

UNIT LEARNING PACKS

FOCUS IN ACTION

Grade 8 Science Focus

Unit 1 - Mix and Flow of Matter

'Focus in Action' UNIT LEARNING PACKS

These booklets are designed to provide Grade 8 students with all the resources needed to review or reinforce concepts, covered in the Alberta Science Curriculum, and included in the Grade 8 Science Final Exam in June. There are circumstances in which **an entire unit** may be missed and covering the concepts from that unit (for the final exam) can be difficult. This can happen for a number of reasons:

- Students – new to the school – register throughout the year (from other provinces, school jurisdictions or countries)
- Students may be ill or have surgery and often can miss one or more units
- Students have extended holidays throughout the year
- Transfers from another school, who have completed the units in a different order

For additional support, students are directed to the **Edquest Middle School Science Website** or, Scienceman Resource (www.scienceman.com/scienceinaction/pgs/hot_8u1.html)

Unit 1 – Mix and Flow of Matter



- **Topic 1 Notes & Quiz** (Page 4)
- **Topic 2 Notes & Quiz** (Page 7)
- **Topic 3 Notes & Quiz** (Page 11)
- **Topic 4 Notes & Quiz** (Page 14)
- **Topic 5 Notes & Quiz** (Page 16)
- **Topic 6 Notes & Quiz** (Page 18)
- **Topic 7 Notes & Quiz** (Page 21)
- **Topic 8 Notes & Quiz** (Page 24)
- **Unit Summary** (Page 26)
- **Review Booklet** (Page 27)
(Covered in class, prior to the Final Achievement Exam)
- **Unit 1 – Mix and Flow of Matter Test** (Page 36)
- **Answer Key for Section Quizzes and Unit Test** (Page 41)

Additional support will be provided, in the form of practice Achievement Test Questions, during the course review in June. Multiple Choice Questions and Numerical Response Questions will be reviewed, as these are the types that will make up the Science 8 Final Exam

Handouts and other activities, to reinforce the concepts covered in this Unit, will be made available based on need. If you require further information or resources, email Edquest directly: edquest@gmail.com.

Finding Solutions to Problems, instead of Making Excuses

Student Instructions for use of this Learning Pack

The purpose of this Learning Unit Pack is to provide you with the resources that will help you cover the material from the curriculum that will be tested on the Final Exam in June. Follow these steps to successfully complete this Unit Learning Pack:

Step 1 – Read the **Topic Notes**

Step 2 – Use a **highlighter** to identify the key words or phrases in the Topic Notes and reread the material again paying close attention to those words that you highlighted. If necessary, modify your highlights to make sure you understand the material in the notes.

Step 3 – Complete the **Topic Quiz**

Step 4 – Correct the Topic Quiz by **checking the answers** in the back of this Learning Pack.

Step 5 – Using your **textbook** and the **completed quiz**, find the page where the question and correct answer can be found and write it next to the question number in your Learning Pack.

Step 6 – **Repeat Steps 1-5** for each of the other Topics in this Unit.

Step 7 – Look over the **Unit Outline** to review the **Key Concepts** once you have completed all of the Topics.

Step 8 – Complete the **Unit Review**, using your **Learning Pack** and **Textbook**.

Step 9 – **Highlight** those sections of the Review that you had difficulty with and review those sections with your teacher prior to taking the Unit Test.

Step 10 – Take the **Unit Test** and correct it using the answer key provided in the back of the Learning Pack.

Step 11 – You should now be ready to answer any questions on the **Final Exam** related to this Unit.

Anything you still do not understand should be discussed with your teacher. Congratulations on your **Independent Study**, and Good Luck on the Final Exam. I hope you have made good use of this resource. Please provide feedback to your teacher, so that this resource can be improved.

Additional support is available in the form of practice Achievement Test Questions. **Multiple Choice Questions** and **Numerical Response Questions** will be made available on request, as these are the types that will make up the **Alberta Science 9 Achievement Exam**.

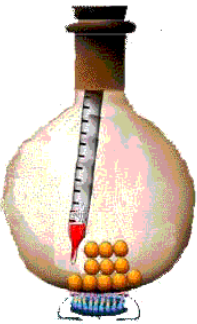


Handouts and other activities, to reinforce the concepts covered in this Unit may be acquired by visiting the Edquest Middle School Science Resource Website

<http://www.edquest.ca>

Topic 1 – Matter on the Move (pgs. 6-12)

Fluid Properties ...

The particle model helps to explain why gases and liquids flow, while solids do not.

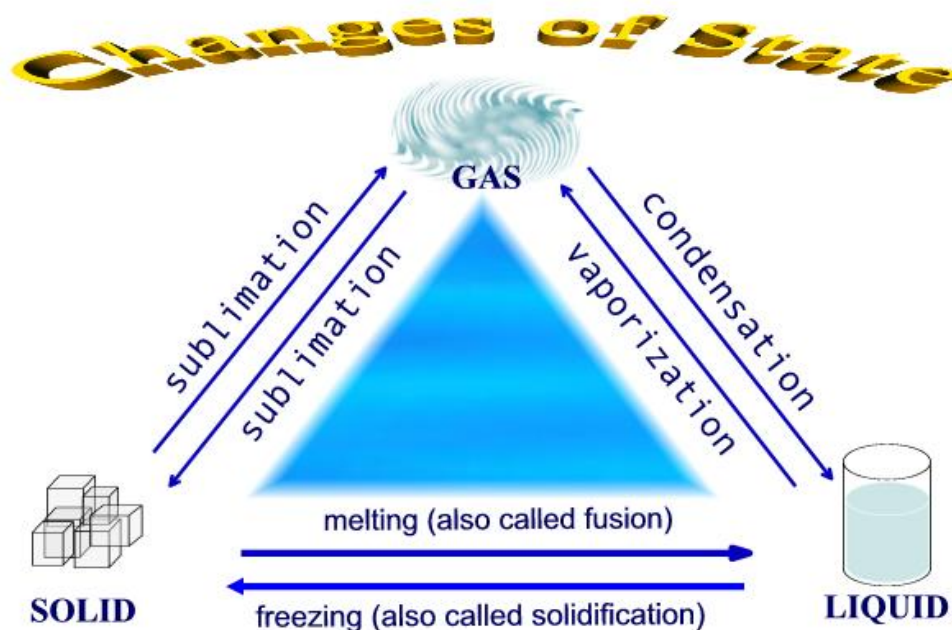
		
Solid ...	Liquid ...	Gas ...
- have definite shape and volume	- have a definite volume, but no definite shape	- have neither a definite shape nor a definite volume
- particles are tightly packed together (vibrating)	- have enough energy to pull away from each other	- have lots of energy and huge spaces between each particles
- form a pile when they are poured (the particles do not continue to flow apart from each other)	- can be poured (always flowing to the lowest possible level) and form a level (flat) surface at rest	- flow easily past each other, move in all directions, do not flow to the lowest possible level

The Particle Model (Theory)

- All substances are made of tiny particles
- All particles in a pure substance are the same (different pure substances are made of different particles)
- All the particles have spaces between them
- All the particles are always in motion (the speed of the particles increases / decreases when the temperature increases / decreases)
- The particles in a substance are attracted to one another (the strength of the attraction depends on the type of particle)

Changes of State

A change of state occurs when the particles of a substance gain or lose energy. The diagram below indicated the terminology used.



