

## Grade 9 Science Review

### Chapter 1 - Organisation of matter

1. Find the density of a mysterious liquid with a mass of 4.5 grams and a volume of 16 ml.
2. Find the mass of an unknown substance with a density of 7.8 g/ml and a volume of 24 ml.
3. When a solid is placed in 105 ml of water in a graduated cylinder, the water level rises to 118 ml. If the density of this solid is 2.6 g/ml, what is the mass?
4. What is the volume of an item that has a density of 5.42 g/ml and a mass of 16.802 g?
5. Convert the following:  
4500 ml = \_\_\_\_\_ L      0.65 L = \_\_\_\_\_ mL      2.45 g = \_\_\_\_\_ mg
6. Describe the movement and structure of particles in a solid, a liquid and a gas.
7. What is the difference between a mixture and a pure substance?
8. What are the 2 types of mixtures? Give 2 examples of each.
9. What are the 2 types of pure substances? Give an example of each.
10. What is the mass of solute dissolved in 3200 mL of a 2 g/L solution?
11. In a lab, 41 g of solute is placed in 250 ml of solvent to create a solution. What is the concentration of this solution?
12. You have 65.3 g of solute and want to make a solution that is 20 g/L. What is the volume of water needed to make this solution?

13. A solution has a concentration of 8 g/L and a volume of 7 L. If the concentration of the solution is reduced by half (so the new concentration is 4 g/L), what will happen to the volume of the new solution?
14. A solution is made by adding 3 g of chocolate powder to 150 mL of milk. What is the concentration percent of this new solution (chocolate milk)?
15. Check off what type of mixture or pure substance each of the following is.

	Mixtures		Pure Substances	
	Homogeneous	Heterogeneous	Element	Compound
Chocolate Chip Cookie				
Chicken Noodle Soup				
Iron (Fe)			√	
Blood				
Carbon Dioxide (CO <sub>2</sub> )				
Chocolate Milk				
Water (H <sub>2</sub> O)				
Urine				
Gold (Au)				

## Chapter 2 - Energy

- Explain the difference between an energy transformation and energy transfer.
- Define the three types of physical changes listed below:
  - Phase Change (or Change of State):
  - Dissolution:
  - Deformation:
- Give the definition of the following chemical changes:
  - Synthesis:
  - Decomposition
  - Oxidation
  - Precipitation

4. Energy that comes from the movement of particles is what type of energy?
- Solar Energy
  - Thermal Energy
  - Sound Energy
  - Hydraulic Energy
5. What is decomposition?
- The transformation of complex molecules into simpler ones
  - A chemical reaction involving oxygen
  - A physical change that changes the shape of a material
  - None of the above
6. Energy that is contained in and transported by electromagnetic waves is called:
- Radiant Energy
  - Thermal Energy
  - Elastic Energy
  - Wind Energy
7. State whether the following are examples of energy transformation or energy transfer:
- A lamp's electrical energy changes into radiant energy: \_\_\_\_\_
  - Electricity travels along wires from a power plant to homes: \_\_\_\_\_
  - Eating an apple and then dancing around: \_\_\_\_\_
  - Heat moving around our homes: \_\_\_\_\_
  - Turning on the TV in a dark room, and the TV lights up the room: \_\_\_\_\_

### Chapter 3 - Fluids & Pressure

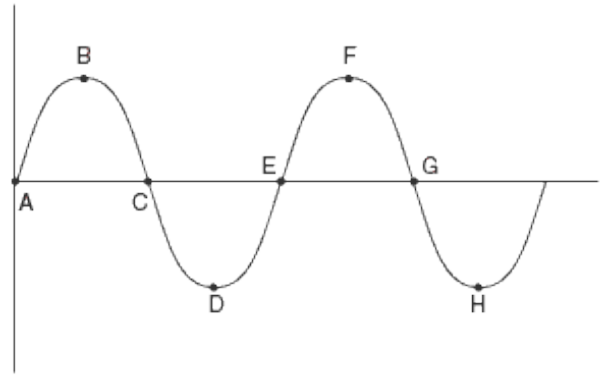
- What is the difference between an incompressible fluid and a compressible fluid? Provide an example of each.
- Which of the following is NOT a fluid?
  - Milk
  - Blood
  - Oxygen
  - Kleenex
- When we inhale, our lungs fill with air and the volume of air in our lungs increase. During inhalation, what happens to the pressure in our lungs?

