

Grade 9

Numerical Response

Practice

Achievement Exam

Questions developed for each Grade 9 Unit
based on the [General Learning Outcome's](#)
From Alberta Education for Science - Grade 9

Resources :

Science Focus 9

McGraw-Hill Ryerson Publishing

Science In Action 9

Pearson Education Canada

Developed for Teachers and Students by Edquest.ca

Numerical Response Practice Questions – Grade 9 Achievement

Unit A – Biological Diversity

Symbiosis is an association between members of different species.

Match the description to the type of symbiosis.

- 1 – only one organism benefits
- 2 – one organism benefits, one is harmed
- 3 – one appears like the other
- 4 – both organisms benefit

- _____ commensalisms
- _____ mutualism
- _____ parasitism
- _____ mimicry

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Match the type of **Asexual Reproduction** with its description.

- 1 – an exact copy of the parent
- 2 – parent splits into two
- 3 – reproduction not involving seeds
- 4 – reproduction similar to seed, but produced by cell division

- _____ vegetative reproduction
- _____ spore production
- _____ binary fission
- _____ budding

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Organisms of the same species have the same number of **chromosomes**.

What is the number of chromosomes that all humans have?

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The reduction of diversity has resulted in species being listed on **Protection Lists**.

Match the description of how the species is affected to the term it describes.

- 1 - none in a local area
- 2 - none in the world
- 3 - few left in a local area
- 4 - numbers are being reduced

- _____ endangered
- _____ extirpated
- _____ threatened
- _____ extinct

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Variation can be either discrete or continuous.

For the following list of variations, mark it

- 1 if it is discrete, and
- 2 if the variation is continuous.

- _____ body mass
- _____ earlobes
- _____ human height
- _____ pigmentation

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Biotechnology is the science of speeding up artificial selection to get an organism with the desired combination of traits.

Match the technology with the description of how it is achieved.

- 1 – grow a cutting from a plant
- 2 – sperm from one is used to fertilize the egg of another
- 3 – DNA is altered
- 4 – eggs and sperm are combined in a laboratory environment

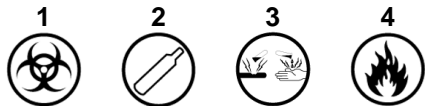
- _____ in vitro fertilization
- _____ cloning
- _____ genetic engineering
- _____ artificial insemination

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Numerical Response Practice Questions – Grade 9 Achievement

Unit B - Matter and Chemical Change

Match the **WHMIS** Symbol with the description of the Hazard



- _____ corrosive
- _____ compressed gas
- _____ biohazardous
- _____ flammable

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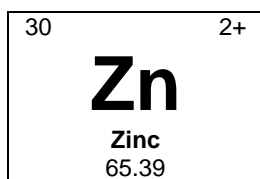
Match the description of the Theory of Matter with the time it occurred.

- 1 - Chemists only investigated materials that had a high value to humans
- 2 - The use of simple tools and the discovery of fire
- 3 - The work of Dalton suggests matter is made up of elements
- 4 - A group of Hittites discovered how to extract an element from rock

- _____ Stone Age
- _____ Bronze Age
- _____ Iron Age
- _____ Atomic Age

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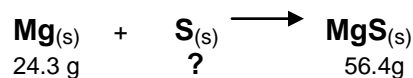
Use the illustration of the element from the **periodic table** to answer the question.



What is the atomic mass of **Zinc**?

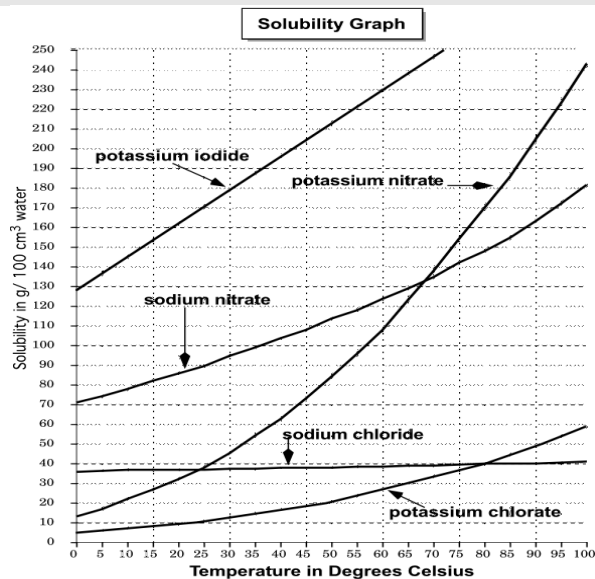
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The **Law of Conservation of Mass** in a chemical reaction states that the mass of the products will equal the mass of the reactants.



