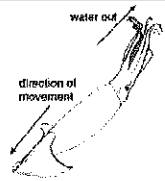
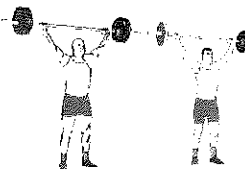


As the cart moves from point B to point C, the cart's potential energy _____ as its kinetic energy _____.

At which of the four points will the cart have the least potential energy? _____

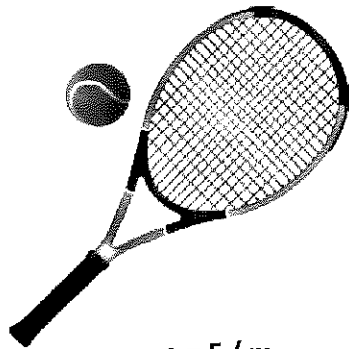
_____ is energy that is stored and available to be used later.

_____ is energy that an object has because of its motion.

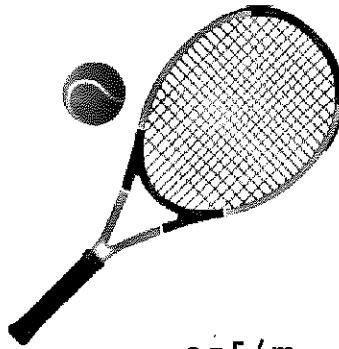
Newton's Laws

	First Law	Second Law	Third Law
			
			
			
			

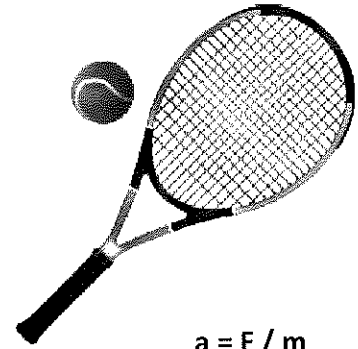
A tennis racket hits a tennis ball, exerting a different amount of force on the ball during a tennis game.



Swing A
 $F = 20 \text{ N}$
 $a = F / m$
 $a = 20 \text{ N} / 10 \text{ kg}$
 $a = 2 \text{ m/s}^2$



Swing B
 $F = 10 \text{ N}$
 $a = F / m$
 $a = 10 \text{ N} / 10 \text{ kg}$
 $a = 1 \text{ m/s}^2$



Swing C
 $F = 5 \text{ N}$
 $a = F / m$
 $a = 5 \text{ N} / 10 \text{ kg}$
 $a = 0.5 \text{ m/s}^2$

Which swing results in the greatest acceleration of the ball?

How does Newton's first law of motion apply to a ball rolling across the gym floor after an unbalanced force is applied?

- A. The ball will stop at the line halfway across the gym.
- B. The ball will continue to roll until an unbalanced force is applied.
- C. The ball will start bouncing until it hits the wall.
- D. The ball will roll in a zigzag pattern to the other end of the gym.

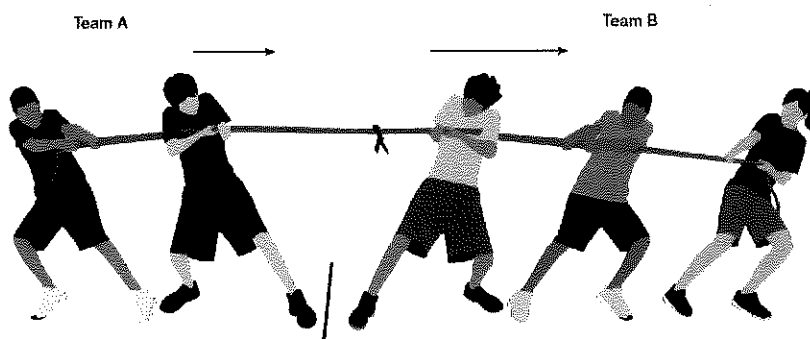
A person walks out of a store with a pillow at the top of an overflowing shopping cart. While walking to the car, the cart's wheel hits a large rock, causing the cart to suddenly stop. Which of the following is likely to happen as a result of Newton's first law of motion?

- F. The pillow will slide backwards due to inertia.
- G. The pillow will apply a balanced force on the cart.
- H. The pillow will slide forward due to inertia.
- J. The pillow will not be affected by the sudden stop.



The law requires all people riding in a car to wear seat belts. If the car suddenly stops, the seat belts hold the passengers in place. How does Newton's first law of motion apply when a person is not wearing a seat belt?

- A. The passengers will continue moving forward due to inertia.
- B. The passengers will move backward into the seat.
- C. The passengers will lean into another passenger's seat.
- D. The passengers will not be affected by the sudden stop of the car.



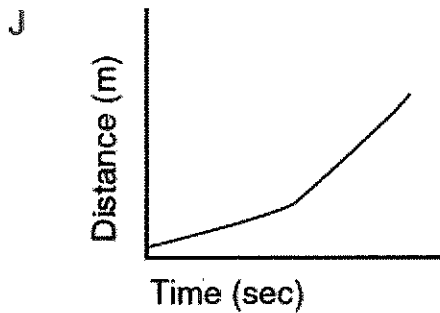
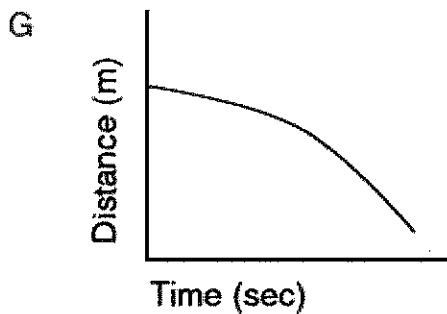
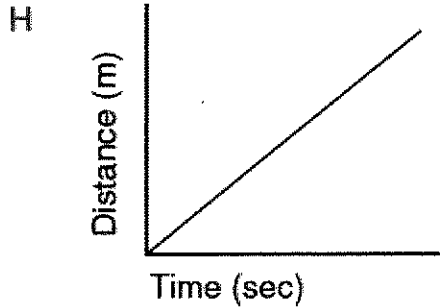
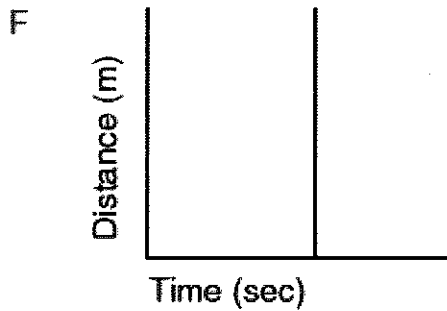
In the picture above, two teams of students are playing tug-of-war. Each team is pulling in the opposite direction, but both teams are moving in the same direction. Which of the following best describes the forces in this situation?