### Chapter 4 – Waves (The Perception of Light and Sound)

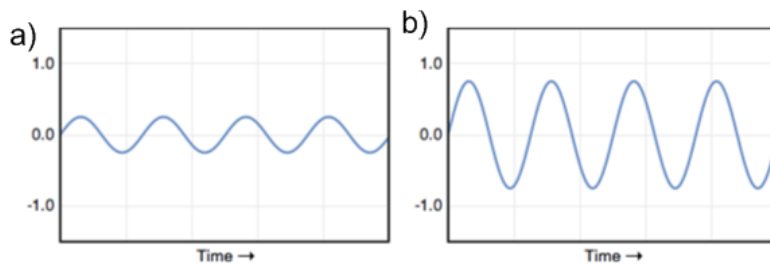
- What do waves carry?
  - Matter
  - Energy
  - Matter & Energy
  - Fluids
- Karen has noticed that she has difficulty seeing things close up, they become all blurry. Which of the following is true?
  - Karen might have myopia and a diverging lens could correct it.
  - Karen might have myopia and a converging lens could correct it.
  - Karen might have hyperopia and a diverging lens could correct it.
  - Karen might have hyperopia and a converging lens could correct it.

3. In the wave to the right, indicate the following:

- I. A wavelength (highlight a full wavelength)
- II. The crest
- III. The trough



4. Which of the following has a higher amplitude?



## Chapter 5 – Cellular Specialization and Reproduction

1. What is the relationship between cells, tissues, organs and systems?
2. Give the three main reasons as to why cell division occurs.
3. Describe mitosis (with at least three characteristics)
4. Describe meiosis (with at least three characteristics)
5. How many chromosomes does a diploid cell have?
6. How many chromosomes does a haploid cell have?
7. What is DNA? What is a gene? What is a genome?

**Reproductive System**

1. What is puberty?
2. What are hormones?
3. Which hormones trigger puberty?
4. What are the female sex hormones? What are the male sex hormones?
5. What is oogenesis?
6. What hormones cause the menstrual cycle to start?
7. Where is a female ovum fertilized?
8. What is spermatogenesis?
3. Where are proteins first digested? Where are carbohydrates first digested? Where are fats first digested?
4. Give 2 examples of mechanical transformations that occur during the digestion process.
5. In which organ are all nutrients absorbed?
6. Where does the absorption of water take place?
7. What is the name of the muscle contraction that moved food down the esophagus to the stomach?
8. Which digestive gland targets the breakdown of fats?
9. Give 2 examples of chemical transformations that occur during the digestion process.
10. What is important about the location of the first item on an ingredient list?

**Chapter 6 - Nutrition, Respiration, Blood,  
Cardiovascular and Lymphatic System**

1. Which nutrient is the body's main source of energy?
2. What are the 6 nutrients? Give an example of a food rich in each nutrient.

**Respiration**

1. What are the 6 main parts of the respiratory system?
2. What is the main goal of respiration?
3. What happens during inhalation?

4. What happens during exhalation?
5. How does gas exchange occur in the lungs?  
Where exactly does this happen?
6. What is the name of the small blood vessels that carry the oxygenated blood away from the lungs?

### Blood compatibility

1. What are the 4 constituents of blood?
2. Which blood type is known as the universal donor? Why?
3. Which blood type is known as the universal recipient? Why?
4. Can a person with blood type AB- donate to a person with a blood type of A-? Why or why not?
5. Can a person with blood type B+ donate to a person with a blood type of B-? Why or why not?
6. Which blood types would be able to donate to a person with O+ blood?
7. Which blood types could donate to a person with A+ blood?

### Cardiovascular System

1. What is an artery? What is a vein? What is a capillary?
2. What is the difference between pulmonary and systemic circulation?
3. What part of the heart is considered the pump?

