

Science 9 Year End Review

Name: _____

Unit 1: Biological Diversity

Topic 1

What is biological diversity? What is variation? How is variation within a species different from variation among species?

What are two things necessary to group two organisms together as the same species. Give an example of two organisms that may look alike but are not the same species. Give an example of two organisms that that don't look alike but are the same species.

What is speciation? Give an example of speciation.

What are behavioral adaptations? What are structural adaptations?

What value does variation have in an environment?

Topic 2

What are the two main components of a niche?

What is competition and why is it a healthy feature of environments? Who can it occur between? What are some resources organisms might compete for?

What is a broad niche? Who lives there?

What is a narrow niche? Who lives there?

How do generalist and specialist species compare? Which of the two are better adapted to live through changes in the environment? Which of the two would you expect to see living in a stable environment?

At what latitudes would you expect to find specialists? Generalists?

What is specialization? Give an example.

Briefly describe the three kinds of symbiotic relationships

Topic 3

What does it mean if something is heritable?

What are the two main kinds of reproductive strategies? How do they differ?

What is binary fission? What organism uses binary fission to reproduce?

When asexual spores form, the genetic material is provided by _____ parent. A benefit of this type of reproduction is that _____ spores are produced ensuring that at least some of them survive.

What does the meristem do in plants? What kind of offspring do meristems produce?

Describe the process of budding.

What are zygospores?

Why is bacterial conjugation considered primitive sexual reproduction?

List the male and female parts of a plant and explain the process of pollination.

What is the difference between self-pollination and cross pollination?

What is fertilization?

What is the difference between an embryo and a zygote?

Gametes are sex cells. What are the male sex cells called? What are the female sex cells called?

What are the advantages/disadvantages of internal/external fertilization?.

Topic 4

Genetics is the study of heritable traits. How does discrete variation differ from continuous variation? Name some traits that show discrete variation. Name some traits that show continuous variation.

Explain the difference between a dominant and recessive trait.

If an individual inherits both a dominant and recessive copy of a trait which copy of the trait will be expressed?

What is a Punnett square? What is it used for?

A trait can occur at a high frequency in a population and not be the dominant trait. Explain how this is possible.

How can the environment and choices people make(nurture) shape certain characteristics? Give one example of each.

What are mutations?

What are mutagens?

Topic 5

What is DNA?

Describe the structure of DNA.

What are chromosomes and where are they located in cells?

What are genes and where are they located?

Somatic (body) cells divide by a process called **mitosis**. How many daughter cells are produced in this process?

Sex cells are also known as _____. They reproduce via a process called _____. This produces _____ daughter cells. What is special about the number of chromosomes in these cells?

What is the benefit to reproducing sexually?

What is biotechnology? What has biotechnology been used for?

Why is genetic engineering controversial?

Topic 6

What is artificial selection? What is it also known as? Give an example of it being used.

List the four statements that sum up the theory of natural selection.

How is artificial selection different from natural selection?

Topic 7

How do humans impact biodiversity?

What is a bio-indicator species? Give an example.

Topic 8

How do zoos help preserve biodiversity? What are some pros and cons of zoos?

What is a seed bank? How are they beneficial?

What has been done to help protect endangered and threatened species?

Unit 2: Matter and Chemical Change

Topic 1

What does WHMIS stand for? What is it used for?

What are the 5 main points of the particle model of matter?

-
-
-
-
-

What are homogeneous and heterogeneous mixtures?

Pure substances can be either _____ or _____.

Topic 2

What are features of a physical change?

What is a chemical change?

Before you can determine if a chemical change has occurred, you must be able to conclude that a new substance has been formed. What observations could you make to determine if a chemical change has occurred, and how many observations should you make to be sure?

Physical properties are broken down into two main categories. What are these two categories and give two examples from each category?

Topic 3

What is the law of conservation of mass?

What is the law of definite composition?

Briefly describe how electrolysis was used to determine that water was a compound?

What new concept did Dalton's theory introduced that was not in the particle model of matter?

What is an element? What is a compound? How are they different?

How/why are models used to represent our scientific knowledge?