- A. The forces are balanced and the net force is zero.
- B. The forces are balanced and Team A is exerting a greater force.
- C. The forces are unbalanced and Team A's force is greater.
- D. The forces are unbalanced and Team B's force is greater.

When a car suddenly stops at a red light, a book lying on the car seat slides forward. Why does the book continue to move forward?

- A. The book loses its backward force.
- B. The car moves in reverse more rapidly than the book.
- C. The friction of braking transfers energy to the book.
- D. The book's inertia causes it to continue moving.

Which graph best represents a car traveling down the freeway at a constant speed?

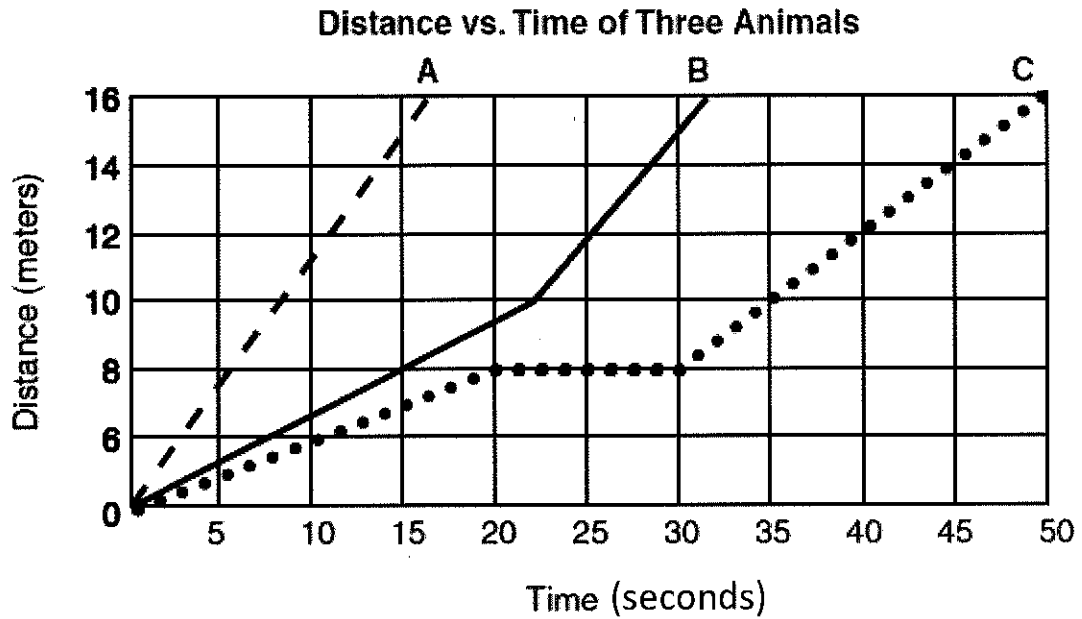


Use the table below to answer question 10.

Object	Mass (g)	Volume (cm ³)
X	38	32
Y	36	19
Z	21	35

10. If a force of 50 N is applied to each of the three objects, which one will have the least acceleration?
- F. Object X, because it has the greatest mass
 - G. Object Y, because it has the least volume
 - H. Object Z, because it has the least mass
 - J. Object Z, because it has the greatest volume

Use the information below to answer questions 14–15.



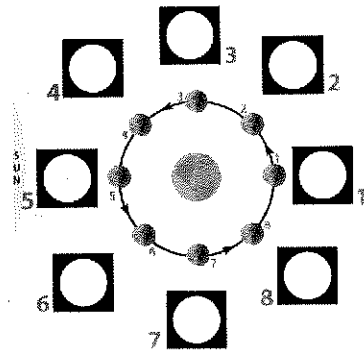
14. What is the average speed of Animal A during the race?
- F. 1 m/s
 - G. 5 m/s
 - H. 16 m/s
 - J. 32 m/s
15. If all animals started the race at the same time, which animal has the greatest speed during the first 10 seconds of the race?
- A. Animal A
 - B. Animal B
 - C. Animal C
 - D. Animals B and C

Reporting Category 3: Earth and Space Systems

Moon Phases: draw the phase of the moon as seen from Earth in each of the large circles then write the names of the phases in the correct boxes on the chart

	Moon Phase
1	
2	
3	
4	

	Moon Phase
5	
6	
7	
8	

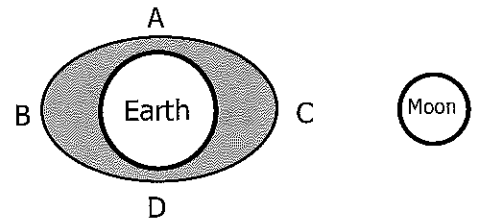


Tides:

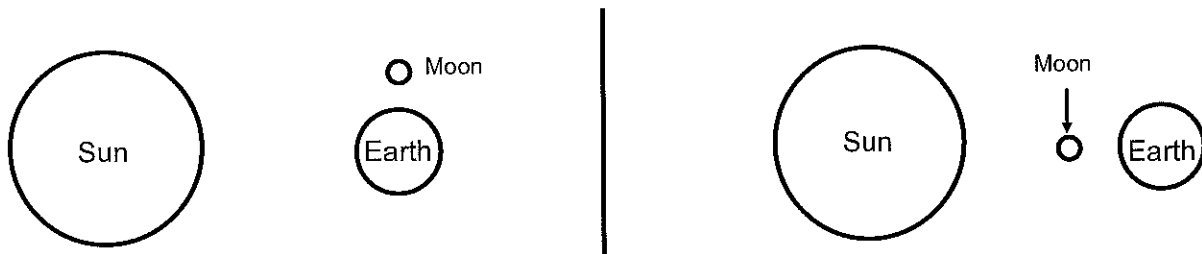
What causes tides?

Use the diagram to the right to answer the questions.