What is the mass of **Sulfur**?

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8	8	8	8
9	9	9	9



Using the **Solubility Graph** on the left, answer this question based on your interpretation of the graph.

- 1 - potassium iodide
- 2 - potassium nitrate
- 3 - sodium nitrate
- 4 - sodium chloride
- 5 - potassium chlorate

- _____ this will dissolve 20g at 50°
- _____ it is the least affected by temperature
- _____ it is the most affected by temperature
- _____ twice as much of this will dissolve at 0°

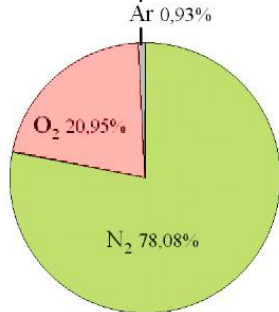
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4	4	4	4
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Numerical Response Practice Questions – Grade 9 Achievement

Unit C – Environmental Chemistry

The **Nitrogen Cycle** enables living organisms to utilize the free nitrogen in the atmosphere because of **nitrogen fixation**.

What is the percentage (to the nearest tenth) representing the amount of free nitrogen in the atmosphere?



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8	8	8	8
9	9	9	9

Acidity is measured on the pH scale. The scale varies according to the strength of a particular chemical.

- 1 – Drain cleaner has a pH of 13.8
- 2 -- Tomatoes have a pH of 4.2
- 3 – Battery Acid has a pH of 0.5
- 4 – Baking Soda has a pH of 8.2

Order the chemical substances described above from the strongest **Acid** to the strongest **Base**

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8	8	8	8
9	9	9	9

Indicators are used to identify different types of **organic molecules**. Match the indicator used for each type of Organic molecule listed.

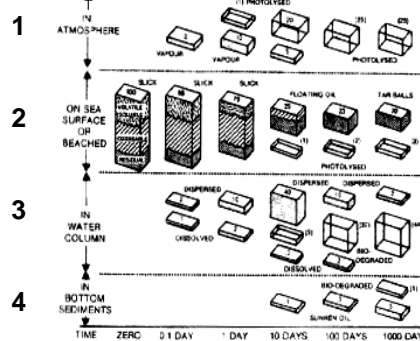
Indicators:

- 1 Benedict's solution
- 2 Biuret solution
- 3 Iodine solution
- 4 Translucent Spot on Brown paper

Fat/Oil Starch Protein Glucose

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4	4	4	4
5	5	5	5
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8	8	8	8
9	9	9	9

An oil spill, like the **Exxon Valdez** can be very damaging to the environment.



Using the chart, rank the environmental contamination from shortest lasting to longest

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0	0	0	0
1	1	1	1
2	2	2	2
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7	7	7	7
8	8	8	8
9	9	9	9

Certain comments indicate the viewpoint of the person who makes them.

Identify the viewpoint for each phrase.

- 1 economic
- 2 political
- 3 environmental
- 4 educational

- ' ... there will be less impact on animals.'
 ' ... we can learn from our mistakes.'
 ' ... its going to cost us plenty.'
 ' ... there are regulations to follow.'

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0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
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7	7	7	7
8	8	8	8
9	9	9	9

Biological Indicators - freshwater invertebrates - are used to indicate water quality.

- 1 Caddisfly larvae
- 2 Water boatman
- 3 Midge larvae
- 4 Mayfly nymph

Identify the Invertebrates in the order they are shown



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8	8	8	8
9	9	9	9

Numerical Response Practice Questions – Grade 9 Achievement

Unit D – Electrical Principles and Technologies

A motor has an internal resistance of **40 Ω**.

The motor is in a circuit which has a current of **4.0 A**.

What is the **voltage**?

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A current of **625 mA** runs through a bulb that is connected to **120V**.

What is the **resistance** of the bulb?

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7	7	7	7
8	8	8	8
9	9	9	9

There are four common **forms of energy**:

- 1 Chemical
- 2 Electrical
- 3 Mechanical
- 4 Thermal

Match the form with its description

- _____ stored
 _____ charged
 _____ moving
 _____ kinetic

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8	8	8	8
9	9	9	9

There are many different **alternative energy sources** including:

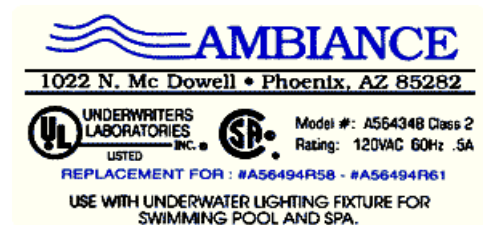
- 1 Tidal
- 2 Wind
- 3 Solar
- 4 Waterfall

Match the type of alternative energy you would **most likely** find in each province.