Applications

- The most common form of matter in our universe exists in a fluid state called **plasma**, which is a gas-like mixture of positively and negatively charged particles. (It is often considered to be the fourth state of matter) – Plasma, if controlled could be used as rocket fuel.
- Morphing is a special film effect that mimics the changes we see in the states of matter (*like terminator – when the policeman morphs into liquid*)
- Every substance has its own freezing and melting point which presents important applications for the manufacturing industry – like candle making
- Recycling industries apply the knowledge of changes of state to breakdown and reconstruct material for reuse.

Mix and Flow of Matter
Topic 1 – Matter on the Move Practice Quiz

1. The particles are vibrating in a place and the substance has a definite shape and volume. The state of matter is...
 - A. Solid
 - B. Liquid
 - C. Gas
 - D. Plasma

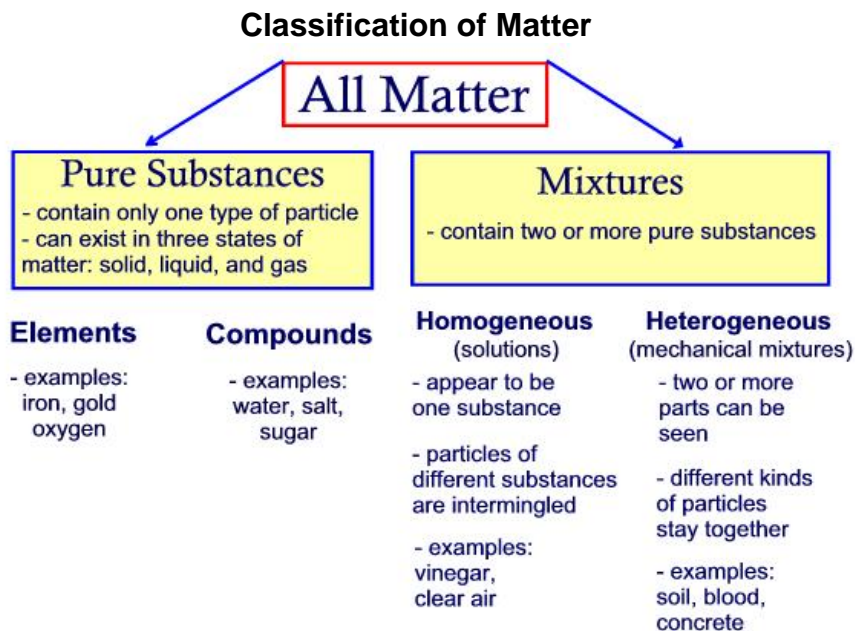
2. The particle model involves all of these key ideas, EXCEPT ...
 - A. All substances have tiny particles
 - B. All particles in any substance are the same
 - C. All particles have spaces between them
 - D. All particles are attracted to one another

3. These particles do not form rigid clumps. They can slip past each other. Because of this, the particles cannot hold their shape. The state of matter described is ...
 - A. Solid
 - B. Liquid
 - C. Gas
 - D. Plasma

4. When a substance, such as water, undergoes a change of state directly from a liquid to a gas, it is called ...
 - A. Sublimation
 - B. Condensation
 - C. Vaporization
 - D. Solidification

5. Every substance has its own freezing point and melting point. However, some substances can change directly from a solid to a gas. This transformation is called ...
 - A. Solidification
 - B. Condensation
 - C. Vaporization
 - D. Sublimation

Topic 2 – Mixing and Dissolving (pgs. 13-26)



- All pure substances have their own unique set of properties, or characteristics
- All mixtures contain two or more pure substances, which have their own distinct properties (some of which may be hidden)

Homogenous Mixtures

- Are the mixtures which look as though they have only one set of properties
- The blended mixture has equal amounts of both substances (all parts of the mixture are the same)
- If the homogenous mixture does not have any settling of any of the substances it is made of, then it is called a **solution**
- Solutions occur because each particle slips between each other particle and is evenly distributed throughout the entire mixture

Heterogeneous Mixtures

- The properties of the pure substances, in a heterogeneous mixture, are not hidden
- If there are two or more materials that are visible within a mixture, then it is called a heterogeneous mixture

In-Between Mixtures

- A heterogeneous mixture, in which the particles settle slowly after mixing, is called a **suspension** (eg. Orange juice)
- A heterogeneous mixture, in which the particles do not settle at all, is called a **colloid** (eg. Fog)
- To disperse the particles for a longer period of time, an emulsifying agent (like a protein) is used to form an **emulsion** (eg. Mayonnaise)
- Mixtures that are obviously two or more substances are called **mechanical mixtures**, the separate parts of the mechanical mixture are called **phases**.

What Makes Materials Dissolve?

- Forming a solution by mixing two or more materials together is called dissolving
- Dissolving occurs because of the attracting between the particles (there may be a stronger attraction to the particles of another substance, than to the particles of the same substance).

Solutes and Solvents

The **solute** is the substance that dissolves in a **solvent**. The solvent is the substance that dissolves the solute to form a **solution**.

Soluble means to be dissolved in a particular solvent. Solutes and solvents can be gases or liquids.

Water – the Universal Solvent

- It is called the 'universal solvent' because it can dissolve so many materials
- 97% of water on Earth is ocean water, 2% is frozen and only about 0.5% is 'usable' (and even this has materials already dissolved in it that can be harmful).

The Rate of Dissolving

- The speed at which the solute dissolves in a solvent is called the rate of dissolving and can be affected by:
 - **Agitation** (stirring or shaking)
 - **Temperature**
 - **Pressure**

How Much Can be Dissolved?

- The limit to concentration is called **solubility**
- A **saturated solution** is one in which no more solute will dissolve in a specific amount of solvent at a specific temperature
- An **unsaturated solution** is one in which more solute can be dissolved in a specific solvent at the same specific temperature
- Solubility chart (p. 20)
- **Using the particle theory**, the attractive forces between the particles becomes balanced and no more particles of the solute can be attracted by the particles of the solvent.









Beyond the Limit: Supersaturated Solutions

- a solution that contains more solute than would normally dissolve at a certain temperature is called a **super-saturated solution**.

Cleaning Up with Solvents

- Not all solute will dissolve in solvents. **Insoluble** means not able to be dissolved in a particular solvent.
- certain solvents are used for special circumstances because they will dissolve some solutes that water and other solvents cannot (rubbing alcohol is use to dissolve chlorophyll – grass stains, because the particles have strong attractions)

WHMIS Safety Symbols

	<p>Poisonous and Infectious This symbol belongs to class D-I and is one of the most commonly found symbols in homes across North America. This symbol represents materials that are toxic when ingested. This category includes such common products as bleach, Mr. Clean, and Tide.</p>		<p>Compressed Gas This symbol is in class A and is used to inform people of compressed gas. This category includes such things such as propane bottles, butane bottles, and acetylene bottles.</p>
	<p>Biohazardous This symbol is often found in hospitals and is put on products that have materials that are harmful, such as viruses or bacteria. Examples of bacteria that fall into this category are Ebola and the flesh eating disease.</p>		<p>Oxidizing This symbol informs people that this substance produces oxygen when burned. This specific reaction creates a high problem for combustion and has to be stored in special containers and must be transported with extreme care.</p>
	<p>Corrosive This symbol is the second most common symbol found in homes across North America. This symbol is most commonly found on products such as bleach and battery acid, which are highly corrosive and are able to burn organic matter.</p>		<p>Dangerously Reactive This symbol is found on some household products and on a large number of lab chemicals. Itl means that when certain chemicals are mixed they will react and produce a harmful side effect. Some chemicals that should not be mixed are bleach, drain cleaner, and ammonia because, when combined, they will form a toxic gas.</p>
	<p>Flammable and Combustible This symbol is the Flammable and combustible material, which is in class B and tells a person that certain substances will react with a flame and burn. Some materials that fit into this category are gas and oil. These substances are highly flammable and ignite with little effort.</p>		<p>Toxic / Infectious This symbol belongs to class D-2 and is one of the less common symbols found in homes. It is more commonly found in Chemistry Labs. This symbol is somewhat similar to the fourth symbol, but chemicals that fit into this category cause slower effects to the body. Some examples of this are arsenic and nicotine.</p>

