

Note: These questions provide good coverage of the entire course, but they are not necessarily exhaustive. You are still expected to review your notes, homework, quizzes, tests, and labs as part of your preparation for the summative assignment and final exam.

✓	<u>Chemistry Unit Question Checklist</u>
	1. What is matter?
	2. Identify and give examples of physical properties of matter.
	3. Identify and give examples of chemical properties of matter.
	4. Compare and contrast a physical vs. a chemical property.
	5. Compare and contrast the three states of matter with respect to shape, volume, distance between particles, movement of particles, and attraction between particles.
	6. Convert between various S.I. units and prefixes (e.g., kilograms to grams, centimetres to kilometres).
	7. What are the indicators that a chemical change has taken place?
	8. Given an example of a change, identify whether it is physical or chemical.
	9. Explain how colour can be present after both a physical and chemical change.
	10. What are the different classifications of matter? Provide a brief explanation and an example of each.
	11. Given a diagram of some combination of atoms and molecules, identify the substance as a mixture or pure substance (elements or compounds),.
	12. Given a description of a substance, identify its classification of matter.
	13. Given the chemical formula of a substance, identify (a) its classification, (b) the elements present, and (c) the number of atoms of each element.
	14. Identify the number of molecules and/or atoms present in a given diagram or formula.
	15. Give a brief explanation of Dalton's Atomic Theory.
	16. What substance did Dalton study to form his theory, as well as to make his first calculations (which were actually incorrect)?
	17. Compare and contrast the properties of Metals, Non-metals, and Metalloids.
	18. Find metals, non-metals, and metalloids on the periodic table and give an example of each.
	19. What was Thomson's major contribution to the advancement of atomic theory?
	20. What was Rutherford's major contribution to the advancement of atomic theory?
	21. Using a periodic table, correctly identify and calculate: atomic number, mass number, # of protons, # of neutrons, # of electrons.
	22. What was Bohr's major contribution to the advancement of atomic theory?
	23. What is a spectroscope? How is it used, and what does it allow you to see?
	24. Draw the Bohr-Rutherford diagram for any specified element.
	25. Compare and contrast the following <u>families</u> or <u>groups</u> of elements: Alkali Metals, Alkaline Earth Metals, Halogens, Noble Gases.
	26. What is an ion?
	27. How do you determine whether an atom will gain or lose electrons?
	28. What is the valence shell?
	29. What is an isotope?

✓	<u>Electricity Unit Question Checklist</u>
	1. What does it mean for an object to be electrically neutral?
	2. What does it mean for an object to be positively/negatively charged?
	3. Summarize the “Law of Attraction and Repulsion” using words and/or diagrams.
	4. What is an insulator?
	5. What is a conductor?
	6. What happens when a charge is applied or created on (a) an insulator; (b) a conductor?
	7. Can a charged object attract a neutral object? If so, how can this happen?
	8. You can build a static charge by walking with slippers on a carpet. Why can you not build an infinite charge?
	9. Explain what is happening when we see a spark. Make sure you include sufficient detail.
	10. What is “grounding” as applied to electricity? Give some examples of how this is used.
	11. Explain the function of a lightning rod in the context of “grounding.”
	12. Use words and a diagram to explain charging by friction/contact/induction/permanent induction.
	13. Given an uncharged (neutral) electroscope, explain what will happen when a positive/negative rod is (a) brought close, (b) touched and then taken away, or (c) touched while the scope is grounded, then both taken away.
	14. Given a positively/negatively charged electroscope, explain what will happen when a positive/negative rod is (a) brought close, and (b) touched and taken away.
	15. Explain how a positively/negatively charged electroscope can be used to determine the type of charge (positive or negative) on some other object.
	16. What is current?
	17. Draw a simple circuit using proper symbols for: battery, cell, resistor, lamp, switch, voltmeter, ammeter.
	18. Draw a simple circuit showing how to connect a voltmeter to measure the voltage across a lamp/resistor/load.
	19. Draw a simple circuit showing how to connect an ammeter to measure the current through a lamp/resistor/load.
	20. Given the equation $I = Q / t$ , solve a given word problem for any of I, Q, or t. Make sure to show your work and use correct units (converting to S.I. standard units where necessary).
	21. Correctly identify the units and symbols for: current, charge, time, electric potential difference, voltage, potential difference, power, energy.
	22. What is electric potential difference / voltage / potential difference?
	23. Given the equation $V = E / Q$ , solve a given word problem for any of V, E, or Q. Make sure to show your work and use correct units (converting to S.I. standard units where necessary).
	24. Understand and explain the effect on (a) current, and (b) voltage, when adding and removing components from a simple circuit.
	25. Explain electrical resistance.
	26. Explain what happens to the energy provided to the electrons by the battery/power supply.
	27. Given Ohm's Law ( $V = I R$ ), solve a given word problem for V, I, or R. Make sure to show your work and use correct units (converting to S.I. standard units where necessary).
	28. Identify and explain the factors that influence the resistance of a resistor.
	29. How is a battery in a circuit similar to a pump that lifts water into a reservoir?
	30. What is power?
	31. Given the equation $P = E / t$ , solve a given word problem for any of V, E, or Q. Make sure to show your work and use correct units (converting to S.I. standard units where necessary).