- _____ Alta _____ N.S. _____ B.C. _____ Ont.

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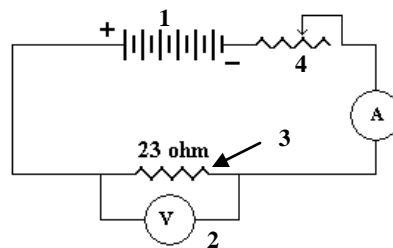
This is a **CSA** label for an underwater lighting fixture in a swimming pool or spa.



What is the recommended maximum **electrical current flow rate** for this electronic device?

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9	9	9	9

This is a schematic diagram.



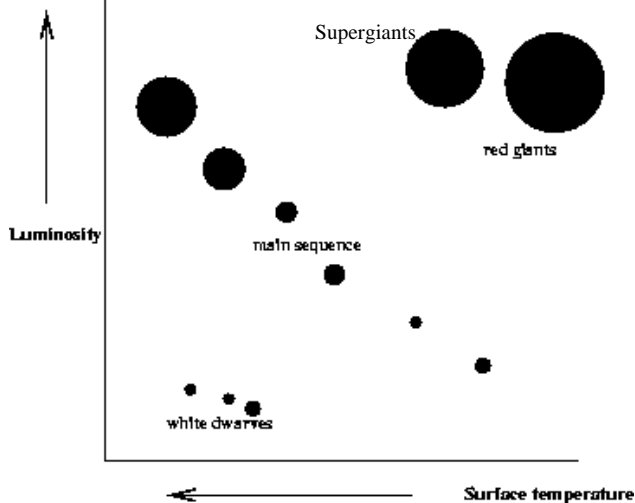
Identify the symbols of this circuit.

- _____ voltmeter
 _____ variable resistor
 _____ resistor
 _____ battery pack

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Numerical Response Practice Questions – Grade 9 Achievement

Unit E – Space Exploration



The **Hertzsprung-Russell** diagram (which includes data from thousands of stars) graphs the brightness and temperature of each class of star.

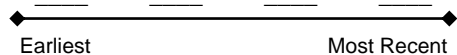
Rank the star types from coolest to hottest.

- _____ Giant
- _____ Supergiant
- _____ White Dwarf
- _____ Our Sun (main sequence)

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Place these events that represent a small part of the early achievements of space science in the order they happened, beginning with the earliest.

- 1 Sputnik 1
- 2 International Space Station
- 3 Goddard's liquid fuel
- 4 Archytas's pigeon



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7	7	7	7
8	8	8	8
9	9	9	9

Canadian Achievements in Space include:

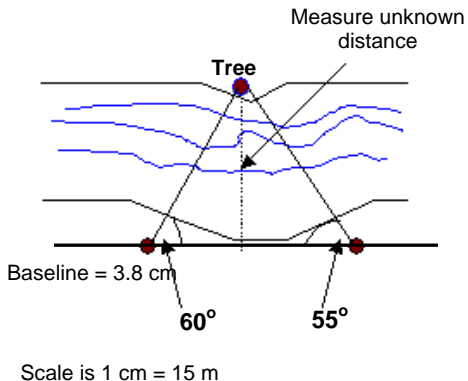
- 1 1st Female Astronaut
- 2 1st Magnetic Observatory
- 3 1st Canadian to walk in space
- 4 1st Canadian in Space

Match each Canadian to their achievement

- _____ Roberta Bondar
- _____ Marc Garneau
- _____ Sir Edward Sabine
- _____ Chris Hadfield

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Using the **triangulation method**, calculate (to the nearest tenth of a meter) the distance (in meters) across the river without actually crossing it.



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Comets are often described as "dirty snowballs", because they are made up of dust and ice that travel through space. Comets orbit the Sun and make regular appearances in the night sky.

Haley's Comet is visible from the Earth every **76 years**.

In what year did **Haley's Comet** last appear to people on the Earth?

(Hint: It was the same year as the **CHALLENGER SHUTTLE** disaster)

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Numerical Response Practice Questions – Grade 9 Achievement

Answer Key for Numerical Response

Practice Questions – Version 2004

Unit A – Biological Diversity					
1	2	3	4	5	6
1423	3421	46	3142	2121	4132
Unit B – Matter and Chemical Change					
1	2	3	4	5	
3214	2143	65.4	32.1	5423	
Unit C – Environmental Chemistry					
1	2	3	4	5	6
78.1	3241	4321	2314	3412	2413
Unit D – Electrical Principles and Technologies					
1	2	3	4	5	6
16.5	19.4	1234	2143	0.5	2431
Unit E – Space Exploration					
1	2	3	4	5	
1342	4312	1423	43.5	1986	

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