Applications

- Swedish dentists have developed a mixture that may replace the drill used for filling cavities. The mixture dissolves decayed dentine in teeth. It is a red mixture called **Carisolv**.
- **Perchloroethethylene** is the solvent used in 'dry' cleaning, even though it is a liquid

Mix and Flow of Matter
Topic 2 – Mixing and Dissolving Practice Quiz

1. Milk is a substance that is fairly common. It should be classified as ...
 - A. Element
 - B. Compound
 - C. Homogenous
 - D. Heterogeneous

2. A rock like material appears to be one color – at a distance – but, upon careful examination, it has many different colors. It should be classified as ...
 - A. Element
 - B. Compound
 - C. Homogenous
 - D. Heterogeneous

3. Homogenizations helps the fat globules in milk stay dispersed longer than suspended particles. If a solution has particles which do not settle out, it is called a ...
 - A. Phase mixture
 - B. Emulsion
 - C. Coagulant
 - D. Colloid

4. When a substance, such as sugar, dissolves in water, the particles intermingle. This is possible because the particles of sugar ...
 - A. Are pure
 - B. Have strong attractions to each other
 - C. Have spaces between them
 - D. Are vaporized

5. Dissolving can be affected by a number of different factors including all of the following, EXCEPT ...
 - A. Temperature
 - B. Agitation
 - C. Pressure
 - D. Volume

Topic 3 – Separating Earth's Mixtures (pgs. 27 – 38)

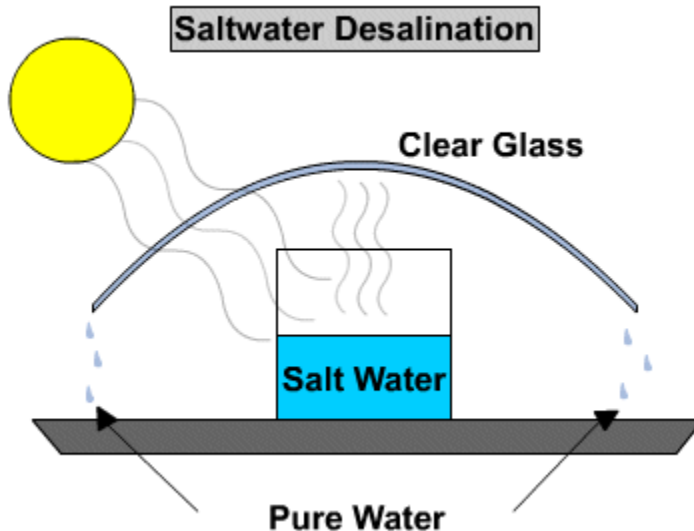
The Earth is rich in natural mixtures

Separating Mixtures

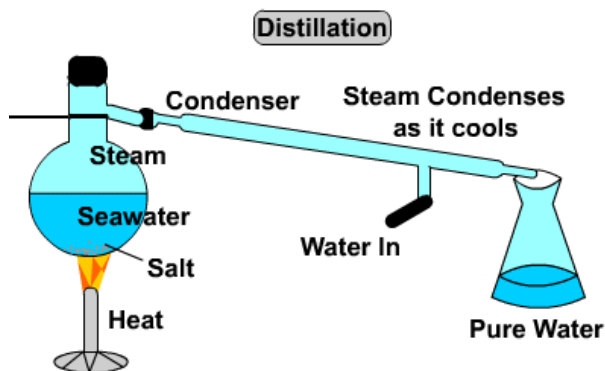
- when fluids are used to make solids flow, the solids must later be recovered
- separation methods are designed to take advantage of the unique properties of the substances that have been mixed

Desalinating Water

- the '**desert tent**' method (much like distillation) is inexpensive, but slow, and only practical in areas which receive a lot of bright sunlight



- **desalination plants**, along the Red Sea, use lots of energy and are very expensive to operate
- the process of removing water from a solution is called **dehydration**
- the **solvent** (which is the water, in most cases) is separated from the solution by means of evaporation
- **distillation** is a separation method that allows all the **liquid fractions** of a mixture to be separated from each other and collected independently
- <http://lorien.ncl.ac.uk/ming/distil/distil0.htm>
- all seawater contains salt, but in varying amounts - from place to place, with the **dead sea** having the highest concentration



Processing Petroleum

- petroleum is a natural mixture of hydrocarbons and must be processed to recover useful petroleum products
- the process that does this is called **fractional distillation**
- when the petroleum is heated, it changes into a gas (**vaporize**), which is collected and cooled, enabling it to change back into a liquid (**recondense**)
- the recondensed liquid is further separated (the parts recondense at different temperatures) into each of the fractional parts, that are soluble in each other, but not in water
- fractional distillation is done in a two-tower structure and the fractional products can then be converted (further processed) into over 500,000 types of petrochemicals

Solid Mixtures From Underground

- an ore is a mineral (or group of minerals) that contains a valuable substance (like gold)
- to extract the substance (gold) that needs to be recovered it must be mined and crushed, then mixed with water to create a fine suspension
- chemicals are then added to dissolve only the substance (gold) you want
- the substance (gold) is then released from the solution when another substance (zinc) is added, allowing the residue (gold) to sink and be collected

Applications

- Convenience foods are often dehydrated, so they can be stored for long periods of time without spoiling (you just add water when you want to use it)
- petrochemical products include aspirin, sports equipment, eyeglasses, chewing gum, duct tape and fertilizer - check out this link
- there are many different types of salt, the most common one is sodium **chloride** (table salt) – potassium chloride is **potash**
- sugar beets and sugar cane are refined to give us sugar crystals, maple sap is boiled to make '**sweetwater**' or **maple syrup**

WRAP-UP p. 39

>>>> A good review of Topics 1 – 3 in this Unit <<<<

Mix and Flow of Matter
Topic 3 – Separating Earth's Mixtures Practice Quiz

1. Separation methods are based on ...
 - A. The attractive forces between particles
 - B. Differences in physical properties of components
 - C. Similarities in physical properties of components
 - D. Similarities in chemical composition of components

2. The 'desert tent' method of separation uses a process that involves evaporation and condensation. This process is called ...
 - A. Distillation
 - B. Desalination
 - C. Dehydration
 - D. Decomposition

3. The process of separating the different products of petroleum is known as fractional distillation. The reason that this method is able to separate the different fractions of the petroleum product is because each substance ...
 - A. Condenses at a different temperature
 - B. Evaporates at a different temperature
 - C. Condenses at the same temperature
 - D. Evaporates at the same temperature

4. Most underground mixtures are solid rock. To separate the different minerals from each other, a number of steps are needed. To mine gold the following process must occur in the correct order. Which answer represents the correct order?
 1. chemicals are then added to dissolve the ore
 2. the ore is blasted and then crushed
 3. the ore is mixed with water to create a fine suspension
 4. the ore is released from the solution when zinc is added

