**Final Exam Review**

Where should I start . . .

* + - * Read through your notes.
      * Redo or complete all worksheets handed out during the 4 units.
      * Study and then Re-do your unit tests/quizzes.
      * Make study notes - especially the topics you are having trouble with.
      * Complete the final exam review sheets. Here they are…!

# Chemistry Review

1. Definitions! Define each term below and also give and example.

|  |  |  |
| --- | --- | --- |
| **Term** | **Definition** | **Example** |
| Physical change |  |  |
| Chemical change |  |  |
| Element |  |  |
| Compound |  |  |

1. Identify each of the following changes as a physical change (P) or a chemical change (C).
   1. \_\_\_\_\_\_\_ Shredding a piece of paper.
   2. \_\_\_\_\_\_\_ Silver tarnishes over time when it is exposed to air.
   3. \_\_\_\_\_\_\_ When baking soda and vinegar is mixed, the mixture "fizzes".
   4. \_\_\_\_\_\_\_ A marshmallow is toasted over a bonfire.
   5. \_\_\_\_\_\_\_ Water vapour in the atmosphere cools and condenses to form a cloud.
2. a) Explain the characteristics of ionic compounds.

|  |  |  |
| --- | --- | --- |
| **Characteristics** | **Ionic Compounds** | **Molecular Compounds** |
| Types of atoms involved:  - Metals or non-metals? |  |  |
| Structure: Are the electrons:  - Shared or transferred? |  |  |

**b) Complete the chart below.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Lewis Dot diagram  (showing the bonding of the two elements)** | **Type of Bond Formed**  **(ionic or covalent)** | **Chemical Formula of compound** | **Chemical name of compound** |
| **Magnesium and Chlorine** |  |  |  |
| **Sodium and Sulfur** |  |  |  |
| **Carbon and Fluorine** |  |  |  |

4. Use the following words or numbers to complete questions 1-7. You may use words or numbers more than once.

18 16 14 12 8 9 10 1 2 3 Neon Argon Helium K+1 K-1 positively negatively not neutrons positrons electrons protons atomic mass atomic radius

* + - 1. The ion S2- would have \_\_\_\_\_\_ electrons surrounding its nucleus.
      2. A neutral atom with 8 protons in its nucleus will also have \_\_\_\_\_\_ electrons. It will **gain/lose** (Circle one)
      3. **\_\_\_\_\_\_** electrons to match the electron population of  **\_\_\_\_\_**, the nearest noble gas.

1. When element 19 has one electron taken away from it, its symbol is \_\_\_\_\_\_\_**.**
2. The atom is composed of an extremely small central nucleus containing protons **(\_\_\_\_\_\_\_\_\_\_\_\_** charged, relative mass = 1) and  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (neutral, relative mass =1) surrounded by  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  (negatively charged, relative mass = 0.0005).
3. The atomic number indicates the number of  **\_\_\_\_\_\_\_\_\_\_\_**  in an atom and is unique for each element.
4. In a neutral atom, the number of **\_\_\_\_\_\_\_\_\_\_\_\_**  must equal the number of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
5. The number of neutrons in the nucleus is usually greater than or equal to the number of protons. The sum of the numbers of protons and neutrons is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5. Which of the following represent elements and which represent compounds?

O2  Co CO Fe Al2(SO4)3  NO Xe P4  SO2 C8H18

6. Complete the following chart using a periodic table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Symbol** | **Atom or Ion** | **# of protons** | **# of electrons** | **# of neutrons** |
| 1  1H | atom |  |  | 0 |
|  | atom | 19 |  | 20 |
| 23  11Na |  |  |  |  |
|  | atom | 13 |  |  |
|  |  | 12 | 10 | 12 |

|  |
| --- |
| 17 35.453  Cl |

1. The box above is from a typical periodic table. List three pieces of information you can obtain from this box.
2. Which elements form a family of elements with arsenic?
3. What type of ion forms when a neutral atom gains an electron?
4. What type of ion forms when a neutral atom loses an electron?
5. What is a binary compound?
6. A white powder with a low melting point dissolves in water but does not conduct electricity in solution. Is this an ionic or covalent substance? Explain your answer.
7. A yellow powder with a high melting point dissolves in water and conducts electricity in solution. Is this an ionic or covalent substance? Explain your answer.
8. Give the correct name for each of the following compounds.

