

**Grade 8**  
**Numerical Response**  
**Practice**  
**Achievement Exam**

Questions developed for each Grade 8 Unit  
based on the **General Learning Outcome's**  
From Alberta Education for Science - Grade 8

Resources :

**Science Focus 8**

McGraw-Hill Ryerson Publishing

**Science In Action 8**

Pearson Education Canada

Developed for Teachers and Students by [Edquest.ca](http://Edquest.ca)

# Numerical Response Practice Questions – Grade 8 Achievement Exam

## Unit A – Mix and Flow of Matter

1. Match the WHMIS symbols with their correct meaning

1. Corrosive
2. Poisonous
3. Biohazardous
4. Flammable



\_\_\_\_\_

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

2. The following solutions were made in a class lab activity.

1. 10g of salt in 50ml of water
2. 5g of salt in 30ml of water
3. 10g of salt in 75ml of water
4. 25g of salt in 100ml of water

Rank the salt solutions that were made by their concentration. Greatest to least.

\_\_\_\_\_

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

3. Solubility (g/100ml) of different substances can be affected by temperature. Use the table to answer the question.

Compound	Solubility	
	@ 0°	@100°
1. salt	35.7	39.2
2. sugar	180	192
3. baking soda	6.9	10.6
4. oxygen	0.007	0.0015

Rank the compounds by their solubility increase @ 100°

Highest ← \_\_\_\_\_ → Lowest

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

4. Viscosity is a measure of how thick a substance is.

Use the table of 'ramp method' flow rates to rank the substances?

Substance tested	Flow Rate (sec.)
1. Table syrup	19
2. Tar	224
3. Olive oil	5.4
4. Engine oil	56

Rank the substances by their viscosity

Highest ← \_\_\_\_\_ → Lowest

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

5. If a sample of silver has a mass of 5.25g and a volume of 0.5ml, what is the density of silver?

$$D = M / V$$

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

6. What is the pressure exerted on an area of 3m<sup>2</sup>, when a force of 154N is applied to that area?

$$P = F / A$$

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

# Numerical Response Practice Questions – Grade 8 Achievement Exam

## Unit B - Cells and Systems

1. Match the body system with the organ that belongs to it.

1. Circulatory System
2. Respiratory System
3. Digestive System
4. Integumentary System

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_  
Lungs    Skin    Heart    Small Intestine

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

2. Living organisms have specific structures that perform life functions. Match the structure with the function from the list provided.

1. food-gathering structures
2. breathing structures
3. moving from place to place
4. protection

\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_  
tentacles    spiracles    pseudopod    spines

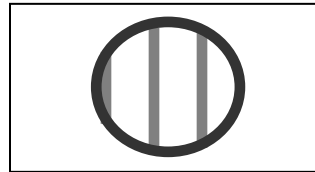
	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

3. The human body has this many bones.

(Hint: You may not have to use all the spaces for this question)

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

4. Field of view for a microscope is ...  
Low power ( **4X** ) = 2.7mm



Calculate the field of view for the Medium Power ( **10X** )

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

5. Identify the different types of cells by matching the number with the name of the cell.

1. blood cell
2. muscle cell
3. nerve cell
4. bone cell



\_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

6. Heartbeats vary from organism to organism in the animal kingdom. The hummingbird has a heartbeat of 1000/min. A human is about 70/min. and an elephant has only 25/min.

About how many times does your heart beat in 15 seconds?

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

## Numerical Response Practice Questions – Grade 8 Achievement Exam

### Unit C - Light and Optical Systems

1. Albert A. Michelson set up two mirrors on top of two mountains, 34.6km away from each other. He then sent a beam of light from one mirror to the other and recorded the time it took. By dividing the distance and the time, he found that light traveled at 299,798km/s.

At that rate, how many minutes does it take for light from the Sun (a distance of 149,596,000kms) to reach the Earth?  
(8.32 min)

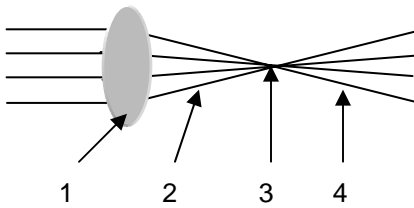
	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

2. Hans and Zacharias Jensen of the Netherlands built the first microscope. It was simple in design, but it led to some very incredible discoveries. 81 years later, in 1676, Antonie van Leeuwenhoek identified 'animalcules' using his own microscope.

In what year was the first microscope invented and built?

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

3. Light through a convex lens



- \_\_\_ focal point
- \_\_\_ diverging rays
- \_\_\_ converging rays
- \_\_\_ refraction

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

4. Wavelengths



Where would each type of energy form be found on this electromagnetic spectrum

- \_\_\_ radio
- \_\_\_ x-rays
- \_\_\_ infrared
- \_\_\_ ultraviolet

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

5. Sources of Light.

- 1 incandescent
- 2 fluorescent
- 3 phosphorescent
- 4 bioluminescent

Match the application with the light source it uses

- \_\_\_ glow-in-the-dark toy
- \_\_\_ classroom lights
- \_\_\_ firefly
- \_\_\_ flashlight

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

6. Special eyes for survival.

- 1 Eyes on the side of it's head
- 2 More photoreceptors in the retina
- 3 Pupils can dilate very wide to let light in
- 4 Can see ultraviolet light

Match each animal with its special eye described in the table above

- \_\_\_ eagles
- \_\_\_ honeybees
- \_\_\_ cats
- \_\_\_ fish

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

## Numerical Response Practice Questions – Grade 8 Achievement Exam

### Unit D – Mechanical Systems

1. A block and tackle pulley system is used to lift heavy machinery in the CTS room. One machine is 223 kg. To lift it into place where it is going to be used, it has to be raised 1.2m off the floor.