A. 1 2 3 4 B. 3 1 4 2 C. 2 3 1 4 D. 4 2 3 1

5. In the 'sugar production' process, different types of sugar are collected at different points during the process. Using sugar cane, the producers wash and chop it, then dissolve it. To get the crystals of white sugar ...
 - A. The raw brown sugar is bleached
 - B. The pale brown crystals are rinsed and dissolved and further refined
 - C. The raw brown crystals come out of the centrifuge
 - D. The white crystals are collected immediately after the crushed cane is dissolved

Topic 4 – Flow Rate and Viscosity (pgs. 40 – 49)

- a liquid's resistance to flow (its thickness or thinness) is called **viscosity**
- a thicker a liquid is, the more **viscous** it is and the higher viscosity it has
- viscosity is a property in liquids and gases (in which it increases and decreases differently than in liquids)
- the time it takes for a fluid to flow over a set distance is called **flow rate**

Product Performance and Viscosity

- viscosity is measured precisely in many industries (paint, cosmetics)
- nail polish goes on smooth and dries to a solid, while mascara is thick and dries quickly ... the viscosity of these liquids is controlled by a solvent
- a **solvent** keeps the ingredients of the mixtures dissolved, then it evaporates

Product Appeal and Viscosity

- heat affects viscosity because it thins out the fluid, making it less viscous
- food manufacturers consider viscosity in order to make their product marketable (a candy that is too hard will not sell – if it is too hard)
- **Applications:**
 - a liquid for stripping paint off furniture would drip off before it had a chance to remove the paint, so the viscosity (making it a gel) was increased to improve its performance
 - a chef will thicken or thin gravy, or sauce, by adding, or taking away more solvent (water)
 - mechanics must adjust the viscosity of oil depending on the season of the year
 - artists change the viscosity of the paints they are using
 - technicians control the viscosity of chemicals in chemical processing plants

How Does the Viscosity of Liquids Vary?

- liquids flow at different rates because they have different viscosities
- as temperature increases, the attractive forces between the particles is less, so
- *the viscosity of a liquid **DECREASES** as it is **HEATED** and **INCREASES** when it is **COOLED**.*

How Does the Viscosity of Gases Vary?

- gas particles flow differently than liquid particles, because they are so far apart and the attractive forces between the particles are very low
- instead of sliding past each other (as they do in a liquid), the particles of a gas are more likely to collide (increasing the resistance to flow and therefore increasing the viscosity)
- temperature has a direct effect on viscosity of a gas - as temperature increases, the attractive forces between the particles is less, so
- *the viscosity of a gas **INCREASES** as it is **HEATED** and **DECREASES** when it is **COOLED***

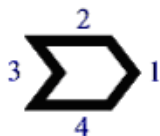
Mix and Flow of Matter
Topic 4 – Flow Rate and Viscosity Practice Quiz

1. The viscosity of liquids can be compared by observing their ...
 - A. Clarity
 - B. Volume
 - C. Resistance to Flow
 - D. Resistance to Acceleration

2. In order to increase the speed of flow of oil in a pipeline, the oil should be ...
 - A. Heated
 - B. Cooled
 - C. Expanded
 - D. Compressed

3. Fluid A has a flow rate of 10.5 ml per second. Fluid B has a flow rate of 11.3 ml per second. Compared to fluid A, fluid B is ...
 - A. More viscous
 - B. Less viscous
 - C. More dense
 - D. Less dense

4. Use the diagram below to answer the next question.



- The shape shown here travels through a fluid. This shape would experience the most drag if it were moving in direction.
- A. 1
 - B. 2
 - C. 3
 - D. 4
-
5. When your dad or mom start the cold car in the morning, they may mention that the viscosity of the motor oil would be decreased by ...
 - A. Running the engine
 - B. Charging the battery
 - C. Changing the antifreeze
 - D. Replacing the thermostat

Topic 5 – Density (pgs. 50 – 58)

Density is mass per unit volume of a substance

- According to the particle theory, the size of the particles of a substance determines how many particles of that substance can 'fit into' a given space (each substance has its' own unique density)

Density of Solids, Liquids and Gases

Water is a special substance, because when it freezes, it expands and becomes less dense – thus ice is less dense than liquid water

- because water vapor particles have more space between them, there are fewer particles in the same space and the water vapor has a lower density than liquid water
- ***gases are less dense than liquids***
- when an object (solid) moves through a fluid (liquid or gas) it pushes the particles apart and moves between them
- liquid and gaseous particles tend to move 'out of the way' for solid particles as well, because they have less attractive force between the particles
- when heat is applied to a substance, the particles gain energy and the space between the particles increases – with more space between the particles, the density of the substance decreases

Density: How are Mass and Volume Related?

- **mass** is the amount of matter in a substance (number of particles)
- **volume** is a measurement of the amount of space occupied by the substance (space that allows the particles to be present)
- **capacity** is the greatest amount of matter in a substance
- **weight** is the force of gravity exerted on an object
- **force** is a push or pull, or anything that causes a change in the motion of an object
- **gravity** is the natural force that causes an object to move toward the centre of the Earth

A Formula for Density

- the mass-to-volume ratio is the relationship between mass and volume (expressed as a quantity of the mass divided by its volume)

$$\text{Density} = \text{Mass} / \text{Volume} \quad (D = m / V)$$

- as long as the temperature and pressure stay the same, the mass-to-volume ratio, or density, of any pure substance is a **constant** (does not change)

Mix and Flow of Matter

Topic 5 – Density Practice Quiz

- An everyday situation, like a 'crowded' elevator, can represent the particle model, which helps us to visualize empty spaces between the particles. In this example, a 'spacing box' is used in an elevator. Each person has his or her own individual 'spacing box'. The idea of spaces between particles, in this example, helps us understand the concept of density, if we consider ...
 - The placement of the spacing boxes in the elevator
 - The type of spacing box used
 - The size of the spacing box
 - The number of spacing boxes
- The particles in liquid cannot support the particles of a solid, unless ...
 - The liquid is less dense
 - The liquid particles have less attractive force between them
 - The solid particles have more attractive force between them
 - The solid is less dense
- Which of the following statements best describes the correct difference, in terms of density?
 - Liquids are less dense than gases
 - Gases are less dense than liquids
 - Gases are more dense than solids
 - Liquids are more dense than solids
- A Grade 8 student made the following statement, "All liquids are less dense than all solids and denser than all gases". Which of the following substances proves this student's statement to be incorrect?
 - Mercury
 - Wood
 - Iron
 - Helium
- The formula for density is $\text{Density} = \text{Mass} / \text{Volume}$. If a substance has a volume of 100cm^3 and has a mass of 1932 grams, what is the density of the substance?
 - 193.20 g/cm^3
 - 19.32 g/cm^3
 - 1.932 g/cm^3
 - 0.1932 g/cm^3

Topic 6 – Buoyancy (pgs. 59 – 69)

Buoyancy is the tendency for materials to rise or float in a fluid

- the **buoyant force** is the upward force exerted on objects that are placed in a fluid

The “ Anti-Gravity “ Force

- buoyancy refers to the ability of a fluid to support an object floating in or on the surface of the fluid
- **floating** occurs when an object is suspended in the fluid
- the particles of a fluid exert a force in a direction opposite to the force of gravity, which **pulls down** – toward the centre of the Earth
- the upward force on objects, submerged in, or floated on fluids – **pushes up**, away from the centre of the Earth
- buoyant force is measured in **Newtons (N)**