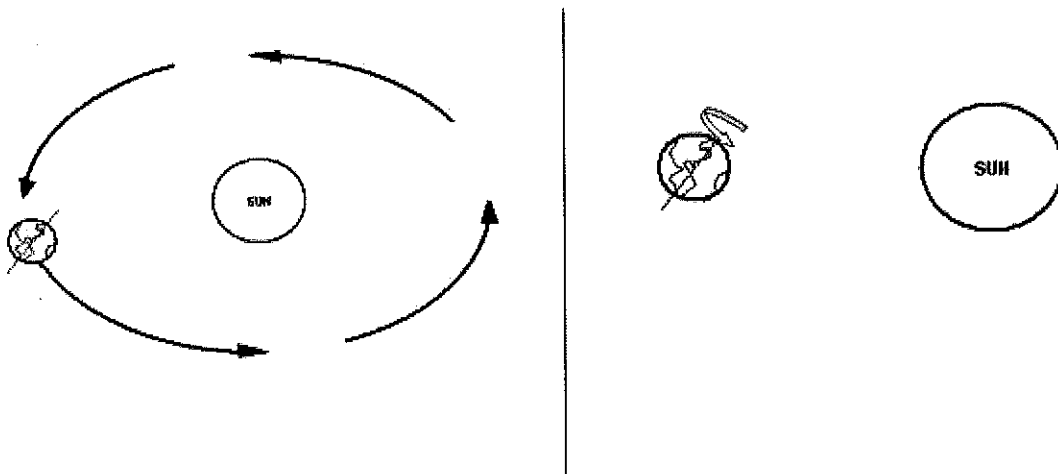
_____ Where is high tide?
 _____ Where is low tide?



What kind of tide is caused by each arrangement of the sun, moon, and Earth?

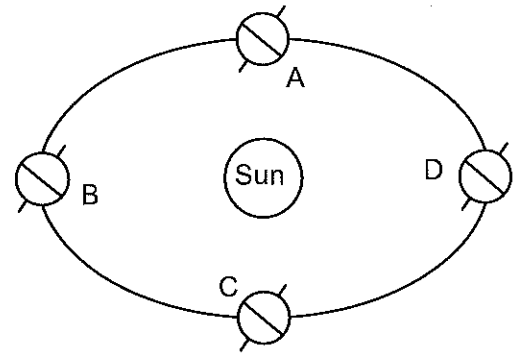


Rotation & Revolution: label the diagrams and tell what each causes



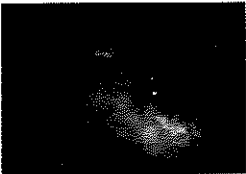
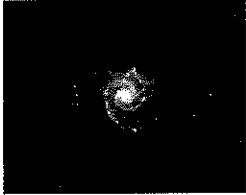

Seasons: Identify the season at each location.

	Northern Hemisphere	Southern Hemisphere
A		
B		
C		
D		



Draw arrow heads on the diagram above to show the direction the Earth moves around the Sun.

Galaxies:

	Type of Galaxy	Amount of Gas & Dust	Age of Stars
			
			
			

Earth is a member of the _____ Galaxy which is a _____ galaxy. Our solar system is located near the edge of our galaxy.

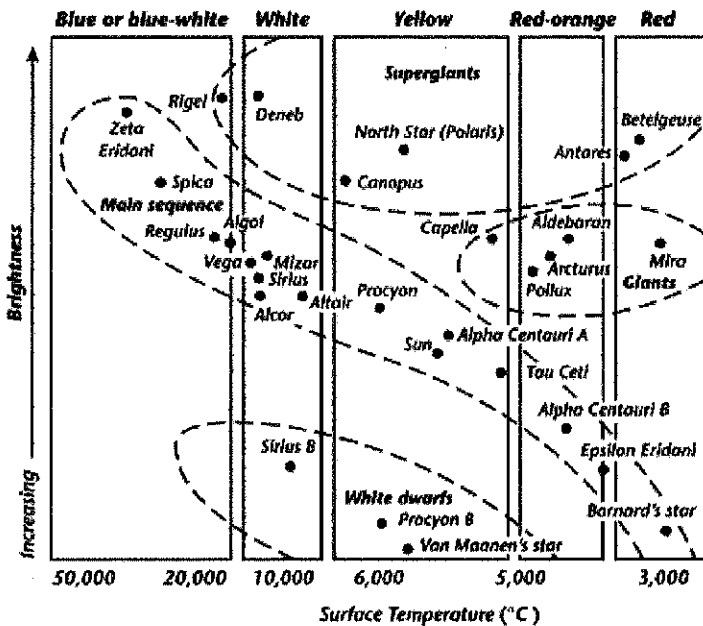
Life Cycle of a Star:

	Where Formed	Just Born	Age Increases →			Death
Human	Womb	Baby	Teenager/ young adult	Middle age	Old age	Dead
Low Mass Star	Nebula	Protostar	Main Sequence	Giant	White Dwarf	Black Dwarf
High Mass Star	Nebula	Protostar	Main Sequence	Supergiant	Super-nova	Neutron Star
Very High Mass Star	Nebula	Protostar	Main Sequence	Supergiant	Super-nova	Black Hole

Mass determines how long a star lives. High mass stars use up their fuel very fast and die sooner than low mass stars.

Hertzsprung-Russell Diagram

Hertzsprung-Russell Diagram



A comparison of a star's surface temperature vs. _____.

Most stars are part of the _____.

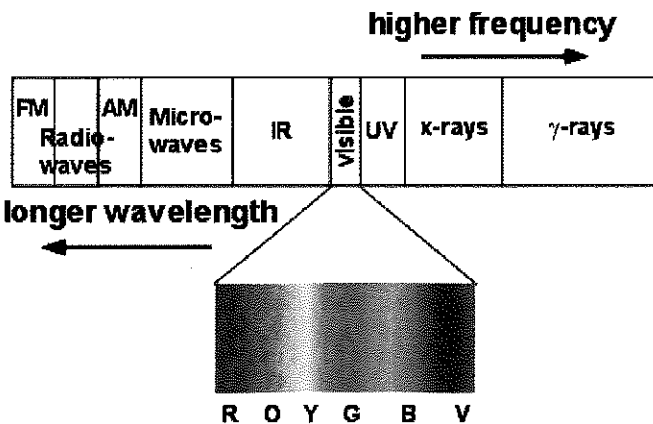
Brightest stars found at the _____ of the diagram.

Hottest stars are found at the _____ of the diagram.

Which star is brighter? Why?
Polaris or the Sun

Use the H-R Diagram to describe the Sun.

Electromagnetic Spectrum



We use visual and radio telescopes to observe objects in space. Visual Telescopes are called refracting and reflecting. **Reflecting** telescopes use mirrors and **refracting** telescopes use lenses to view objects far away. **Radio** telescopes detect the different wavelengths of objects in space.