How much work is being done to raise the machine onto its platform?  
(Show your work)

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

2. To test the success of a protective egg carton (which has a mass of 200g), Jacobs (who has a mass of 60kg), carried it up to the roof. It was dropped from a height of 4m.

How much work was done by Jacobs to test the egg protection device?  
(Show your work)

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

3. The pulley system illustrated here was used to lift a heavy load.



If 340N of force is used, how much force is the pulley system able to overcome?

(Show your work)

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

4. The work done by a lever is 5225J. The work done by the effort force is 8650J.

What is the efficiency of the lever?  
(Show your work)

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

5. Your grandfather gave you his bicycle. As you push down on the pedals you find that you are exerting 797N of force. The resulting load force causing the bicycle to move forward is 104N.

What is the mechanical advantage of the bicycle?  
(Show your work)

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

6. A hydraulic lift was used to lift a load of 264N up three shelves high in a warehouse. The operator found that the distance it moved was 3.2m. If the mechanical advantage of the hydraulic lift was 10.

How much effort force was needed to lift the load?  
(Show your work)

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

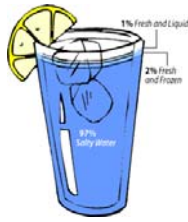
# Numerical Response Practice Questions – Grade 8 Achievement Exam

## Unit E – Fresh and Saltwater Systems

1. This illustration models the total amount of water available on Earth.

4 parts represent the Earth's water supply:

1. ice cubes
2. lemonade
3. melted water
4. lemon slice

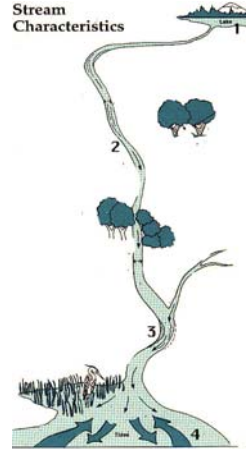


Match each part in the model with what it represents...

\_\_\_\_\_ Salty    \_\_\_\_\_ Frozen    \_\_\_\_\_ Underground    \_\_\_\_\_ Surface

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

2. Match the stream characteristics with its location in the illustration.



\_\_\_\_\_ meanders

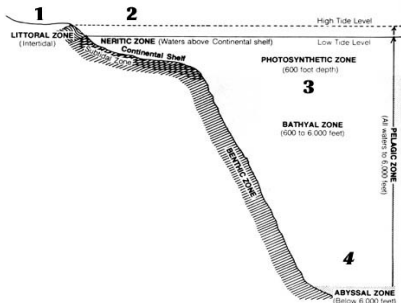
\_\_\_\_\_ rapid flow

\_\_\_\_\_ sediment deposits

\_\_\_\_\_ collects forming a channel

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

3. Identifying Ocean Zones



Match the organism with the ocean zone you would find it in.

\_\_\_\_\_ heron    \_\_\_\_\_ whales    \_\_\_\_\_ seaweed    \_\_\_\_\_ viperfish

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

4. Use this table to answer the question

City	Jan Temp	July Temp
1	-4	+22
2	-7	+18
3	-11	+17
4	-15	+18

Match the city with the information provided in the table.

\_\_\_\_\_ Calgary    \_\_\_\_\_ Toronto    \_\_\_\_\_ Halifax    \_\_\_\_\_ Edmonton

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

5. Table of Freshwater Use (Litres/person/day)

Country	Domestic	Agricultural	Industrial
1	6	118	1
2	431	313	3136
3	110	16	424
4	129	1849	172

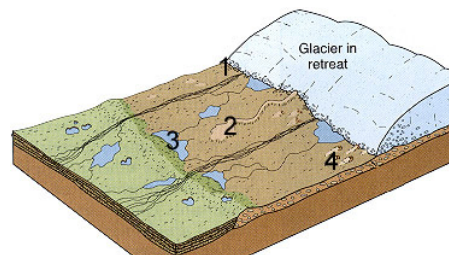
Identify each Country by its use of water ...

\_\_\_\_\_ Canada    \_\_\_\_\_ Mexico    \_\_\_\_\_ England    \_\_\_\_\_ Cambodia

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

6. Recognizing Glacial Landforms

Identify each landform by its number.



\_\_\_\_\_ moraine    \_\_\_\_\_ esker    \_\_\_\_\_ kettle lake    \_\_\_\_\_ drumlin

	.	.	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Numerical Response Practice Questions – Grade 8 Achievement Exam

**Answer Key** for **Numerical Response**  
Practice Questions – Version 2004

Unit A – Mix and Flow of Matter					
1	2	3	4	5	6
3412	4123	2314	2413	10.5	51.3
Unit B – Cells and Systems					
1	2	3	4	5	6
2413	1234	206	0.73	3142	17.5
Unit C – Light and Optical Systems					
1	2	3	4	5	6
8.32	1595	3421	4132	3241	2431
Unit D – Mechanical Systems					
1	2	3	4	5	6
2676	2408	1020	60.4	0.13	26.4
Unit E – Fresh and Saltwater Systems					
1	2	3	4	5	6
2134	3241	1324	3124	2431	1234

Find more Resources like these for Teachers  
[Grade 7](#) – [Grade 8](#) – [Grade 9](#)

Find more Resources like these for [Students](#)

General Science Resources and Projects for Middle School at: [Edquest.ca](http://Edquest.ca)  
Email Comments and Suggestions to: <mailto:edquest@telus.net>