Sinkers and Floaters

- design has a lot to do with whether an object will sink or float – if the weight of the object is spread over a large enough area, water can support objects that have densities greater than water

Average Density

- the **average density** of an object is the total mass of all substances that are enclosed in the object, divided by the total volume

Benefits of Average Density

- average density is useful because it enables objects that would otherwise sink – such as large ships (TITANIC) – to float
 - average density also helps floating objects sink – a **fish bladder** enables fish to increase or decrease their density, by adding or removing air
 - depth-control has been adapted to enable the **submarine** (in water) and the **blimp** (in the air) to rise and dive, much like a fish – using the same principles of average density
 - <http://www.howstuffworks.com/submarine.htm> (flash demo)
 - <http://www.howstuffworks.com/cargolifter.htm> (dirigibles, blimps, etc.)
- Story of Archimedes of Syracuse (Eureka!)**
<http://www.shu.edu/html/teaching/math/realms/history/>

Archimedes' Principle

- states that: **the buoyant force acting on an object equals the weight (force of gravity) of the fluid displaced by the object.**
- used his own body (which displaced water in the bathtub) to prove the king's goldsmith was cheating the king
- the buoyant force does not depend on the weight of the submerged object, but rather on the weight of the displaced fluid

How Buoyancy and Density are Related

- The buoyant force of a liquid does not depend on physical state, but rather on density (This is also true for buoyancy in gases)
- the relationship between buoyancy and density is the basis for the hydrometer, which is an instrument designed to measure density directly
- the higher the hydrometer floats in the liquid being tested, the higher the density is (of the liquid)
- hydrometers are used widely in the food and beverage industries
- besides density, hydrometers can also (indirectly) measure sugar content of canned fruit syrup or alcohol content of wine

WRAP-UP p. 70

>>>> A good review of Topics 4 – 6 in this Unit <<<<

Mix and Flow of Matter
Topic 6 – Buoyancy Practice Quiz

1. Your friends collected rocks from a lake to build a perimeter for the fire pit. They noticed that the rocks weren't as heavy while they carried them partially submerged in the water. This is because of the ...
 - A. Mass of the Rock
 - B. Density of the Water
 - C. Buoyant force of the Water
 - D. Buoyant force of the Rock

2. Which of the following pools would give the most buoyancy?
 - A. Banff Hot Springs (Outdoors) pool at 40°C
 - B. Southland Leisure Center (Indoors) Hot Tub at 40°C
 - C. Fairmount Hot Springs (Outdoors) pool at 35°C
 - D. West Edmonton Mall Wave (Indoors) pool at 35°C

3. Large ocean liners, like the Titanic, can float on the water because ...
 - A. Its average density is lower than saltwater
 - B. The metal it was made of is less dense than water
 - C. The metal is more dense and therefore can float
 - D. Saltwater is more dense and can hold up steel

4. Archimedes' principle states that '*the buoyant force acting on an object equals ...*'
 - A. The mass of the fluid displaced by the object
 - B. The force that holds the object afloat
 - C. The weight of the object displaced by the fluid
 - D. The weight of the fluid displaced by the object

5. Archimedes formulated his principle as a result of a very simple test about sinking and floating. He stepped into the bath and he sank, but when he stepped into the boat, on the water, he floated in the boat. The reason for this was because the buoyant force was ...
 - A. Less in the water
 - B. Less in the boat
 - C. Greater in the water
 - D. Greater in the boat

Topic 7 – Fluid Pressure (pgs. 71 – 77)

A Formula for Pressure

Pressure can be calculated by using the following formula:

$$\text{Pressure (P)} = \text{Force (F)} / \text{Area (A)}$$

$$\text{or, } P = F / A$$

Force is measured in **newtons** (N)

Area is often measured in **square metres** (m²)

Pressure is **newtons per metre square** (N/ m²) - also called a **pascal** (Pa), after **Blaise Pascal** (a french scientist in honour of his pioneering work in pressure)

1000 pascals is called a **kilopascal** (kPa)

Compression of a Gas

- Compression of a gas is made possible because of these conditions:
 - the gas must be in an enclosed, sturdy, sealed container
 - the space between the particles still exists, enabling the substance to continue to be a gas
 - an external (outside) force is applied to push the particles closer together
- gases are compressible because their particles can be squeezed closer together into a smaller volume
 - because the space between the particles is already so small, liquids and solids are almost **incompressible**.
- instead of compressing when the force is applied to a solid or liquid, the force is transmitted (from particle to particle) throughout the substance

Some Advantages of Compression

- gases can exert a force back (a counterforce) when they are compressed – useful in cushioning shocks
- automobile shocks, airbags, running shoes
<http://www.howstuffworks.com/airbag.htm>
<http://www.howstuffworks.com/category-automotive.htm>

Atmospheric Pressure

- Earth's atmosphere is about 160 km thick and is held to the Earth by the force of gravity
- the force exerted by the weight of the air is called air pressure and changes with altitude
- the higher the altitude, the lower the pressure (because fewer particles are present, exerting pressure – the air is thinner)
- the pressure inside your body does not change as quickly, with changes in altitude, so the number of particles pressing from the **inside out** is still the same at the top of a mountain and at the base
- if the difference in pressure on either side of the eardrum becomes great, you experience a '**pop**' inside your ear (this is the pressure equalizing)

Measuring Air Pressure

- the most common device for measuring air pressure is the **barometer**
- in a mercury barometer, increased air pressure forces the column of mercury up the glass tube and allows it to fall when the air pressure decreases

Balanced and Unbalanced Forces

- if the inside of a closed container experiences a lower air pressure than the air pressure pushing on the outside, the walls of the container will buckle (cave in) because there is an **unbalanced force** - the force of the atmosphere is greater than the force within the container

Applications

- Blaise Pascal was only 16, when he published a geometry book, and invented his first mechanical calculator when he was 19
- Pascal's ideas formed the basis of 'hydraulics'
- cushioning materials (gymnastic mats, Styrofoam packaging and bubble wrap) are used to absorb the force of impact to reduce the pressure felt
- all-terrain vehicles have a wide tire to spread out the pressure over a larger area
- carbonated soda products are packaged in plastic bottles and are crushed when the air or soda is sucked out because of unbalanced forces unlike glass bottles which can withstand the external force acting on it
- the **carbonation** is provided by the carbon dioxide gas added to the syrup and then trapped in the bottle (if you open it quickly the carbon dioxide will escape quickly causing fizz)

Mix and Flow of Matter
Topic 7 – Fluid Pressure Practice Quiz

1. A window washer notices that the spray hoses he uses are spraying water at too high pressure and damaging the trim on the windows. The rate of flow of water coming out of the nozzle could be reduced by ...
 - A. Shortening the hoses
 - B. Lengthening the hoses
 - C. Increasing the nozzle opening
 - D. Decreasing the nozzle opening

2. A gas can be compressed if three conditions are met. They include all of the following EXCEPT ...
 - A. The gas must be at room temperature
 - B. The gas must be in a sealed container
 - C. It will remain a gas even after it has been compressed
 - D. A force is applied to push the particles closer together

3. When we suck on a straw in a tetra-pak juice container, the sides of the container collapse. This happens because ...
 - A. We are increasing the pressure inside the container
 - B. The atmospheric pressure is collapsing the walls of the container
 - C. The pressure inside the container is increased and collapses from the added pressure
 - D. We are lowering the strength of the container when we suck on the straw.