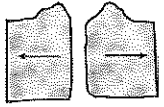


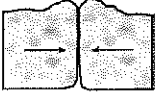

When looked at through a spectroscope, all objects have a unique spectral pattern. We can tell what elements are in stars and if they are moving towards or away from us by looking at their spectral patterns. The

spectrum of stars that are moving away from us is shifted towards the red end of the spectrum. This is called **Red Shift**.

Light-year – a unit of distance – the **distance** that light will travel in one year. Our closest stellar neighbor (after the Sun) is the triple star system Alpha Centauri which is 4.3 LY away. Since one light-year is equal to 9,500,000,000,000 kilometers the Alpha Centauri system is 40,850,000,000,000 kilometers away. It is much easier to represent the distance in light-years.

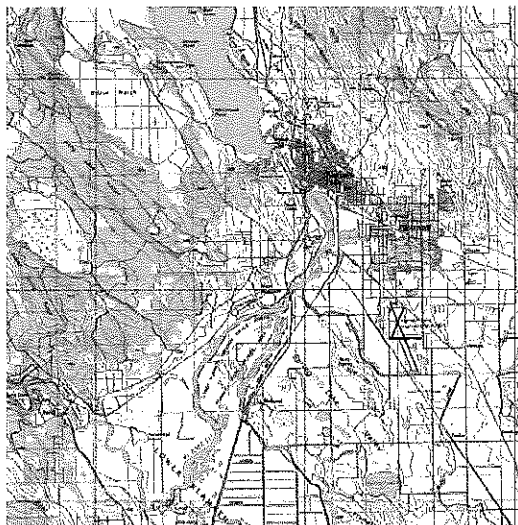
Plate Tectonic Theory

Alfred Wegener proposed Continental Drift (continents were once connected in one large landmass and have slowly moved to their current locations) based on 1) the shape of the continents, 2) fossil evidence, and 3) evidence from glaciers. After WWII scientists discovered spreading centers (mid-ocean ridges) on the ocean floor. This explained how the continents could move. Convection currents in the mantle cause the plates to move.

Diagram	Type of Boundary	Motion at Boundary	Land Feature(s) Formed
		oceanic/oceanic away	Mid-ocean ridge
		continental/continental away	Rift valley
		oceanic/oceanic together	Island arc (volcanic islands)
		Subduction	Trench
		continental/oceanic together	Volcanic mountains
		Subduction	Trench
		continental/continental together	Folded mountains
		Shearing or plates sliding past each other	Strike-slip Fault or Transform fault

Topographic Maps & Satellite Views

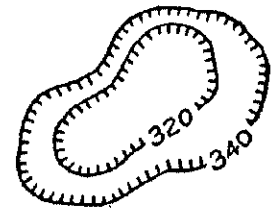
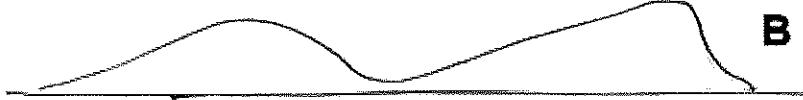
The following map and satellite image are of Klamath Falls, Oregon





Lines far apart = gradual elevation change

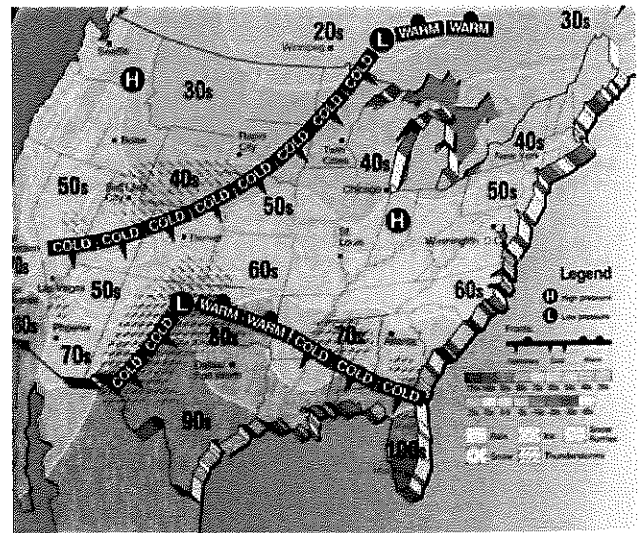
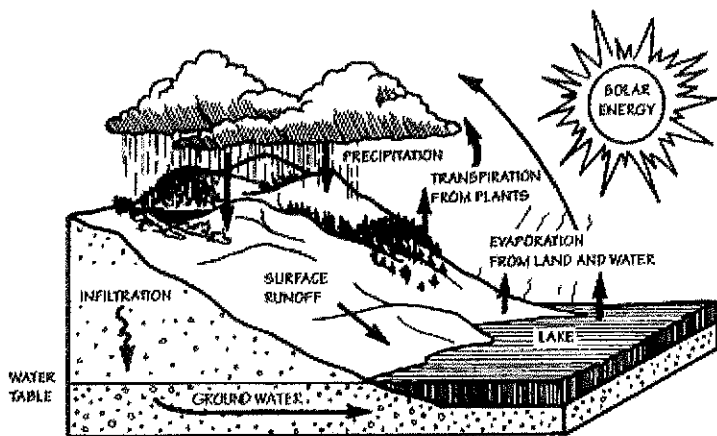
Closely spaced lines = rapid elevation change = steep area