**For compounds with a \* , state how many of each type of atom make up one molecule.**

XeF2 K3PO4 CS2

SnO2 BF3 Ba(OH)2

P2O5 SnF2 SO3

CuCl2 BrCl3 NiSO4

H2S \*Fe2(SO4)3 AsF3

\*Al(NO3)3 Na2O CaBr2

Ca(PO4)2 NO NaH

HF(s) HF(aq) MgH2

15. Provide the correct chemical formula for each of the following compounds.

phosphoric acid barium phosphate phosphorus pentasulfide

tin (II) bromide dichlorine monoxide nickel (II) sulfate

calcium sufate sulfur hexafluoride copper (II) sulfate

nitrogen monoxide chromium (III) carbonate hydrosulfuric acid

cobalt (III) chlorate iron (II) fluoride sulfur dioxide

ammonium carbonate boron trihydride manganese (IV) oxide

iodine trichloride beryllium sulfide bromine monochloride

silver nitrate dinitrogen trioxide lithium nitride

tin (IV) oxide zinc hydroxide ammonium nitrate

calcium hydroxide nitrous acid lead (II) nitrate

16. Explain why each of the following is wrong.

a) CaOH2 b) copper sulfate c) magnesium dioxide

17. Use Lewis Dot diagrams to show how compounds would form between the following pairs of elements. Show the chemical formula for each compound.

a) sodium and chlorine b) calcium and fluorine

c) aluminum and nitrogen d) lithium and nitrogen

18. Balance the following and state the reaction type:

a) N2(g) + H2(g) → NH3(g)

b) K(s) + O2(g) → K2O(s)

c) H2(g) + O2(g) → H2O(l)

c) NaOH(s) + H3PO4(aq) → Na3PO4(aq) + H2O(l)

d) Pb3O4(s) → PbO(s) + O2(g)

19. Write a balanced equation for each of the following word equations and state the type of reaction

1. phosphoric acid + sodium hydroxide → sodium phosphate + water
2. magnesium + hydrochloric acid → (determine the products!)

c) octane (C8H18) + oxygen gas → carbon dioxide gas + water vapour

20. Complete the following word equations and then write a balanced chemical equation for each:

a) A double displacement occurred between solutions of silver nitrate and calcium chloride.

b) The single displacement between aluminum metal and aqueous lead(II)nitrate.

21. Describe the tests that are used to positively identify: Hydrogen, Oxygen, Carbon Dioxide gas.

22. Draw a sample pH scale. On the scale indicate the general locations of acidic substances, basic substances or neutral substances. Place the following substances in appropriate locations on the scale.

Lemon juice, stomach acid, baking soda, ammonia cleaner, drain cleaner.

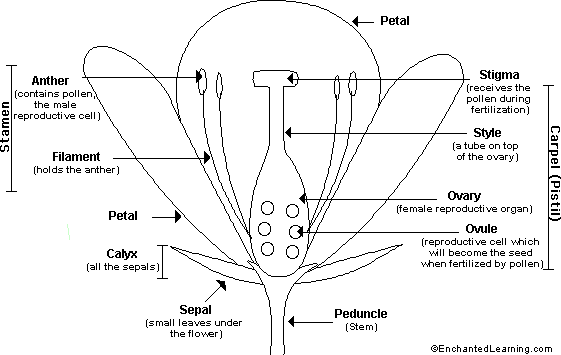
23. What is involved with a neutralization reaction?