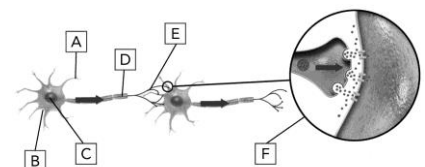
### Lymphatic System

1. What is extracellular fluid? Lymph?
2. What is phagocytosis?
3. How do antibodies and antigens protect our bodies?
4. Which of the following protects the body from infection?
  - a) Red blood cells
  - b) Platelets
  - c) White blood cells
  - d) Lymph

### Chapter 7 - Nervous system, Senses, Musculoskeletal System

1. In the diagram of a neuron (located below), which letter represents the location of an axon?

- a) A
- b) C
- c) D
- d) E





10. Fill in the following table using the words below:

Sense	Organ	Receptors	Location of Receptors	Example of Stimuli
Hearing				
Vision				
Smell				
Taste				
Touch				

Words to use: Chemicals, Cochlea, Dermis, Ear, Eye, ~~Hearing~~, Light, Nasal Cavity, Nerve Cells, Nose, Odour, Olfactory Bulb, Papillae, Photoreceptors, Pressure, Retina, Sensory, Skin, ~~Smell~~, Sound Waves, Taste Buds, ~~Taste~~, Temperature, Texture, Tongue, ~~Touch~~, ~~Vision~~

### Chapter 8 – Biotechnology

- Which of the following is a definition of pasteurization?
  - A process whereby food is heated for a period of time in order to destroy harmful microorganism.
  - The capacity to resist a disease to which we have been exposed by being able to fight off the infectious agent.
  - A prepared substance that is able to immunize an organism against one or several diseases.
  - A medical procedure used to help women become pregnant.
- Why are some foods pasteurized? What are the benefits of pasteurizing foods?

### Chapter 10 – Origins of Life

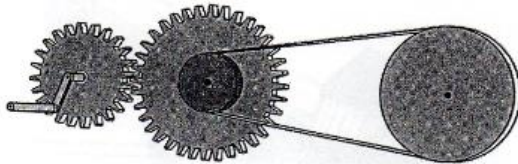
- What conditions are needed for new life to be able to form?



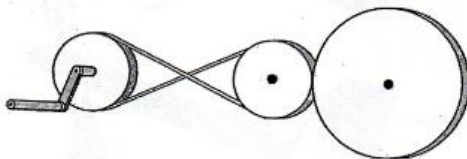
### Chapter 12 and 13 - Technology Review

1. In which of the following motion transmission chains does the final component (driven component) turn in the same direction as the initial component (driver component)?

A)



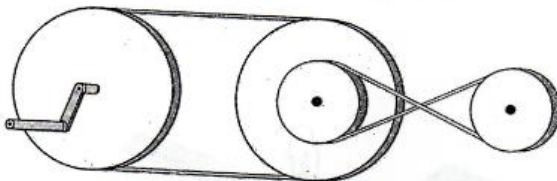
B)



C)



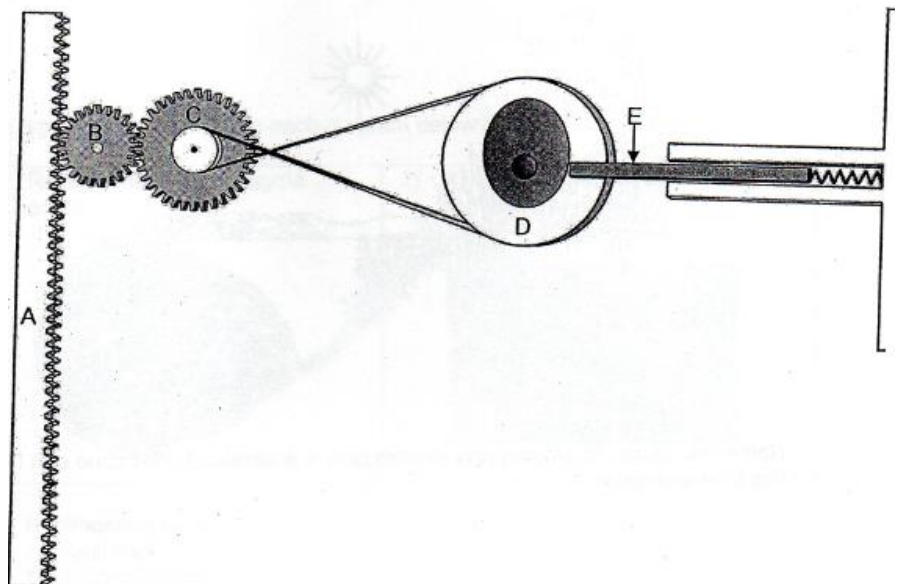
D)



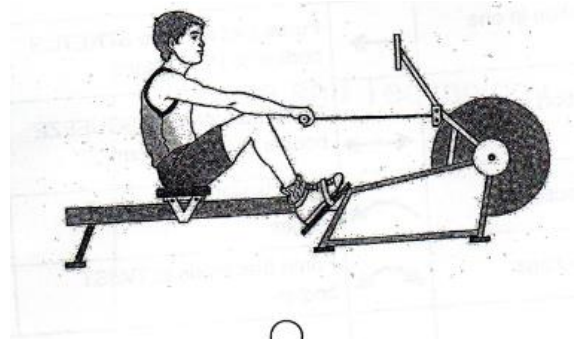
2. The following diagram shows five components (A, B, C, D and E) involved in a series of transformations and transmissions of motion.

