1.0 **Fluids are used in Technological devices and common everyday materials**

Key Concepts
- Workplace Hazardous Materials Information System (WHMIS) and safety
- Fluid properties

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

W ___________ H ___________ M ___________ I ___________ S ___________

Recognition of WHMIS symbols is important to lab safety. Identify the following WHMIS symbols.

<table>
<thead>
<tr>
<th>![Symbol 1]</th>
<th>![Symbol 2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Symbol 3]</td>
<td>![Symbol 4]</td>
</tr>
<tr>
<td>![Symbol 5]</td>
<td>![Symbol 6]</td>
</tr>
<tr>
<td>![Symbol 7]</td>
<td>![Symbol 8]</td>
</tr>
</tbody>
</table>

Fluids are used in many different ways. Describe how fluids are used in the following processes:

**Slurries**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Glass Production**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

**Toothpaste**

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Give examples of practical applications for each of the following fluid properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>viscosity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>density</td>
<td></td>
<td></td>
</tr>
<tr>
<td>buoyancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hydraulics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pneumatics</td>
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</tbody>
</table>

2.0 *The properties of mixtures and fluids can be explained by the particle model of matter.*

**Key Concepts**
- organization of pure substances and mixtures
- concentration and solubility
- factors affecting solubility
- The particle model

Matter can be organized in different ways. One way is as solids, liquids, and gases. Another way is as mixtures and solutions. **Complete the Organizational Chart**

Describe a *suspension*, a *colloid*, and an *emulsion*.

______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________
Describe the process of **paper chromatography** and give examples of practical applications.

_____________________________________________________________________________________

What conditions must be present to enable a material to **dissolve** in another material?

_____________________________________________________________________________________

Explain the difference between a **solute** and a **solvent**.

_____________________________________________________________________________________

Describe the difference between **Concentration** and **Solubility**. (24-28)

_____________________________________________________________________________________

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

_____________________________________________________________________________________

Why are some substances **insoluble**?

_____________________________________________________________________________________

What factors affect **solubility**?

_____________________________________________________________________________________

Why is water referred to as the **universal solvent**?

_____________________________________________________________________________________

What is an **aqueous** solution?
How does temperature affect solubility?

_____________________________________________________________________________________

The Particle Model of Matter (p.33)
What are the 4 key principles explained using the Particle Model of Matter?

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

Illustrate the action of particles in solids, liquids and gases.

<table>
<thead>
<tr>
<th>Solids</th>
<th>Liquids</th>
<th>Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What factors affect the rate of dissolving?

_____________________________________________________________________________________

3.0 The properties of gases and liquids can be explained by the Particle Model of matter

Key Concepts
• Viscosity
• Density
• Buoyancy
• Pressure

What is viscosity, how is it measured?

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_____________________________________________________________________________________

_____________________________________________________________________________________
Describe some **practical applications** using knowledge about viscosity.

_____________________________________________________________________________________
_____________________________________________________________________________________

How is viscosity affected by **temperature**?

_____________________________________________________________________________________
_____________________________________________________________________________________

What formula is used to **calculate density**?


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

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_____________________________________________________________________________________

Describe the density of solids liquids and gases, using the **particle model**.

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_____________________________________________________________________________________

What is **buoyancy** and how is it determined?

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_____________________________________________________________________________________

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

_____________________________________________________________________________________
_____________________________________________________________________________________

How does a ‘cartesian diver’ work? (p.50)

What is average density and what benefits does it have?

Explain ‘Archimedes Principle’ and how he came to formulate it (Eureka!).

Describe how the Plimsoll Line works.

Describe how Hot Air Balloons use the principle of buoyancy.
Describe what **compressibility** is.

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

What conditions must be met to **compress** a gas?

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

**Pascal's Law states:**

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

**Calculate pressure** using a formula.

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

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_____________________________________________________________________________________
_____________________________________________________________________________________

What effect does **atmospheric pressure** have on our body?

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

How is atmospheric pressure affected by **altitude**?
Describe the components needed to make a hydraulic system.

_____________________________________________________________________________________
_____________________________________________________________________________________

What is the primary difference between hydraulic systems and pneumatic systems?

_____________________________________________________________________________________
_____________________________________________________________________________________

4.0 Many technologies are based on the properties of fluids

Key Concepts

• solubility
• compression and decompression
• flow rates to move fluids
• factors affecting reaction rates

Explain how detergent works.

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_____________________________________________________________________________________
_____________________________________________________________________________________

What is a hyperbaric chamber?

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Illustrate and describe how the following technologies work to move fluids.

<table>
<thead>
<tr>
<th>Diaphragm Pump</th>
<th>Bicycle Pump</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Archimedes Screw</th>
<th>Pipeline pig</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
What is a valve used for?

What is a bathyscaph?

Using pictures and a brief explanation describe how a submarine works. (p.71)
This website will help you - http://www.physics.sfasu.edu/astro/social/social016.htm