4. There are advantages to compression because they can exert a counterforce. This counterforce can be useful in the following application – of a bicycle ...
 - A. Sprockets
 - B. Gears
 - C. Handlebars
 - D. Shocks

5. The atmosphere around the Earth is approximately 160 km thick. It is the force of gravity which keeps it in place. What effect does this layer of air have on us when we hike up a mountain?
 - A. It weighs us down a lot less as we climb
 - B. It weighs us down a lot more as we climb
 - C. It has no effect, because our body is use to it
 - D. It has no effect, because our body can adjust to it

Topic 8 – Fluid Systems (pgs. 78 – 84)

Applications

- Aerosols work because particles flow from areas of high pressure to low pressure (Aerosol spray counter <http://www.invention.com/klein.htm>)
- Aerosols use to have CFC's (**chlorofluorohydrocarbons**) but were banned because of their effect on the ozone layer (they break down ozone by reacting with ultraviolet light)
- Fire extinguishers work differently than aerosols (liquid carbon dioxide, under pressure, changes to a gas when released, because the particles gain energy and need more space)
- any gas or liquid under pressure must be in a very sturdy container (if the container is ruptured or exposed to high temperature, it can explode because the particles gain energy and need more space)
- (pneumatic tools) tampers are used to pack down dirt or gravel in road construction and dentist's use pneumatic drills

Hydraulic Systems

Hydraulics is the study of pressure in liquids

- devices that transmit applied forces through a liquid to move something else, because of pressure, are called **hydraulic systems**
- in a hydraulic system, a force is exerted on a continuous, enclosed liquid
- this force creates pressure which is transferred equally throughout the liquid

Hydraulics to Transport Fluids

- liquids flow away from the applied force in all directions (**pumps** provide the applied force, and **valves**, which can direct the fluid or allow it to escape from the system, control the flow of the liquid)

Pneumatic systems are similar to hydraulic systems, except that gases are used, instead of liquids - they operate on the principle that gases can be compressed

- compressors (devices used to compress air) are used to build up air pressure and then release it, allowing the compressed air to **decompress** (the particles move apart suddenly creating a strong, steady force that can be used to perform powerful tasks)

WRAP-UP p. 85

>>>> A good review of Topics 7 – 8 in this Unit <<<<

Mix and Flow of Matter
Topic 8 – Fluid Systems Practice Quiz

1. Valves are devices used to regulate the flow of a fluid. In an aerosol product such as whipped cream, the cream inside can be dispersed easily by bending the nozzle. This is possible because the particles always ...
 - A. Travel from lower pressure areas
 - B. Travel from higher pressure areas
 - C. Get more energy when they are released
 - D. Make foam when they are released

2. In a hydraulic press model built by an apprentice, a pedal is used to push down the large piston, while the small piston lifts up a load. The apprentice's model didn't work. What's wrong with it?
 - A. The pistons should have the same diameter
 - B. The load should be on the larger piston
 - C. Both pistons should be smaller
 - D. Both pistons should be larger

3. Two identical syringes are used to build a model of a hydraulic press. The press does not lift the loads you expect. To remedy the situation you should use ...
 - A. Larger syringes
 - B. Longer syringes
 - C. Smaller syringes
 - D. Syringes with different diameters

4. Fluids, such as water, have been transported from place to place using hydraulic systems. The aqueduct is an ancient device that transported water over great distances. It was able to do this because of ...
 - A. The force of gravity
 - B. A very rudimentary hydraulic system
 - C. A very rudimentary pneumatic system
 - D. Simple pumps set up along the way

5. In terms of design, a pneumatic device (such as a compressor) resembles a hydraulic press. The distinguishing difference is that this pneumatic device uses ...
 - A. Compressed alcohol
 - B. Incompressible fluids
 - C. Compressed air
 - D. An electrical current to operate it

Mix and Flow of Matter Summary & Review

Topic 1 The Particle Model of Matter	<ul style="list-style-type: none"> - What properties distinguish solids, liquids and gases (p.7)? - What are the key ideas in the Particle Model of Matter (p. 8)? - Describe the action of particles in solids, liquids and gases. (p. 9-10) - Describe the Changes of State and the terminology used, when a substance undergoes a specific change of state. (p. 11-12)
Topic 2 Classification of Matter WHMIS	<ul style="list-style-type: none"> - How is matter classified? (p. 13) - What is the difference between a homogenous and a heterogeneous mixture? (p.14) - Describe a suspension, a colloid, and an emulsion. (p.15) - What conditions must be present to enable a material to dissolve in another material? (p.17) - Explain the difference between a solute and a solvent. (p.18) - Why is water called 'the universal solvent'? (p.19) - What affects the rate at which a material will dissolve? (p.19) - What is a saturated solution? (p.21) - Why are some substances insoluble? (p.24)
Topic 3 Solutions (mixing, dissolving, solute, solvent)	<ul style="list-style-type: none"> - Describe the 'desert tent' method of separation. (p.28) - What is desalination? (p.28) - Describe how distillation is able to separate the parts of a solution. (p.29) - How is petroleum separated and the fractional parts collected? (p.30) - How is ore (such as gold) mined and collected? (p.31) - Describe, in general terms, how sugar is processed from sugar cane. (p.36)
Topic 4 Viscosity and Flow Rate	<ul style="list-style-type: none"> - How is the thickness or a thinness of a fluid measured and what is it called? (p. 40) - Describe some practical applications of the knowledge about viscosity. (p.45) - How is viscosity in different fluids affected by temperature? (p. 48-49)
Topic 5 Density	<ul style="list-style-type: none"> - Calculate density using a formula. (p.57) - How are mass and volume related, when determining density? - Describe the density of solids liquids and gases, using the particle model. (p.51) (Calculated by dividing mass by volume) Response to change in temperature
Topic 6 Buoyancy	<ul style="list-style-type: none"> - How is buoyancy determined? - Describe how a ship (made out of steel) can float.. - How does a '<i>cartesian diver</i>' work? - What is average density and what benefits does it have? - Explain '<i>Archimedes Principle</i>' and how he came to formulate it. - Describe how scuba gear works. (p. 69)
Topic 7 Fluid Pressure (Calculated by dividing force by area)	<ul style="list-style-type: none"> - Calculate pressure using a formula. - What conditions must be met to compress a gas? (p. 73) - Provide some examples of the advantages of compression. - What effect does atmospheric pressure have on our body? (p.75) - How is atmospheric pressure affected by altitude? (p.75)
Topic 8 Fluid Systems Hydraulics Pneumatics	<ul style="list-style-type: none"> - Describe how a fire extinguisher works. (p.79) - Describe the components needed to make a hydraulic system. (p.80) - What is the primary difference between hydraulic systems and pneumatic systems? (p.81)
<p>Design a Concept Map linking the ideas introduced and reinforced in this Unit on Mix and Flow of Matter</p>	
<p>Try some of the Practice Quizzes to see how much you have recalled from this Unit</p>	

Unit 1 – Mix and Flow of Matter – Year End Review









Complete each of the following questions, relating to the specific learner outcomes, covered this year in Grade 8. The questions in this review reflect what you should have mastered and will be tested on in the Final Achievement Exam. The answers will be covered in class.

Part 1 – Fluids are used in Technological devices and common everyday materials

What does the acronym W.H.M.I.S. stand for?