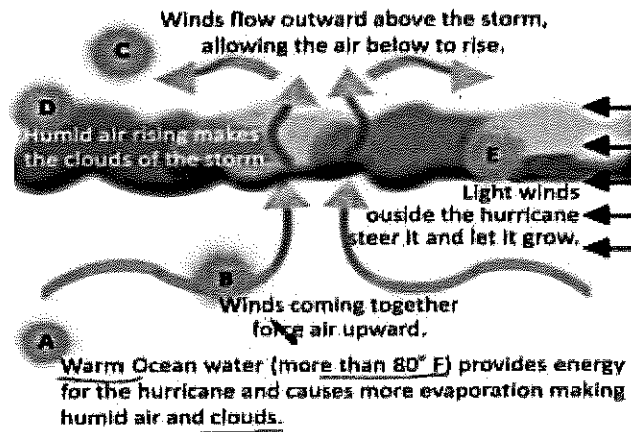
Depression Contours

Weather & Climate

Water Cycle

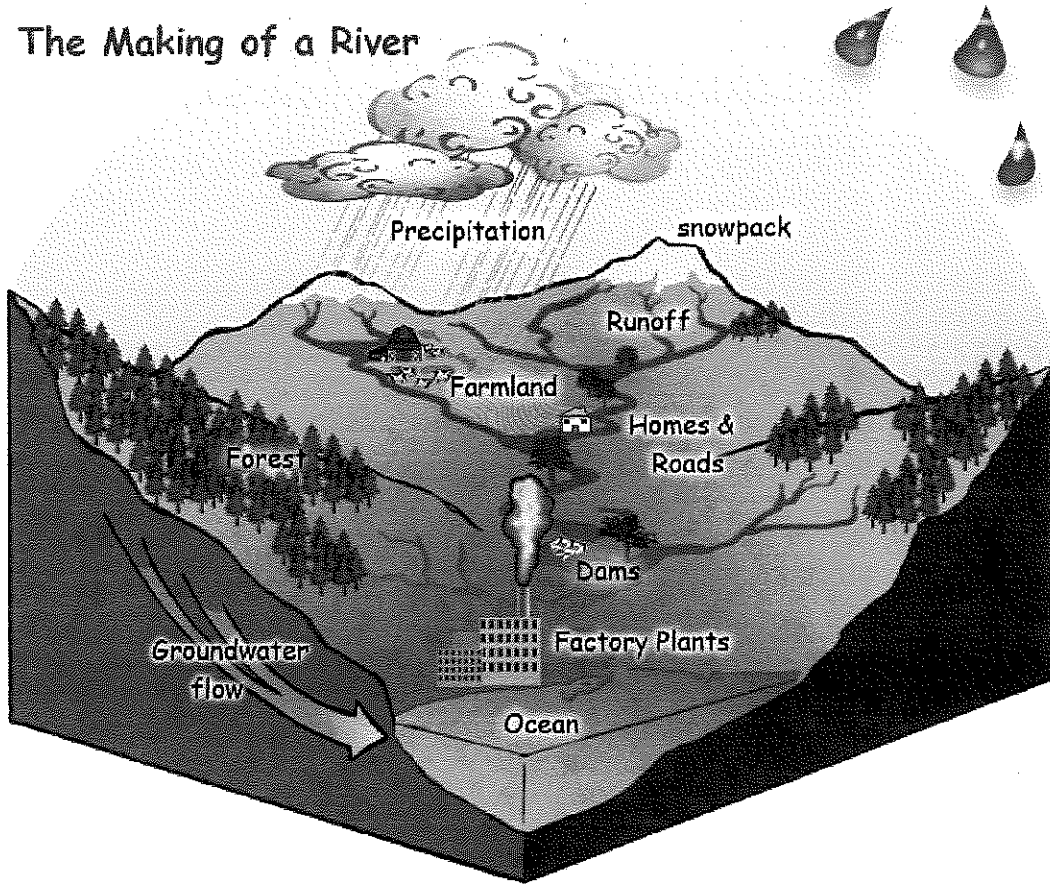


How hurricanes form?



WHAT IS A WATERSHED?

The Making of a River



Melting of the snowpack and increased rainfall can increase the amount of runoff. Human activity like farming, building of homes, roads, dams, and factories can create pollution that is carried by the runoff into the oceans.

Reporting Category 4: Organisms and Environment

Food Chains

Directions: Put the following organisms in order to create a food chain. Label each trophic level as you go.

Grasshopper	Bear	Grass	Fish
-------------	------	-------	------

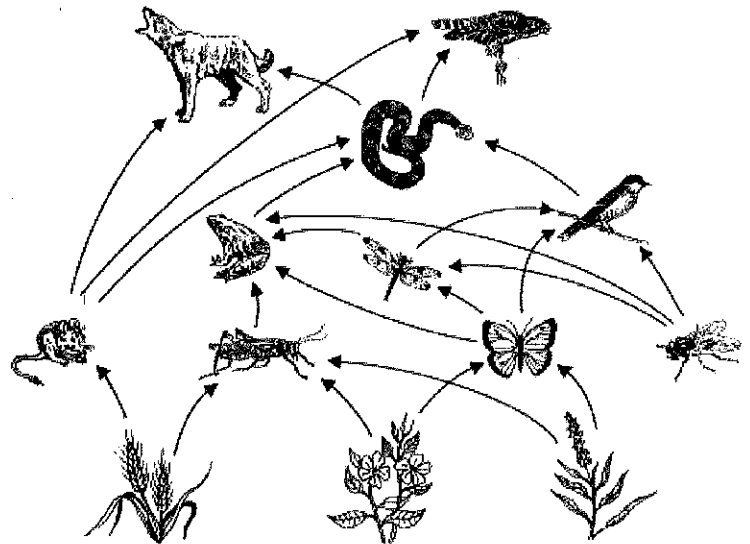
Answer: _____

Take the trophic levels above and create an energy pyramid in the space below. Put a happy face next to the level that has the most available energy and a frowny face next to the one with the least.

Food Webs

Directions: Answer the following questions based on the food web provided.

1. Circle the producers.
2. Which of the following organisms feeds on the largest variety of producers?
3. Which consumer feeds on the largest variety of organisms?
4. What would happen if the frog population was removed from this food web?
5. Identify two predator/prey relationships in this food web.



Define and give an example of the following:

Parasite – Host Relationship:

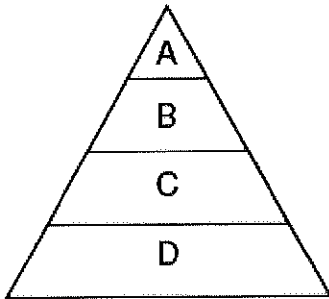
Predator – Prey Relationship:

Biotic:

Abiotic:

Energy Pyramid

Directions: Draw an energy pyramid below. Answer the following questions based on the pyramid.



1. Which level in this pyramid would represent producers?
2. Which level in this pyramid has the least energy available?
3. Which level in this pyramid has the most energy available?
4. How are food chains and energy pyramids related?

Ecological Succession

What is meant by the term ecological succession?

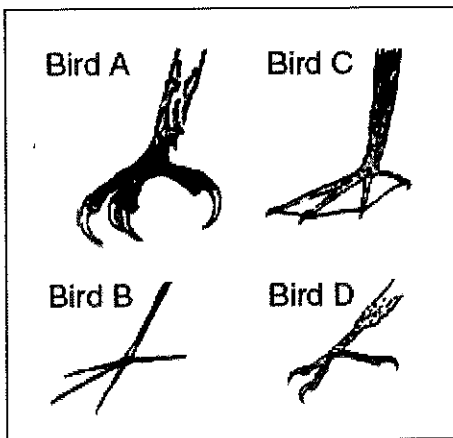
the gradual and orderly process of change in an ecosystem brought about by the progressive replacement of one community by another until a stable climax is established

In the boxes below, sketch out how ecological succession might occur in a garden left unattended. Use an asterisk to mark the most stable stage. Why is it the most stable?

the organisms are best adapted to the abiotic factors in the area

		*
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Dichotomous Keys – Use the dichotomous key to identify the following birds.