Indicate whether the operation of each pair of components listed below involves motion transmission or motion transformation.

- 1) Components A & B
- 2) Components B & C
- 3) Components C & D
- 4) Components D & E



3. The diagram to the right shows how an exercise machine called a rowing machine works. Draw the appropriate symbols of the **two types of motion** and the **two forces** involved in using this machine.



4. List the link characteristics for the following objects:

a) Bookshelf



Shelf and side panel  
Note: the shelves are glued in place

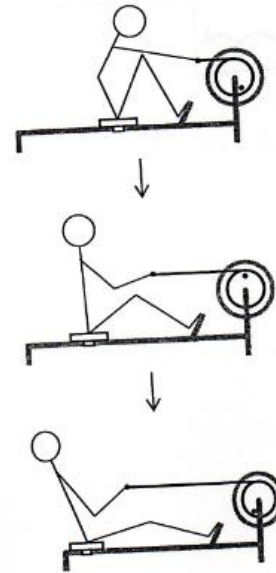
- Direct or Indirect
- Complete or Partial
- Removable or Permanent
- Rigid or Flexible

b)



Light bulb and socket

- Direct or Indirect
- Complete or Partial
- Removable or Permanent
- Rigid or Flexible



Below are some characteristics of different materials. Use that information to help you answer the questions below.

Copper is malleable, ductile, a good conductor of heat and electricity and resistant to corrosion.

Tin is soft, weak, malleable, ductile and resistant to corrosion.

Aluminum is lightweight, soft, ductile, good conductor of heat and electricity.

Red Cedar Wood is lightweight, durable and a good thermal insulator.

Elm is tough and durable.

5. Which properties of copper make it a good material to make electrical wires with?

6. Which material from above would be a good choice for creating a ladder?

7. State the main type of guiding control for each item below:

a) Peanut Butter Jar



b) Window



c) File Cabinet Drawer



d) Door Handle



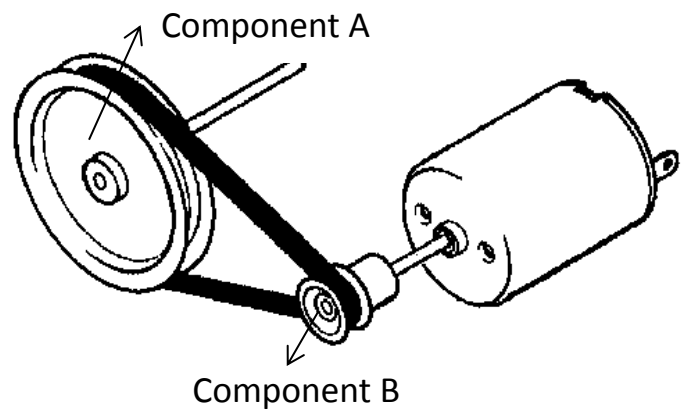
e) C-clamp



f) Laptop











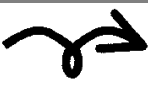
8. What type of system is shown on the right?



9. In the system to the right, would component A or B be moving faster?

## Appendix 2

## Motion and Force Symbols

Motion		Force	
Rectilinear translation in one direction		Force that tends to STRETCH the bodies or PULL them.	
Rectilinear translation in two directions		Force that tends to SQUEEZE the bodies or PUSH them.	
Rotation in one direction		Force that tends to TWIST bodies.	
Rotation in two directions		Force that tends to SPLIT bodies.	
Helical			

## Appendix 3

FORMULAS	
$C = \frac{m}{V}$	<p><math>C</math> : concentration</p> <p><math>m</math> : mass of solute</p> <p><math>V</math> : volume of solution</p>
$C_1V_1 = C_2V_2$	<p><math>C</math> : concentration</p> <p><math>V</math> : volume of solution</p>
$\rho = \frac{m}{V}$	<p><math>\rho</math> : density</p> <p><math>m</math> : mass</p> <p><math>V</math> : volume</p>