W _____ H _____ M _____ I _____ S _____

Identify the WHMIS symbols illustrated and explain what Safety procedures should be followed.

Symbol	Type of Hazard	Safety Procedure
		
		
		
		
		
		
		
		

Describe ‘**Slurry**’ technology

Part 2 – Properties of matter, using the Particle Model

What properties distinguish **solids, liquids and gases** (p.7)?

Solid	Liquids	Gases

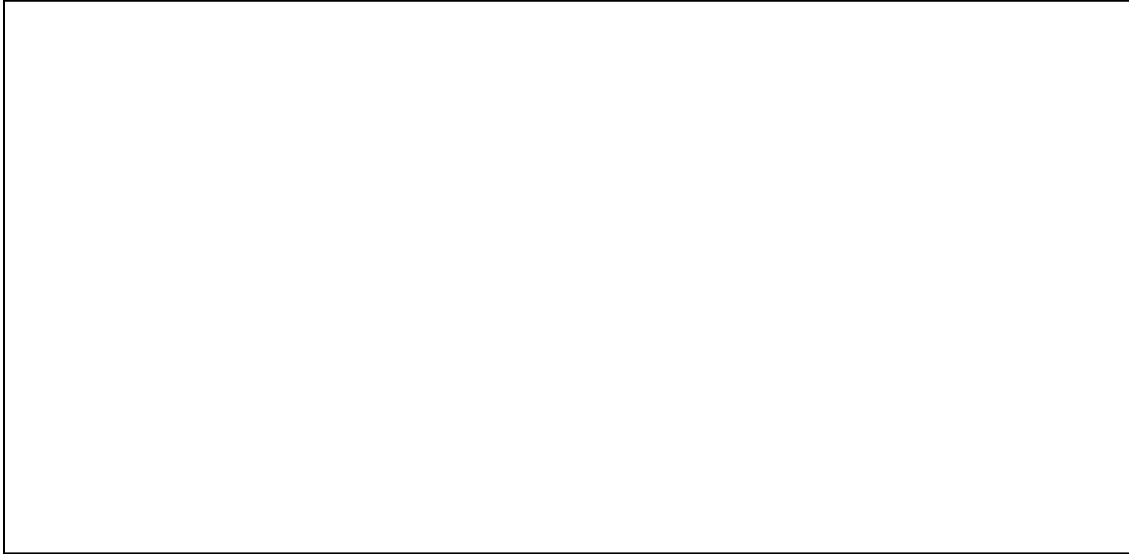
What are the key ideas in the **Particle Model of Matter** (p. 8)?

Describe the action of **particles** in solids, liquids and gases. (p. 9-10)

Solid	Liquids	Gases

Part 3 – Changes of State

Describe the Changes of State and the terminology used, when a substance undergoes a specific change of state. (p. 11-12)

**Part 4 – Classification of Matter**

How is matter classified? (p. 13)



Part 5 – Solutions

Describe a **suspension**, a **colloid**, and an **emulsion**. (p.15)

What conditions must be present to enable a material to **dissolve** in another material? (p.17)

Explain the difference between a **solute** and a **solvent**. (p.18)

Why is water called '**the universal solvent**'? (p.19)

What affects the **rate** at which a material will dissolve? (p.19)

What is a **saturated** solution? (p.21)

Why are some substances **insoluble**? (p.24)

Part 6 – Separation Methods

Describe the '**desert tent**' method of separation. (p.28)

What is **desalination**? (p.28)

Describe how **distillation** is able to separate the parts of a solution. (p.29)

How is petroleum separated and the **fractional parts** collected? (p.30)

How is **ore** (such as gold) mined and collected? (p.31)

Describe, in general terms, how sugar is **processed** from sugar cane. (p.36)

Part 7 – Properties of gases and liquids (using the Particle Model)**Viscosity – Density – Buoyancy – Pressure**

How is the **thickness or a thinness** of a fluid measured and what is it called? (p. 40)

Describe some **practical applications** of the knowledge about viscosity. (p.45)

How is viscosity in different fluids affected by **temperature**? (p. 48-49)

Calculate density using a formula. (p.57)

--

How are **mass and volume related**, when determining density?

Describe the density of solids liquids and gases, using the **particle model**. (p.51)

How is **buoyancy** determined?

Describe how a ship (made out of steel) can **float**.

How does a '*cartesian diver*' work?

What is **average density** and what benefits does it have?

Explain '*Archimedes Principle*' and how he came to formulate it.

Describe how **scuba gear** works. (p. 69)

Calculate pressure using a formula.

What conditions must be met to **compress** a gas? (p. 73)

Provide some examples of the **advantages of compression**.

What effect does **atmospheric pressure** have on our body? (p.75)

How is atmospheric pressure affected by **altitude**? (p.75)

Describe how a **fire extinguisher** works. (p.79)

Describe the components needed to make a **hydraulic system**. (p.80)

What is the primary difference between **hydraulic systems** and **pneumatic systems**? (p.81)

Grade 8 – Unit 1 Test

Student**Class**

- All fluids flow and can be observed by many of the characteristics below. Which of these characteristics would you use to observe a gas flowing?
 - their effect
 - hearing
 - seeing
 - feeling
- Properties fall into two categories. Physical properties and Properties of behaviour. Which of the following is a behaviour?
 - colour
 - density
 - crystal size
 - poisonous
- Does it burn? Does it rot? Does it explode? These describe this type of property of a substance.
 - physical
 - behaviour
 - solubility
 - chemical nature
- Chlorine is useful because of this property
 - crystal structure
 - poisonous
 - acidity
 - reactivity
- Copper II Sulphate can be hydrated or anhydrous. This means the presence or absence of ...
 - oxygen
 - a gas
 - water
 - crystals
- Many substances can be clear, colourless and odourless. Others can be coloured, have an odour or can be soluble in water. To determine whether a substance is a mechanical mixture, we look for the number of ...
 - particles in the substance
 - parts visible
 - atomic particles
 - properties
- Mortar is a mixture of sand and cement. It is a type of material used to bind rocks or bricks together. One of the important factors to make mortar work effectively is to ensure ...
 - suitable types
 - correct temperature
 - proper conditions
 - proper proportions
- To determine if a substance is pure, looking for this, in a standard reference table, will help you identify the substance.
 - crystal structure
 - colour
 - state
 - density

9. Certain substances when heated, will decompose. This property can account for the fact that certain pure substances do not have a ...

- A. **density**
- B. **colour**
- C. **boiling point**
- D. **crystal structure**

10. Windshield washer fluid is a solution that helps automobile drivers clean the mud off their windshields. One of the most important properties manufacturers should consider when making this solution for winter conditions is the ...

- A. **behaviour**
- B. **melting point**
- C. **density**
- D. **texture**

11. In order to increase the speed of flow of oil in a pipeline, the oil should be ...

- A. **heated**
- B. **cooled**
- C. **expanded**
- D. **compressed**

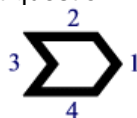
12. Fluid A has a flow rate of 10.5 ml, per second. Fluid B has a flow rate of 11.3 ml, per second. Compared to fluid A, fluid B is ...

- A. **more viscous**
- B. **less viscous**
- C. **more dense**
- D. **less dense**

13. The drag exerted on objects moving through air is caused by air molecules ...

- A. **colliding with the object**
- B. **spinning within the object**
- C. **combining behind the object**
- D. **gliding along behind the object**

14. Use the diagram below to answer the next question.



The shape shown here travels through a fluid.