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**Electricity Unit Question Checklist**

32. Explain the concept of electrical efficiency.
33. Given the equation for efficiency, solve a given word problem for any of Efficiency, Energy In, or Energy Out. Make sure to show your work and use correct units (converting to S.I. standard units where necessary).
34. Be prepared to apply any of the provided equations to solve a multi-step problem (e.g., Given efficiency and  $E_{\text{Out}}$ , determine  $E_{\text{In}}$ . Use  $E_{\text{In}}$  and a given time to calculate power).
35. Using correct symbols, draw a simple (a) series, or (b) parallel circuit.
36. Given a simple (a) series, or (b) parallel circuit with some values for I, V, or R given, determine any other requested values for I, V, and R.

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**Astronomy Unit Question Checklist**

1. What are the two primary purposes of a scientific model/theory?
2. If we make multiple observations that do not agree with our theory, what options should we consider?
3. What were the two primary models of astronomy that attempted to explain observations made from Earth?
4. The word "planets" comes from the Greek word for "wander" or "wanderer." How did the planets earn this name?
5. Give a brief explanation of the Geocentric model.
6. How did Newton's Law of Gravity help to improve the Heliocentric model?
7. What role do predictions play in verifying a scientific theory or model?
8. Give an example of a prediction that reinforced the Heliocentric model.
9. What is an eclipse?
10. Name the two types of eclipses we experience on Earth, and briefly describe each.
11. What is the special relationship between the Sun and the Moon which results in two types of eclipses?
12. What is the direction of rotation of the Earth?
13. What is the "north star?"
14. What is the period of rotation of the Earth around the Sun (be specific).
15. What are the two primary components/elements of the Sun?
16. What is happening in the Sun to generate energy? Be specific.
17. Working outwards from the centre of the Sun, name each layer and the temperature at that layer.
18. Working outwards from the centre of the Sun, name each layer and briefly describe the layer.
19. On a provided diagram of the Sun, label three structural layers of the Sun, and three features (i.e., events) on the surface of the Sun.
20. Name three features (i.e., events) that occur on the surface of the Sun, and briefly describe each.
21. Give examples of how we use Earth as a reference for various units of measurement. What are the units?
22. Why do we use Earth as a reference for various units of measurement?
23. Match specific features to the various planets (e.g., Venus rotates from east to west).
24. What is the term used to describe the inner planets? Why?
25. Identify some of the features associated with each of the inner planets.
26. What is the general term used to describe the outer planets?
27. What are some of the features/properties of Pluto which make it difficult to classify as a planet?

