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8th Grade Practice MCAS #1 (Mid-year)
STUDY GUIDE

HEREDITY

1. Vocabulary

Directions: Write the vocab word next to the correct definition, using the word bank.

Definition:	Word:
a. The passing of traits from parents to offspring	
b. The molecule that contains genetic information	
c. The structure that holds the DNA	
d. A segment of DNA that encodes information for a trait	
e. A defining characteristic (ex. height, hair color)	
f. A version of a gene (ex. blue eyes or brown eyes)	
g. The physical representation of a gene (ex. brown hair, tall)	
h. The letters that represent the gene code (ex. BB, Bb, bb)	
i. The trait that masks/covers the affects of another trait; represented by a capital letter (ex. B)	
j. A trait that is only visible when two copies of the allele are present; represented by a lowercase letter (ex. b)	
k. The two alleles are identical/the same (ex. BB or bb)	
l. The two alleles are different (ex. Bb)	

***Word Bank**: dominant, recessive, genotype, phenotype, allele, homozygous, heterozygous, trait, heredity, gene, DNA, chromosome*

2. Chromosomes

a. Where are chromosomes located in the cell? _____

b. How many chromosomes are in somatic (body) cells? _____

c. How many chromosomes are in gametes (sex) cells? _____

d. Chromosomes are structures of tightly wound _____ that hold _____ information that determine _____

Word Bank: *genetic 23 46 DNA nucleus traits*

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3. Punnet Squares

Directions: Create Punnett squares based on the information and answer the questions.

a. A green heterozygous pea plant is crossed with a yellow pea plant.

Genotypic ratio = _____GG : _____Gg : _____gg

Phenotypic ratio = _____ Green : _____ Yellow

b. Teddy is homozygous dominant for tan fur. His girlfriend Sally has white fur. They have two tan hamster babies and one white hamster baby.

c. Create a Punnett square showing Teddy and Sally's *potential* children.

1. What are the genotypic and phenotypic ratios of Teddy and Sally's potential children?

2. What news do you have to break to Teddy?! Why?

4. Reproduction (Sexual vs Asexual)

Directions: Choose the correct type of reproduction for each of the following statements.

Statement	**Type of Reproduction (Sexual or Asexual)**
Only 1 parent is needed	
2 parents are needed	
Involves sperm and egg joining together	
Occurs quickly	
Offspring's DNA is identical to the parent	
Offspring's DNA is different from both parents	
Occurs in bacteria	
Occurs when plants send out root-like extensions	
Creates new humans & animals	
Growth & repair of humans & animals	

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Directions: Fill in the table with bulleted facts.

	Sexual Reproduction	**Asexual Reproduction**
Advantages:		
Disadvantages:		

EVOLUTION:

1.Vocabulary

Directions: Write the vocab word next to the correct definition, using the word bank.

Definition:	**Word:**
a. The process in which populations gradually change over time	
b. Process by which individuals that are better adapted to their environment survive and reproduce more successfully than less well adapted individuals	
c. When a species dies out completely	
d. A characteristic that helps an organism survive and reproduce in its environment	
e. A group of closely related organisms that are capable of interbreeding and producing fertile offspring.	
f. Process by which humans choose which animals survive and reproduce in hopes of producing organisms with specific traits	
g. A group of the same species of organisms living in the same geographic location	
h. Process by which a single species undergoes **s**eparation, **a**daptation, and **d**ivision to become a new species	

Word Bank: *adaptation, evolution, speciation, extinction, selective breeding, population, natural selection, species*

2. Common Ancestry

What are two pieces of evidence that support two organisms having a **common ancestor**?

a) _____ b) _____

3. Life Origins

a) What era of geologic time had few organisms and no oxygen? _____

b) What era of time had the dinosaurs? _____

c) What era of time are we in now? _____

c) What are the PRODUCTS of photosynthesis? _____ + _____

d) What are the PRODUCTS of cellular respiration? _____ + _____ + _____

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4. Human Impact

a) Name 3 types of human activity that negatively impact the environment.

1. _____2. _____ 3. _____

b) Which type of human activity has negatively impacted the atmosphere? Why?

_____

CHEMISTRY:

1. Vocabulary

Directions: Write the vocab word next to the correct definition, using the word bank.