This shape would experience the most drag if it were moving in direction ...

- A. **1**
- B. **2**
- C. **3**
- D. **4**

15. When your dad or mom start the cold car in the morning, they may mention that the viscosity of the motor oil would be decreased by ...

- A. **running the engine**
- B. **charging the battery**
- C. **changing the antifreeze**
- D. **replacing the thermostat**

16. The long, narrow flexible pipes, used to carry fibre optic cables, are hauled on flatbed trailer trucks. The front of the pipes is covered with a tarp. This is done to increase the fuel efficiency of the truck because it limits the movement of air through the pipes, which reduces the ...

- A. **viscosity of the air within the pipes**
- B. **air resistance within the pipes**
- C. **air pressure on the truck**
- D. **weight of the truck**

17 The shop teacher asks you to help change the oil in a truck. If it takes 70 seconds for 50 ml of dirty oil to flow out of the engine, the flow rate is ...

- A. **0.71 mL/s**
- B. **1.4 mL/s**
- C. **20 mL/s**
- D. **35.0 mL/s**

18. Steam is injected into tar sand formations to facilitate the extraction of oil. The oil separates from the sand so that it can be pumped out of the ground. The steam causes the oil to separate from the sand because viscosity ...

- A. **decreases when there is an increase in water content**
- B. **increases when there is an increase in water content**
- C. **increases when there is an increase in temperature**
- D. **decreases when there is an increase in temperature**

19. Your friends collected rocks from a lake to build a perimeter for the fire pit. They noticed that the rocks weren't as heavy while they carried them partially submerged in the water. This is because of the ...

- A. **mass of the rock**
- B. **density of the water**
- C. **buoyant force of the water**
- D. **buoyant force of the rock**

20. Which of the following pools would give the most buoyancy?

- A. **Banff Hot Springs pool at 40°C**
- B. **Southland Leisure Centre Hot Tub at 40°C**
- C. **Fairmount Hot Springs pool at 35°C**
- D. **West Edmonton Mall Wave pool at 35°C**

21. Because wind speed and wave action are the same on the lake as on the ocean, the difference in speed is most likely due to the ...

- A. **ocean water exerting a greater buoyant force than the lake**
- B. **greater force of gravity on the lake**
- C. **lake water exerting a greater buoyant force than the ocean**
- D. **greater force of gravity on the ocean**

22. When you place an unknown metal in the graduated cylinder, the weight of the object appears to drop from 1.55 N to 1.40 N. The buoyant force exerted by the water on the unknown metal is ...

- A. **0.15 N**
- B. **1.40 N**
- C. **1.55 N**
- D. **2.95 N**

23. Density and buoyant force are related. As the ...

- A. **density of a fluid increases, the buoyant force decreases**
- B. **density of a fluid decreases, the buoyant force increases**
- C. **density of a fluid increases, the buoyant force remains the same**
- D. **density of a fluid decreases, the buoyant force decreases**

24. Three sealed jars were dropped into water. Each jar contained 150 cc of a different substance, crushed salt, sugar, and flour. Each jar floated at a different height because of its ...
- A. **density**
 - B. **volume**
 - C. **composition**
 - D. **viscosity**
25. A window washer notices that the spray hoses he uses are spraying water at too high a pressure and damaging the trim on the windows. The rate of flow could be reduced by ...
- A. **shortening the hoses**
 - B. **lengthening the hoses**
 - C. **increasing the nozzle opening**
 - D. **decreasing the nozzle opening**
26. Snowshoes make it easier to walk over snow because they ...
- A. **make the person wearing them lighter**
 - B. **spread out the force over a larger area**
 - C. **increase the mass of the person wearing them**
 - D. **decrease the density of the person wearing them**
27. Why are wider, thicker tires used on mountain bikes or an all terrain vehicles, instead of, thinner, narrower tires?
- A. **The bigger tires have more air making the vehicle lighter.**
 - B. **The bigger tires offer better traction or grip on the terrain.**
 - C. **The bigger tires with more air make the vehicle less dense.**
 - D. **The bigger tires exert less pressure on the ground due to increased area.**
28. What is the water pressure at a depth of 1 m below the water surface in a swimming pool?
- A. **100 000 Pa**
 - B. **100 Pa**
 - C. **10 000 Pa**
 - D. **1 000 Pa**
29. A garbage can weighs 15 N. The base of the can has an area of 0.1 m². The pressure exerted is ...
- A. **1.5 Pa**
 - B. **15 Pa**
 - C. **1500 Pa**
 - D. **150 Pa**
30. A force of 300 N is exerted over an area of 2m² The pressure is ...
- A. **1200 Pa**
 - B. **600 Pa**
 - C. **450 Pa**
 - D. **150 Pa**
31. Farmer's fields are most often irrigated with a sprinkler system. To increase the area that the sprinkler sprays, the best option is to ...
- A. **increase the diameter of the main pipe and increase the size of the nozzle opening**
 - B. **decrease the diameter of the main pipe and decrease the size of the nozzle opening**
 - C. **increase the diameter of the main pipe, and decrease the size of the nozzle opening**
 - D. **decrease the diameter of the main pipe and increase the size of the nozzle opening**

32. Valves are devices used to ...
- A. **regulate the flow of a fluid**
 - B. **increase the density of a fluid**
 - C. **decrease the density of a fluid**
 - D. **determine the viscosity of a fluid**
33. In a model hydraulic press model built by an apprentice, a pedal is used to push down the large piston, while the small piston lifts up a load. The apprentice's model didn't work. What is wrong with it?
- A. **The pistons should have the same diameter.**
 - B. **The load should be on the larger piston.**
 - C. **Both pistons should be smaller.**
 - D. **Both pistons should be larger**
34. Two identical syringes are used to build a model of a hydraulic press. The press does not lift the loads you expect. To remedy the situation, you should use ...
- A. **larger syringes**
 - B. **longer syringes**
 - C. **smaller syringes**
 - D. **syringes with different diameters**
35. In terms of design, the device that most resembles a hydraulic press is a ...
- A. **barometer**
 - B. **submarine**
 - C. **hot air balloon**
 - D. **disc brake system**
36. If the maximum force applied by the hydraulic lift operator is 200 N, then the maximum load that can be lifted by the large piston (which is 10 times larger than the small piston) is ...
- A. **2 000 N**
 - B. **2 500 N**
 - C. **5 000 N**
 - D. **10 000 N**
37. The primary function of a pump is that it is a device used for ...
- A. **moving fluids**
 - B. **filtering fluids**
 - C. **analyzing fluids**
 - D. **measuring fluids**

Science Focus 8

Mix and Flow of Matter Topic Quiz Answer Keys

	Question 1	Question 2	Question 3	Question 4	Question 5
Topic 1	A	B	B	C	D
Topic 2	C	D	D	C	D
Topic 3	D	B	A	C	B
Topic 4	C	A	B	C	A
Topic 5	C	D	B	A	B
Topic 6	C	C	A	D	C
Topic 7	C	A	B	D	A
Topic 8	B	B	D	A	C

Mix and Flow Unit Test ... Answer Key

1	A	11	A	21	A	31	B
2	D	12	B	22	A	32	A
3	B	13	A	23	D	33	B
4	B	14	C	24	A	34	D
5	C	15	A	25	C	35	D
6	B	16	B	26	B	36	A
7	D	17	A	27	D	37	A
8	D	18	D	28	C		
9	C	19	C	29	D		
10	B	20	C	30	D		