✓	<u>Astronomy Unit Question Checklist</u>
	28. Distinguish between Asteroids, Comets, and Meteors.
	29. What is the difference between a Meteor and Meteorite?
	30. What is the most visible, and often spectacular, feature of a comet? What direction does it point? Why?
	31. What are the limiting factors on our ability to observe the stars and gather information about them? How have we used technology to overcome some of this limitation?
	32. Understanding the electromagnetic spectrum, and how visible light is only one small part of that spectrum.
	33. What factors determine the brightness of a star? What is the formal measure of brightness called?
	34. Relate colours in the visible spectrum to the surface temperatures of various stars.
	35. What is the device we use to determine the elements present within a star?
	36. Given the following spectra for known elements (e.g., hydrogen, helium, etc.), determine the composition of the "mystery stars."
	37. What measurements do we need in order to determine the size (radius) of a star?
	38. What breakthrough observation allowed us to finally determine the mass of observed stars?
	39. Given a blank Hertzsprung-Russell Diagram, label any or all of the following: Main Sequence, Red Giants, Red Supergiants, Red Dwarfs, White Dwarfs, the Sun, Spectral Class along x-axis (OBAFGKM).
	40. Relate stellar (star) data dealing with class (OBAFGKM), colour (blue through red) and temperature.
	41. What class of star is our Sun? Where would it appear on the H-R diagram?
	42. What is gravity?
	43. How is gravity affected by (a) the distance between objects, and (b) the mass of the objects?
	44. What is a nebula?
	45. Explain the cycle by which a nebula turns into a star.
	46. At what temperature does hydrogen fuse into helium, the birth of a new star?
	47. What are the balancing forces acting within a star to keep it stable? Where are these stable stars in the H-R diagram?
	48. When a star becomes unstable, it moves to a new phase in its life. Describe the changes that occur in (a) low mass, (b) intermediate mass, and (c) high mass stars.
	49. What is a supernova? Why does it occur?
	50. What is the difference in a star that can result in either a neutron star or a black hole?
	51. Why is a black hole black?
	52. Explain the process of triangulation.
	53. What is the limiting factor when using triangulation to determine the distance to stars from the Earth?
	54. Explain the term "parallax."
	55. What is a light-year?
	56. What advantage does the light-year have over the AU when measuring interstellar distances.
	57. Compare and contrast the astronomical unit and the light-year.
	58. Give a brief explanation of Cepheid Variables, and their significance to astronomy.
	59. How many stars in the Milky Way?
	60. What is the approximate size of the Milky Way?
	61. On a diagram of the Milky Way, identify: (a) open clusters, (b) globular clusters, and (c) the Sun.



### Astronomy Unit Question Checklist

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| <input type="checkbox"/> | 62. How do we know the Sun is not at the centre of our galaxy?  |
| <input type="checkbox"/> | 63. What is the name of the nearest galaxy? How far is this galaxy from Earth?  |
| <input type="checkbox"/> | 64. How many galaxies are there in the universe (approximately)?  |
| <input type="checkbox"/> | 65. Who do we credit with the discovery of galaxies outside of the Milky Way?   |
| <input type="checkbox"/> | 66. What are the three types/classifications of galaxies? Identify some of their features.  |
| <input type="checkbox"/> | 67. What is the Doppler Effect?   |
| <input type="checkbox"/> | 68. How would you experience the Doppler Effect with sound?   |
| <input type="checkbox"/> | 69. How is the Doppler Effect used in astronomy to understand the motion of stars? Be specific.   |
| <input type="checkbox"/> | 70. Explain the difference between a "red-shift" and a "blue-shift."  |
| <input type="checkbox"/> | 71. Draw a simple diagram showing the changes in wavelength for the visible spectrum.   |
| <input type="checkbox"/> | 72. How does the Doppler effect impact the spectral lines we use to identify the elements of a star?  |
| <input type="checkbox"/> | 73. Given the following spectral lines for our Sun (which we will assume is currently not moving with respect to Earth), what are the motions of the stars producing the other spectral lines shown in the diagram? |
| <input type="checkbox"/> | 74. What common feature did Hubble observe when he measured the speed of distance galaxies?   |
| <input type="checkbox"/> | 75. What is Hubble's Law, and what does it tell us about the universe?  |
| <input type="checkbox"/> | 76. What is the current, dominant theory for the formation of the universe?   |
| <input type="checkbox"/> | 77. How old is the universe (approximate) based on this theory?   |
| <input type="checkbox"/> | 78. What observations or predictions support this theory?   |