24. Define and explain the Law of Conservation of Mass

# BIOLOGY REVIEW:

Key Words from the unit

|  |  |  |  |
| --- | --- | --- | --- |
| Cell cycle | Mitosis | Anaphase | Telophase |
| Metaphase | Prophase | Mitochondria | Nucleus |
| Chromosome | Ribosome | Centriole | Vacuole |
| Sister chromatids | Chloroplasts | Carcinogen | Vertebrae |
| Invertebrate | Epithelial tissues | Connective tissues | Muscle tissue |
| Nervous tissues | Gas exchange | Organ systems | magnification |
| Types of digestion | Allergy vs sensitivity | Enzyme | Veins |
| Artery | Capillary | Diffusion | Alveoli |
| Organs – esophagus, trachea, stomach, heart, lungs, stomach, sm/lg intestines, heart, | | | |

1. What is the basic hierarchy of a living body?
2. What does the cell theory state?
3. Name what you feel are 5 key organelles and describe their function.
4. Compare and contrast animal vs plant cells.
5. The three stages of the cell cycle involve: Interphase, Mitosis and Cytokinesis. Describe the importance of each of these 3 stages. (you need to be able to recognize the various stages of mitosis for the exam).
6. What causes cancer? How can you reduce your risk of cancer? How can cancer be treated?
7. How many chromosomes can be found in a human hair? In a human gamete (sperm/egg)? Why is there a difference?
8. What is fertilization? Where does it occur in people? Where does it occur in plants?
9. How many different tissue types does the human body have? What are they and what are their main functions?
10. What are some of the factors considered prior to an organ transplant? Once the transplant has occurred, what is the biggest risk and how is it managed most often?
11. You are responsible for knowing the main organs involved and key function/interactions for the following organ systems:
    1. Respiratory
    2. Circulatory – ensure you know the three different kinds of blood vessels
    3. Digestive
    4. Nervous
12. Compare and contrast plant and animal systems in their roles of obtaining food and transporting it throughout the organism.
13. What is your blood composed of?
14. Write the equation for photosynthesis and compare it to the equation for cellular respiration.
15. The three kinds of plant tissues are: Dermal, Ground and Vascular. Define their separate roles and explain how they interact together to keep the plant healthy.
16. Recall the parts of a flower:
17. Would you consider plants to undergo asexual or sexual reproduction?
18. What is the difference between pollination and fertilization?
19. GMOS – what are they and why are they being used/produced?

# Optics Review

First, make sure you have done all of the assigned questions from the handouts!

1. Define the following:

Visible light Light Ray Incident Ray

Electromagnetic spectrum Normal Reflected Ray

Transparent Translucent Opaque

Angle of incidence Angle of Reflection Virtual Image

Real Image Lateral Inversion Concave Mirror

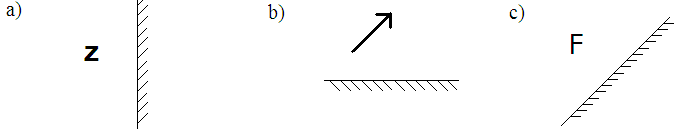
Convex Mirror SALT Focus

Centre of Curvature Principal Axis Refraction

Converging Diverging

Plane mirror Angle of Refraction

2. Using a diagram and object-image lines, show how the image of the following objects can be found in a plane mirror. Describe each image in terms of SALT.



4. Explain the acronym SALT.

5. What would the angle of reflection be for an incident ray of 48˚ in a plane mirror?

6. State the two laws of reflection.

7. How does the image of your face appear if you look into the following mirrors (use salt to describe):

a) a plane mirror

b) a convex mirror

c) a concave mirror (when your face is between F and the mirror)

8. Cam is showing slides to his biology class.

a) If the slides are positioned 15.5 cm from the projector lens that has a focal length of 15.0 cm, where would the screen be placed to produce the clearest image of the slide?

b) What is the linear magnification of the image?

9. A diverging lens is placed 5.0 cm in front of a laser beam to spread the light for the production of a hologram.

a) What is the focal length of the lens if the beam of the laser light seems to come from a point 2.0 cm behind the lens?

b) What is the linear magnification?