What are protons, neutrons, and electrons? Where are they found? What are their charges?
What are their relative sizes?

Topic 4

Why are symbols used for elements? What do the letters represent?

What properties are used to tell the difference between metals, non-metals and metalloids?

What are chemical families? On a periodic table, place the Alkali Metals, Alkaline Earth Metals, Halogens, Noble Gases, and Coinage Metals. Describe, in general terms, their reactivity. Note the position of the elements in each family relative to each other. (Families in a column)

Topic 5

How did Mendeleev arrange the periodic table of elements?

What does the atomic number tell you about the element? (protons and electrons)

How can you use the atomic mass to determine the number of neutrons in an atom?

Topic 6

What are the four main features of an ionic compound? Electrons are _____

What are the four main features of a molecular compound? Electrons are _____

What is a diatomic molecule?

What is an ion? (p. 140)

What are the rules for naming ionic and molecular compounds?

Practice the above rules for naming compounds on the following substances:

- Silicon Dioxide
- Sodium iodide
- CCl₄
- H₂O
- Aluminum oxide
- SO₂
- NO₂

Topic 7

What is a chemical reaction?

What is the difference between the reactants and the products?

Write out the chemical equation for the following reaction: Magnesium oxide is produced when magnesium reacts with oxygen.

Explain the difference between exothermic and endothermic reactions. Do they feel hot or cold? Do the reactants have more energy in their bonds or do the products have more energy in their bonds?

Topic 8

Define reaction rate.

What are some things you can do to increase the rate of reaction or decrease the rate of reaction?

What is a catalyst?

What is an enzyme?

What is an inhibitor?

Describe the process of combustion and corrosion? What element is always present in every combustion and corrosion reaction?

Name two things that can be done to prevent corrosion or slow it down.

Unit 4: Electrical Principles

Topic 1

How do objects become charged?

What is a better term for static electricity? Why?

What are the 3 Laws of Charges?

What are insulators, conductors, and superconductors?

What is an electrostatic discharge? How can you/why would you prevent this from occurring?

Topic 2

What are the four basic components that all circuits have?

Be able to read and interpret circuit diagrams Ex. "If switch B is closed, which light will turn on?"

For each of the following, current and voltage, give its symbol, the instrument used to measure it and its units.

	Symbol	Instrument	Units
Current			
Voltage			

Topic 3

What is resistance? How is resistance measured and what are the units?

Give the formula used to calculate resistance(Ohm's Law) as well as the other two variations of the formula.

A toaster with a resistance of 145Ω is connected to a 120 V source. What current will flow through the toaster?

A variable resistor allows different amounts an appliance to use varying amounts of resistance. In what devices might you use a variable resistor?

Circuits can be connected in parallel or series. What are the differences between parallel and series circuits?

Parallel:

Series:

Topic 4

What does a thermocouple do? How does it work? What energy transformation is taking place?

Briefly describe the piezo-electric effect. What energy transformation is taking place?

Topic 5

What does an electrochemical cell do? What are the main parts of an electrochemical cell?

What is the purpose of the electrolyte?

What is the purpose of an electrode?

What is the difference between a primary cell and a secondary cell?

Primary-

Secondary-

What is the difference between a wet and dry cell?

Wet-

Dry-

Topic 6

What does an electric generator do and when would it be required?

What is an electromagnet? What are three basic parts of an electromagnet?

What is the difference between an AC generator and a DC generator?

AC-

DC-

What is the advantage of using AC currents rather than DC?

How are generators and motors different?

Topic 7

What is the purpose of a transformer?

What is the difference between a circuit breaker and a branch circuit?

A 900 W microwave oven requires 7.5 A of current to run. What is the voltage of the circuit to which the microwave is connected?

A flashlight using two 1.5 V D-cells contains a bulb that can withstand up to 0.5 A of current. What would be the maximum power of the bulb?

Bob has a stereo that operates at 120 V using 2.5 A of current. How much power does Bob's stereo need to operate? If Bob plays his stereo for an average of 5 h each day, how much electricity will he use in a 30- day period?

Rank the following three light bulbs in order of efficiency starting with the most efficient bulb and ending with the least efficient bulb: Incandescent, Halogen and Fluorescent.