### Ecology Unit Question Checklist

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| <input type="checkbox"/> | 1. Define the following: organism, population, community, ecosystem, biome, biosphere.  |
| <input type="checkbox"/> | 2. Explain the difference between biotic and abiotic factors. Give examples of each.  |
| <input type="checkbox"/> | 3. Given a picture or list from a nature scene, identify biotic and abiotic factors.  |
| <input type="checkbox"/> | 4. Identify a given interaction as biotic-biotic, biotic-abiotic, or abiotic-abiotic.   |
| <input type="checkbox"/> | 5. Explain the difference between producers and consumers, autotrophs and heterotrophs.   |
| <input type="checkbox"/> | 6. Explain each of the following terms, giving examples for each: omnivores, herbivores, carnivores, scavengers, parasites, decomposers.  |
| <input type="checkbox"/> | 7. What is a food chain?  |
| <input type="checkbox"/> | 8. What is a food web?  |
| <input type="checkbox"/> | 9. How does a food chain differ from a food web?  |
| <input type="checkbox"/> | 10. Given a list of organisms, construct a food chain or food web.  |
| <input type="checkbox"/> | 11. What is a trophic level?  |
| <input type="checkbox"/> | 12. For a given food chain/web, identify the different trophic levels.  |
| <input type="checkbox"/> | 13. For a given food chain/web, identify an example of a (a) producer, (b) consumer, (c) 1°consumer, (d) 2°consumer, (e) 1°carnivore, (f) 2°carnivore, (g) top carnivore, (h) herbivore, (i) omnivore, (j) scavenger, (k) decomposer. |
| <input type="checkbox"/> | 14. What direction do arrows point on a food web? Why?  |
| <input type="checkbox"/> | 15. In terms of biotic and abiotic factors, what is the important role of producers?  |
| <input type="checkbox"/> | 16. In terms of biotic and abiotic factors, what is the important role of decomposers and scavengers?   |

✓	<u>Ecology Unit Question Checklist</u>
	17. Describe some of the major features and differences for the following Canadian biomes: (a) tundra, (b) boreal forest, (c) temperate deciduous forest, and (d) grassland.
	18. Given numerical data, construct a pyramid of numbers, a pyramid of biomass, and a pyramid of energy.
	19. What does the area of each type of pyramid represent?
	20. What are advantages or disadvantages of each type of pyramid.
	21. What is the advantage of a pyramid over a simple food chain?
	22. How much energy is passed along a food chain with each level of consumer?
	23. How much energy is lost between each level of a food chain? Where does this energy go?
	24. In terms of energy flow in an ecosystem, explain why we rarely see more than 4 or 5 trophic levels.
	25. What is a pest? What is a pesticide?
	26. Define or explain the terms bioaccumulation / bioamplification / biomagnification.
	27. Give an example of a substance that has been introduced into the environment that illustrates the impact of bioaccumulation. What effect does this substance have?
	28. What are the four processes by which a population can change size?
	29. Define or explain (a) emigration, (b) immigration, (c) natality, and (d) mortality.
	30. Calculate the growth rate for the following populations... (given some population data)
	31. Describe the growth (words, graph) of a typical population.
	32. What factors limit the growth of a population?
	33. What do we call the condition where the population does not grow any further?
	34. Give examples of species that exhibit: (a) high birth potential, (b) low birth potential, (c) high survival, (d) low survival, (e) high procreation, (f) low procreation, (g) long reproductive life, and (h) short reproductive life.
	35. In Priestly's experiments, why did the plant and the mouse live longer when they were put under the jar together?
	36. What is photosynthesis?
	37. Why can we call photosynthesis and cellular respiration, 'complimentary processes'?
	38. Given a simple diagram of the carbon cycle, identify or label the following: fossil fuels, combustion, respiration, transpiration, photosynthesis, dissolving, and decomposers.
	39. What is the difference between organic and inorganic matter?
	40. Why are decomposers important in the carbon cycle?
	41. What organism is responsible for converting nitrogen gas into nitrates?
	42. Why are nitrates important?
	43. Denitrifying bacteria convert nitrates back into nitrogen. What simple steps can we take to prevent this from happening in our crops and lawns?
	44. How can you tell if a plant is growing in nitrogen-poor soil?
	45. Explore some negative impacts that humans have had on ecosystems.
	46. Explore some positive impacts that humans have had on ecosystems.