Definition:	Word:
a. A pure substance made up of only one type of atom	
b. Smallest unit of an element	
c. A charged atom	
d. Subatomic Particle with a neutral (zero) charge	
e. Two or more DIFFERENT atoms that are chemically combined	
f. Smallest unit of a chemical compound that still has properties of that compound	
g. A force of attraction that holds atoms or ions together in a molecule	
h. A substance made by combining 2 or more different components NOT chemically combined; Can be separated	
i. Subatomic Particle with a negative charge	
j. Subatomic particle with a positive charge	
k. A substance made of only one type of atom or molecule	

***Word Bank**: element, atom, mixture, molecule, compound, pure substance, chemical bond, proton, neutron, electron, ion*

2. Counting Atoms

Directions: Write the number of each atom that is present in the molecule

Molecular Formula	**Number of Atoms**
H_2O	
$C_6H_{12}O_6$	
Reactants: Products: **$2CO + O_2 \rightarrow 2CO_2$**	Reactants: Products:

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3. Chemical Properties

Directions: Answer each question so that the particle still maintains properties of the original.

a. The smallest sub atomic particle of an atom is an _____
b. The smallest particle of an element is an _____
c. A molecule is made of more than one _____ (the same or different)
d. A compound is made of two _____ atoms
e. The smallest part of a compound is a _____

***Word Bank**: atom (x2), electron, molecule, different*

4. The Law of Conservation of Mass

a. The Law of Conservation of Mass states that mass cannot be _____ or _____. This means a chemical equation must be _____ because the number of atoms in the _____ must equal the number of atoms in the _____.

***Word Bank**: balanced, created, products, destroyed, reactants*

5. Chemical vs. Physical Changes

Indicators of a **Chemical Change**	Indicators of a **Physical Change**
1.	1.
2.	2.
3.	

6. Boiling Point

a. Boiling point can be used to determine the type of _____ in an unknown substance, whether _____ or _____.
b. This is because all elements and _____ have the same boiling point, and they DON'T CHANGE with _____ or _____.

***Word Bank:** compounds metal, mass, non-metal, element, volume*

PHYSICS

1. Kinetic & Potential Energy

Directions: Identify the correct type of energy for each of the images below.

a. A diver on the final descent of her dive	
b. A car driving on a highway	
c. A snow boarder standing at the top of a mountain	
d. A pendulum about to be released	

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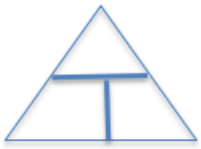
2. Physics Equations

a) Fill in the triangles with the correct variables…

Speed, Distance, Time



Momentum, Velocity, Mass

b) Describe the difference between **Mass** and **Weight:**

Mass is _____ *while weight is* _____

c) Mass is measured in _____, while Weight is measured in _____

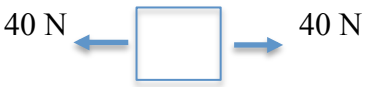
d) Identify the following as **Velocity, Speed, or Neither:**

+ 2m/s	
55 km/min	
16 km/s forward	
-9 cm/s	
100 km	

e) On a position-time graph _____ goes on the **x-axis** and _____ goes on the **y-axis.**

f) Interpret the following **Free Body Diagrams**:

1.



a. **Balanced** or **unbalanced**? (circle one)
b. Net force: _____
c. Motion: _____

2.

a. **Balanced** or **unbalanced**?
b. Net Force: _____
c. Motion: _____

<u>PRIOR REVIEW</u> (6th/7th Grade & Tech Ed)

1. **Levels of Organization:**
   List the levels of organization of living things from LEAST to MOST COMPLEX:

   1. _____ → 2. _____ → 3. _____ → 4. _____ → 5. _____

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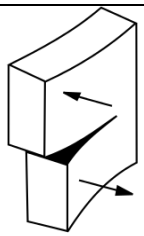
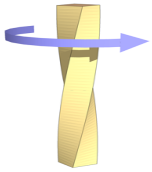
2. **Tech Ed Forces:** Fill in the rest of the table below

Image	Type of Force	Definition	Real World Example
			Pressing on a pancake with a spatula; pressing on a ball of clay until it flattens
		Pulling or stretching tightly	Playing tug of war with a friend
	Shear	Strain in the structure of a substance, produced by pressure	
	Torsion	Action of twisting in opposite directions	