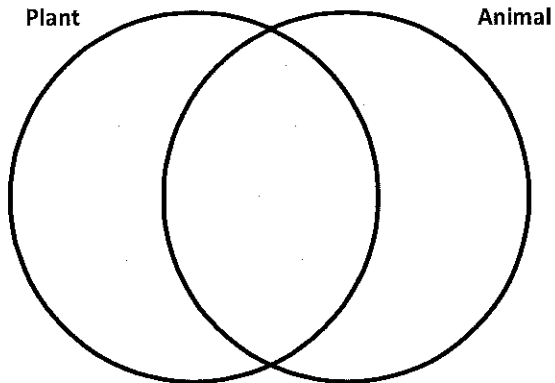


- Bird A –
- Bird B -
- Bird C -
- Bird D –

A Key to Identifying Birds		
Couplet	Description	
1a	Toes webbed	go to 2
1b	Toes not webbed	go to 3
2a	Four toes webbed together	cormorant duck
2b	Three toes webbed together	
3a	Claws curved	go to 4
3b	Claws not curved	jacana
4a	Claws large	eagle
4b	Claws small	kingfisher

Cells

Complete the Venn diagram to compare the characteristics of plant and animal cells. Use all of the words in the word bank.



Word Bank	
1	cell membrane
2	cell wall
3	chloroplasts
4	cytoplasm
5	DNA
6	nucleus
7	round shape
8	square shape

How are prokaryotic and eukaryotic cells different?

prokaryotic –

eukaryotic –

Write the name of the correct organelle in the space provided.

Organelle	Function
	Decides what enters and leaves the cell.
	Gel-like substance that all of the organelles float around in.
	Contains the genetic material (chromosomes) that direct all cell activities.
	Power-house of the cell; converts chemical energy in food into energy the cell can use.
	Stores materials like water.
	Protects and supports the cell (found in plant cells only!)
	Converts radiant energy from the sun into chemical energy (glucose). (Found in plant cells only!)

Word Bank:

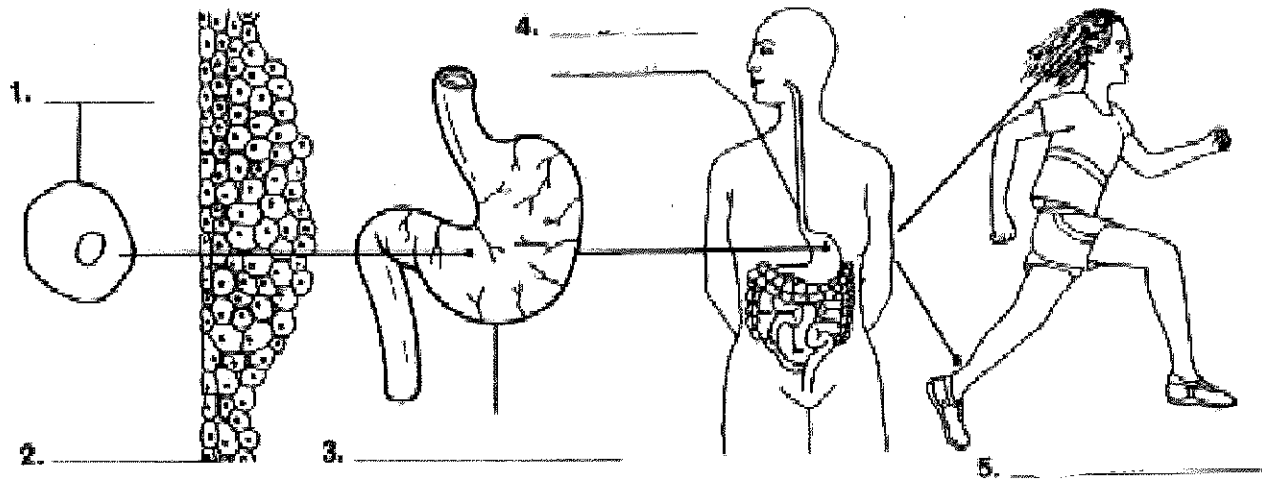
- Cell Wall
- Cell Membrane
- Mitochondria
- Nucleus
- Cytoplasm
- Chloroplast
- Vacuole

Body Systems

Complete the chart by writing the names of the missing organ systems.

Organ System	Function	Major Organs	Word Bank Circulatory Digestive Endocrine Excretory Integumentary Muscular Nervous Respiratory Skeletal Reproductive
	Transports materials	Heart, blood vessels	
	Exchanges O ₂ and CO ₂ gases	Lungs, bronchi	
digestive	Breaks down food into useable form	Esophagus, stomach, intestines	
excretory	Removes wastes from blood	Kidneys, bladder, ureters, urethra	
	Sends messages throughout body	Brain, spinal cord	
endocrine	Regulates body functions; hormones	Adrenal glands, pituitary gland	
	Protects and covers internal structures	Skin, sweat glands	
reproductive	Produce offspring	Testes, ovaries	
muscular	Allows the body to move	Muscles	
	Provides shape & support, protects internal organs, stores needed materials, produces blood cells, allows movement	Bones	

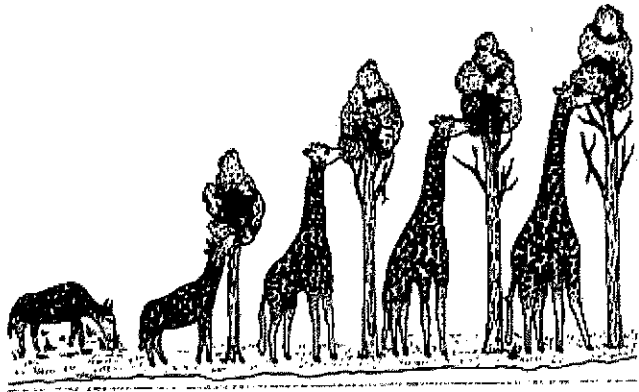
Levels of Organization



Genetics

Genetic information is carried by genes in the chromosomes found in the nucleus of cells.

Genetic traits can change over several generations. Traits that help an organism survive will be passed on while traits that do not help the organism survive will disappear over time.



Giraffe necks became longer over time because the gene for long necks was passed down through the generations. The longer neck allowed the giraffe to eat leaves high in the trees avoiding competition for limited food on the ground.

Changes in the environment can lead to changes in organisms and their traits.

Classification of Organisms

Unicellular –

Multicellular –

Autotrophic –

Heterotrophic –

Sexual reproduction – **have two parents; offspring are similar but not identical to their parents**

Asexual reproduction – **one parent; offspring are identical to parent**

Science Skills

Lab Safety Rules and Equipment

For the following lab scenarios, identify 3 safety rules that must be followed:

1. testing the effects of dye on different fabrics

2. recording the number and types of wildflowers growing in a field


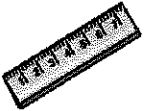




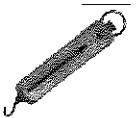

3. Diluting hydrochloric acid with water and finding the pH

Scientific Process

Circle the statements below that represent valid hypotheses:

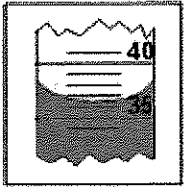
- The clouds are pretty today
- The dogs are mad because they are hungry
- Pedigree dog food makes dogs grow larger
- Grass will not grow in temperatures below 25 degrees Celsius

Laboratory Equipment

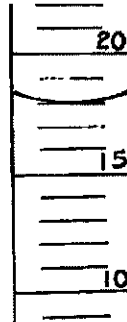
Equipment	Used for:
Beaker 	
Meter stick 	
Graduated cylinder 	
Anemometer 	
Psychrometer 	
Hot plate 	
Spring scale 	
Triple beam balance 	

Measurement

Volume: Use a graduated cylinder to measure the volume of a liquid by reading the meniscus. Bubble your answer in the grid provided.

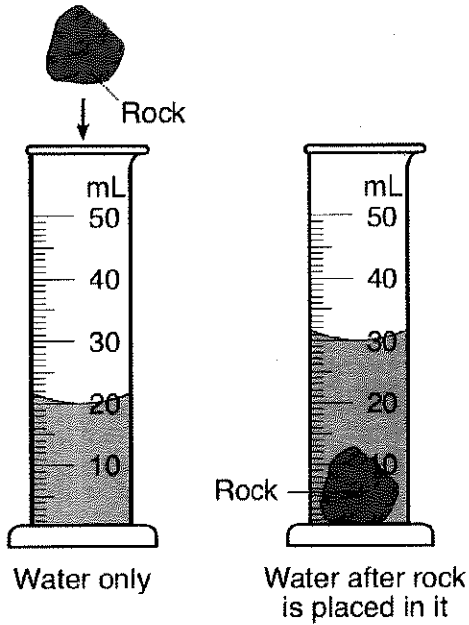


0	0	0	0	.	0	0	0
1	1	1	1		1	1	1
2	2	2	2		2	2	2
3	3	3	3		3	3	3
4	4	4	4		4	4	4
5	5	5	5		5	5	5
6	6	6	6		6	6	6
7	7	7	7		7	7	7
8	8	8	8		8	8	8
9	9	9	9		9	9	9



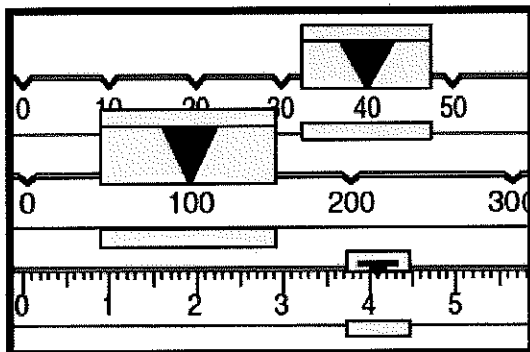
0	0	0	0	.	0	0	0
1	1	1	1		1	1	1
2	2	2	2		2	2	2
3	3	3	3		3	3	3
4	4	4	4		4	4	4
5	5	5	5		5	5	5
6	6	6	6		6	6	6
7	7	7	7		7	7	7
8	8	8	8		8	8	8
9	9	9	9		9	9	9

What is the volume of the rock below?



0	0	0	0	.	0	0	0
1	1	1	1		1	1	1
2	2	2	2		2	2	2
3	3	3	3		3	3	3
4	4	4	4		4	4	4
5	5	5	5		5	5	5
6	6	6	6		6	6	6
7	7	7	7		7	7	7
8	8	8	8		8	8	8
9	9	9	9		9	9	9

What is the mass of the triple beam balance reading below?



0	0	0	0	.	0	0	0
1	1	1	1		1	1	1
2	2	2	2		2	2	2
3	3	3	3		3	3	3
4	4	4	4		4	4	4
5	5	5	5		5	5	5
6	6	6	6		6	6	6
7	7	7	7		7	7	7
8	8	8	8		8	8	8
9	9	9	9		9	9	9

Organizing and Evaluating Information (and Diagrams)

You will be asked to analyze data many times on the STAAR test. Remember, if you see a diagram, graph, or a data table the answer is there for you! Do not give up --- just keep looking until you find it!!!! Here is some practice:

1. The following boxes represent a field. Which pattern for collecting 10 samples would provide the best data for identifying the types of plants in a field?

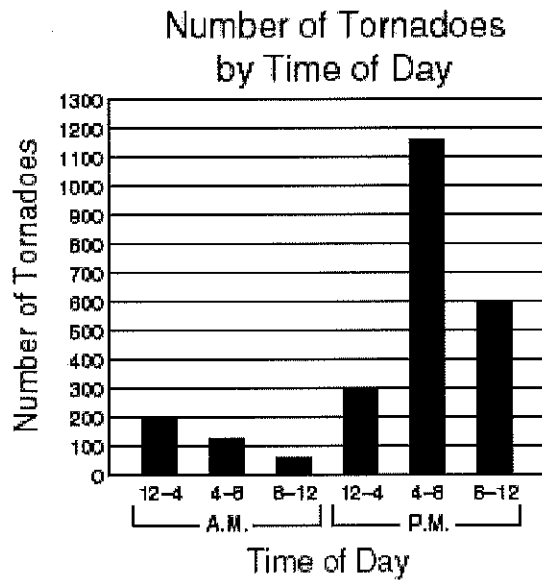
A

C

B

D

2. A student prepared this graph of tornadoes reported over a 50-year period in a midwestern state. Which statement is supported by these data?



- A** Tornadoes are less frequent in the morning.
- B** Darkness increases the strength of tornadoes.
- C** Tornadoes occurring at night are brief.
- D** The probability of a tornado is the same throughout the day.

3. Amber is a type of fossil that formed from tree resin. As sticky resin ran down a tree, insects sometimes became trapped in it. Under certain conditions, ancient resin fossilized into amber with the insects preserved in it.

Which of the following is best supported by the information above?

- A** Tree resin makes good insect repellent.
- B** Amber is a beautiful and valuable gemstone.
- C** Trees can live for long periods of time.
- D** Some insects lived on trees a long time ago

4. Some students conducted a survey about various energy sources used in Regions Q and R. The data table to the right shows the results of the survey. Which of the following best supports the data?

Regional Energy Sources

Energy Source	Percentage of Use	
	Region Q	Region R
Oil	30%	30%
Coal	20%	15%
Nuclear	25%	10%
Solar	5%	10%
Hydroelectric	5%	15%
Wind	5%	10%
Biomass	10%	10%

- F Region Q conserves more energy than Region R.
- G Both regions spend the same on nonrenewable resources.
- H Region Q uses a higher percentage of nonrenewable energy sources than Region R.
- J Both regions use a higher percentage of renewable energy sources than nonrenewable sources.

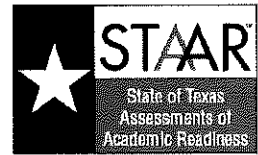
- 5.

Temperature (°C)	Grams of Substance That Dissolve in 100 Milliliters of Water			
	Substance W	Substance X	Substance Y	Substance Z
10	5.0	22.0	70.0	37.0
20	8.0	32.0	52.0	37.5
30	10.0	45.0	42.0	38.0
40	15.0	60.0	35.0	38.5
50	20.0	80.0	28.0	39.0
60	26.0	100.0	22.0	39.5
70	33.0	130.0	18.0	40.0

Some students hypothesize that heating a mixture of any substance and water will always increase the amount of the substance that will dissolve in the water. The table shows results of an investigation testing this hypothesis. The results for which of the substances tested weaken this hypothesis?

- F Substance W
 - G Substance X
 - H Substance Y
 - J Substance Z
6. A researcher wants to determine the average number of cave crickets that exit a certain cave in the first two hours after sunset. The best procedure for collecting precise data in this investigation is to count crickets exiting —
- F the cave on several nights and calculate the average value
 - G the cave for 15 minutes on one night and multiply by 8
 - H the caves in the surrounding area on several nights and calculate the average value
 - J the cave during one night and use this value

STAAR GRADE 8 SCIENCE REFERENCE MATERIALS



FORMULAS

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$D = \frac{m}{V}$$

$$\text{Average speed} = \frac{\text{total distance}}{\text{total time}}$$

$$s = \frac{d}{t}$$

$$\text{Net force} = (\text{mass})(\text{acceleration})$$

$$F = ma$$

$$\text{Work} = (\text{force})(\text{distance})$$

$$W = Fd$$

STAAR GRADE 8 SCIENCE REFERENCE MATERIALS

PERIODIC TABLE OF THE ELEMENTS

1 1A		2 2A												18 8A				
1 H 1.008 Hydrogen	2 He 4.009 Helium	3 Li 6.941 Lithium	4 Be 9.012 Beryllium	5 B 10.812 Boron	6 C 12.011 Carbon	7 N 14.007 Nitrogen	8 O 15.999 Oxygen	9 F 18.998 Fluorine	10 Ne 20.180 Neon	11 Na 22.990 Sodium	12 Mg 24.305 Magnesium	13 Al 26.982 Aluminum	14 Si 28.086 Silicon	15 P 30.974 Phosphorus	16 S 32.066 Sulfur	17 Cl 35.453 Chlorine	18 Ar 39.948 Argon	
19 K 39.098 Potassium	20 Ca 40.078 Calcium	21 Sc 44.956 Scandium	22 Ti 47.867 Titanium	23 V 50.942 Vanadium	24 Cr 51.996 Chromium	25 Mn 54.938 Manganese	26 Fe 55.845 Iron	27 Co 58.933 Cobalt	28 Ni 58.693 Nickel	29 Cu 63.546 Copper	30 Zn 65.38 Zinc	31 Ga 69.723 Gallium	32 Ge 72.64 Germanium	33 As 74.922 Arsenic	34 Se 78.96 Selenium	35 Br 79.904 Bromine	36 Kr 83.798 Krypton	
37 Rb 85.468 Rubidium	38 Sr 87.62 Strontium	39 Y 88.906 Yttrium	40 Zr 91.224 Zirconium	41 Nb 92.906 Niobium	42 Mo 95.96 Molybdenum	43 Tc (98) Technetium	44 Ru 101.07 Ruthenium	45 Rh 102.906 Rhodium	46 Pd 106.42 Palladium	47 Ag 107.868 Silver	48 Cd 112.412 Cadmium	49 In 114.818 Indium	50 Sn 118.711 Tin	51 Sb 121.760 Antimony	52 Te 127.60 Tellurium	53 I 126.904 Iodine	54 Xe 131.294 Xenon	
55 Cs 132.905 Cesium	56 Ba 137.328 Barium	57 La 138.905 Lanthanum	58 Ce 140.116 Cerium	59 Pr 140.908 Praseodymium	60 Nd 144.242 Neodymium	61 Pm (145) Promethium	62 Sm 150.36 Samarium	63 Eu 151.964 Europium	64 Gd 157.25 Gadolinium	65 Tb 158.925 Terbium	66 Dy 162.500 Dysprosium	67 Ho 164.930 Holmium	68 Er 167.259 Erbium	69 Tm 168.934 Thulium	70 Yb 173.055 Ytterbium	71 Lu 174.967 Lutetium	72 Hf 178.49 Hafnium	
87 Fr (223) Francium	88 Ra (226) Radium	89 Ac (227) Actinium	90 Th 232.038 Thorium	91 Pa 231.036 Protactinium	92 U 238.029 Uranium	93 Np (237) Neptunium	94 Pu (244) Plutonium	95 Am (243) Americium	96 Cm (247) Curium	97 Bk (247) Berkelium	98 Cf (251) Californium	99 Es (252) Einsteinium	100 Fm (257) Fermium	101 Md (258) Mendelevium	102 No (259) Nobelium	103 Lr (262) Lawrencium	104 Rf (267) Rutherfordium	

Atomic number — 14
Symbol — **SI**
Atomic mass — 28.086
Name — Silicon

Mass numbers in parentheses are those of the most stable or most common isotope.

Lanthanide Series

Actinide Series