10. A gemologist studies diamonds on a light table under a small magnifying glass, called a loupe, with a focal length of 5.00 cm. If the image of the gemstones is 185 cm from the lens, determine the linear magnification of the lens?

11. a) What is refraction? Why does it occur?

b) Use a ray diagram to explain any one visual effect caused by refraction.

c) Explain any one piece of technology which employs the use of refraction.

12. The diagram below shows a ray of light travelling from air into perspex.



a) What is the index of refraction of Perspex?

b) What is the speed of light in Perspex?

c) What would the angle of refraction be if the angle of incidence were changed to 50 degrees?

13**.** A ray of light travels from air into glass. The ray enters the glass at an angle of 36º from the normal. If the index of refraction for glass is 1.5, determine the angle of refraction.

14. A block of unknown substance is submerged in water. A light ray in the water strikes the substance at an angle of 45º from the normal. If the refracted ray in the substance is at an angle of 16º, what is the index of refraction of the unknown substance? (nwater = 1.33)

15. If a light ray passes from a substance with low index of refraction to another substance with high index of refraction, will the ray bend away from or closer to the normal?

16. The critical angle of a substance is 32 with air, what is the index of refraction of the substance?

17. Why is a critical angle and important term to understand? What does it mean?

# Weather Review

1. How does the sun’s energy differ depending on latitude?

2. How does the sun’s energy get absorbed or reflected on the planet?

3. How is the lithosphere affected by climate change?

4. The atmosphere is a LARGE zone, what portions of the atmosphere do we tend to interact with?

5. What are some of the key evidence that we have of past climate change?

6. What is the most potent greenhouse gas and explain why you think so.

7. Using a diagram, explain why the greenhouse effect is altering our climate.

8. What does the term Albedo refer to?

9. What percentage of the troposphere is nitrogen? oxygen?

10. In the movie 6 degrees of change,

a) What are some of the signs they predicted that we are ALREADY seeing

b) What are things they predict are yet still to come.

11. Write an opinionated paragraph about climate change.

Create a thesis statement and then defend it with your points and conclude…

Do you feel we are contributing to a regular pattern?

Do you feel we are creating an abnormal pattern?

Do you feel it’s a good/bad thing?

EXPLAIN/DEFEND your standpoint

4. Explain the influences which set up prevailing wind patterns.

5. Name and state the direction of each of the following prevailing wind patterns.

a) between 0 and 30 degrees North latitude.

b) between 60 and 90 degrees N lat.

c) between 30 and 60 degrees N lat.

d) between 30 and 60 degrees N lat.

6. Which flight should take less time, Toronto to Vancouver or the return flight? Why?

7. What equipment is used to measure:

i) temperature ii) air pressure

8. If air at 20ºC is holding 6.09g of water/kg air, what is the Relative.Humidity.?

9. If the temperature is15ºC at 65% R.H, how much water is in the air?

10. If the temperature is 30ºC and the R.H. is 40.8%, what is the dewpoint?

11. If the dewpoint is 15ºC and the air temp. is 25ºC, what is the R.H?

12. If the dewpoint is 5ºC and the R.H. is 36.7%, what is the air temp.?

13. How do clouds form? Explain fully.

14. Explain the difference between orographic, frontal, and convective cloud formation.

15. Air turns as it moves along the surface of the Earth over large distances. In the Northern hemisphere, it turns to the . This phenomenon is known as the

effect.

16. A high pressure system usually consists of (stationary/rotating) air, and is associated with (nice-clear-calm / unstable-overcast weather.

17. A low pressure system usually consists of (stationary/rotating) air, and is associated with (nice-clear-calm / unstable-overcast weather.

18. Find Toronto and Buffalo on a map. Explain why Buffalo tends to get more snow than Toronto even though Toronto is further North. Hint: Prevailing winds in this area are from West to East.