Topic 8

How is electricity produced when working with thermo-electric generators?

How is electricity produced in a hydro-electric plant?

Briefly compare nuclear fission and nuclear fusion.

How does a cogeneration system work?

What is geothermal energy?

Unit 3: Environmental Chemistry

Topic 1

List the organic nutrients. Where do we get these nutrients from and what are their roles?

What are minerals? How are mineral requirements distinguished?

What are some problems that could result from lack of certain minerals?

Why can't we just eat dirt to get minerals? How do plants get them?

What elements are commercial fertilizers made of? What do each of these elements do?

Topic 2

What is a pesticide? List the 3 pesticides you learned about. Which type of pest does each help to control?

List some pros and cons associated with the use of DDT.

Topic 3

What is the difference between an acid and a base? How can you tell if something is acidic or basic?

What is acid precipitation and what causes it?

What is liming? Why is it not very practical?

List two devices that are used to help control harmful emissions. Explain how they work.

Topic 4

What is pollution? What is a pollutant?

What is toxicity? What is the difference between acute and chronic toxicity?

Explain LD50.

What is thalidomide? What problem occurred with its use among pregnant women?

Topic 5

What is the difference between persistent and non-persistent pollutants? Give an example of each.

What types of organisms are used as biological indicators of water quality?

What are point sources and non-point sources? Give an example of each.

Topic 6

How does pollution reach populations in the far North?

How is water pollution controlled in ground water?

Explain what biodegradable means.

What is a hazardous waste? What are the 4 R's?

Describe the differences between a sanitary and a secure landfill.

Unit 5: Space Exploration

Topic 1

What is a frame of reference?

What two coordinates are used to measure the location of celestial bodies? What devices are used to measure these coordinates? (p 359)

What is the geocentric model of the universe? What were some problems with this model, list at least two? (p 636)

What model was developed in opposition to the geocentric model and by whom? (p 364)

Topic 2

Galileo made 4 key observations when working with his telescope, what were they? (p 366-367)

Which observation helped Galileo disprove the geocentric model?

What did Kepler discover about the movement of planets? What did he do with this information? (p 371)

What is Newton's law of universal gravitation and what did it explain? What other scientific principle does his law work hand in hand with? (p 372)

Topic 3

What kind of information does a spectroscope provide?

There are three kinds of spectrums. How are these three different spectrums produced? (377)

What is a diffraction grating? What is the benefit of using a diffraction grating? (p 378)

What is the Doppler effect? Using the Doppler effect what can be determined about the movement of a star? (p 382-383)

When is a star red-shifted? When is a star blue shifted?

Topic 4

What is the purpose of adaptive optics and what do they correct? (p 386)

What is an astronomical unit? (p 389)

Topic 5

What is electromagnetic radiation? (p 493)

What are the components of the electromagnetic spectrum? Which waves travel the fastest at the highest frequency and which waves travel the slowest of the lowest frequency? (p 393)

What is radio astronomy? (p 497)

How can a radio telescope be used to find radio objects in the solar system? (p 394)

What are radio objects? (p 394)

Radio waves have wave lengths that are much longer than light waves. What is one benefit and one disadvantage of these longer wavelengths? (p 394)

Briefly describe interferometry and very long baseline interferometry. (p 396)

Topic 6

What is the benefit of placing a telescope into orbit above Earth's atmosphere? (p 399)

There are two components to a rocket, what are they and what do they do? (p 399)

What is the action/reaction principle in relation to rockets? (p399)

What is exhaust velocity and what effect does it have on a rocket? (399)

A staged rocket flies higher and faster, why? (p 399)

What is the benefit of having computers inside a spacecraft? (p 400)

What is the purpose of gravitational assist? How does it work? (p 402)

What is an artificial satellite and what are they used for? (p 403)

What does it mean if something is in geosynchronous orbit? What would be an advantage of having something in geosynchronous orbit? (p 404)

What is remote sensing and how is information that is gathered from remote sensing used? (p 405)

How does a GPS work? (p 407)

Topic 7

What is the process occurring at the surface of the sun that produces energy? