

Science 9: Environmental Chemistry Final Exam Review

1. Explain the difference between organic and inorganic compounds.

Organic compounds contain carbon.
Inorganic compounds do not contain carbon or hydrogen.

2. Complete the table

Organic Compounds	Nutritional Role
Carbohydrates	energy source for metabolism
Lipids	storage of unused chemical energy
Proteins and Amino Acids	structural molecule for body and helps chemical reactions.
Nucleic Acids	encode genetic information produce structural proteins

3. What is the difference between a macromineral and a trace element?

macromineral is required in amounts of 100mg/day or more
trace element is required in amounts less than 100mg/day.

4. Provide three examples of foods suggested in each category of Canada's Food Guide.

Grain Products (5 - 12 servings) - Bread, Cereal, Pasta

Vegetables and Fruits (5 - 10 servings) - Broccoli, Carrots, Pears

Milk Products (3 - 4 Servings) - Milk, Cheese, Yogurt

Meat & Alternatives (2 - 3 servings) - Lean meat, Poultry, Fish

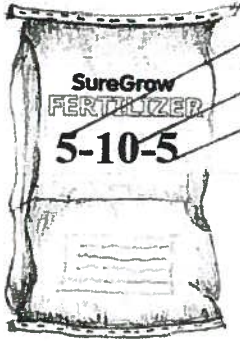
5. Explain the process of diffusion.

Movement of particles in liquids and gases from an area of higher concentration to an area of lower concentration.

6. Explain the process of osmosis.

When a solvent, usually water, diffuses through a selectively permeable membrane.

7. Identify what each number on the fertilizer bag stands for. What does the other 80% include?



5% Nitrogen
10% Phosphorus
5% Potassium

80% other plant nutrients, water.

8. What are the advantages and disadvantages of using artificial fertilizers?

Advantages - Increased Plant Growth, Increased Food Production, Better use of unsuitable farming land.

Disadvantages - Expensive, increased chance of disease spreading through entire crop, environment run-off.

9. What is a monoculture?

- Growing a single crop/plant over a wide area for a large number of consecutive years.

10. Why was DDT developed?

In order to prevent Typhus, (transmitted by lice), outbreaks during wars.

11. Explain the process of bioaccumulation.

A toxin collects in greater concentrations the further up the food chain.

12. What are the harmful effects of using DDT?

- bioaccumulation
- biomagnification
- animal deaths: birds, fish, frogs

- disappearances of species
honey, butterflies etc.

13. Identify the properties and give 3 examples of acids, bases and neutral substances.

Acids: taste sour, pH lower than 7, Turns litmus red

Bases: taste bitter, feel slippery, pH greater than 7, Turns litmus blue

Neutral: no taste, pH equal to 7, no change to litmus.

14. What is pH a measure of? *the relative acidity or alkalinity of a substance. [The power of hydrogen]*

15. How does an indicator work?

An indicator will change to a different colour when exposed to either an acid or a base.

16. Write a neutralization word equation.

Calcium carbonate added to sulphuric acid produces calcium sulphate and water (salt)

17. Identify three negative effects of acid precipitation.

- acidified lakes/streams decline in aquatic life.*
- corrosion of buildings, monuments, vehicles etc.*
- higher levels of chemicals in the atmosphere.*

18. What is acid shock?

- When large levels of snow, ice etc. ~~are~~ containing acid melt and run into water sources.*

19. Calculate ppm, (parts per million) if 1 milligram of mercury was found in 30 L of water.

$$\frac{1 \text{ mg}}{30 \text{ kg}} = 0.0\bar{3} \text{ ppm.}$$

$$\text{mg/kg} = \text{ppm}$$

20. Why is it not necessary to add lime to neutralize lakes and rivers in Alberta that have been exposed to acid precipitation?

Albata rocks contain alkaline minerals such as calcium carbonate that react with the acid in the lakes

21. Explain the difference between dispersion and dilution.

dispersion - particles spreading out by a carrying force (wind)
dilution - particles are dissolved in water lowering the concentration.

22. What are catalytic converters used for and how effective are they?

They are in vehicles to reduce oxide emissions before they are released. They can be up to around 85% efficient

23. What is a scrubber and why it is used?

They are in factories to reduce the production of sulphur oxides.

24. What is a pollutant?

A material or energy that will cause harm to a living organism.

25. What is a toxin?

a chemical that can cause harm to an organism.

26. Explain the difference between acute and chronic toxicity.

Acute causes serious symptoms after one exposure.
Chronic causes symptoms after many exposures.

27. What does LD50 stand for? Where does most of the Human LD50 information we currently have come from?

Lethal Dose 50 - The dose of a chemical that will kill 50% of the applied population.
Human data comes from accidental exposure.

28. Explain what environmental monitoring is intended to do.

Keep a record of potentially harmful toxins that enter the environment in order to prevent or maintain pollution.

29. How is water quality determined?

Clarity, biological indicators in the water.

30. What types of aquatic organism would you likely be able to find in polluted water? What types of aquatic organisms would you likely be able to find in unpolluted water?

Polluted - midge larvae, blackfly larvae, pouch snail, leech, aquatic worms
Nonpolluted - stonefly, mayfly, caddisfly, beetle.

31. Explain the difference between point and non - point sources of pollution.

Point source - areas that are easy to monitor and control.

Non-point - separate easily by dispersion so they are not easy to monitor nor control.

32. What are the three stages of transport with regards to substances in the environment?

1. Release of chemicals at the source.
2. Dispersion of the chemical into the atmosphere
3. Deposition of the chemical in soil or water.

33. Airborne chemicals will travel certain distances and in certain directions depending on what?

Wind speed, Wind direction

34. What are some natural sources of airborne particles?

Forest Fires, Volcanic eruptions,

35. What is the thinning of the ozone layer above Earth caused by and why is it a concern?

CFC's and other ~~to~~ gas pollutants cause the thinning of the ozone. It is a concern because it can be linked to Global Warming.

36. Explain the 3 stage sewage treatment process in Calgary or Edmonton.

Primary - separates large solids and suspended sediments.

Secondary - removes most organic compounds by bacterial conjugation.

Tertiary - Trickling bed evaporator remove nitrates & phosphates

37. Describe the difference between permeable and impermeable soil zones.

Permeable soil zones allow water to pass through them impermeable zones block water from passing.

38. What is an aquifer?

- an underwater reserve of water.

39. What processes are used to biodegrade toxins in the environment?

Biodegradation involves living things, Earthworms, bacteria and fungi are actively breaking down substances.

40. What is a hazardous waste?

a material that is poisonous, toxic, corrosive, flammable or explosive.

41. What does WHMIS stand for? What does MSDS stand for?

WHMIS - Work Hazardous Material Information System.
MSDS - Material Safety Data Sheet.

42. Identify the 4R's and give an example of how you can practice each one.

Reduce - Less Garbage, Less Pollution Recycle - Bottles, Cans, Paper etc.
Reuse - Use Plastic Containers Recover - Catalytic Converters, Scrubbers.

43. How are sanitary landfills secured?

- They are covered each day to avoid windblown litter and keep away scavengers.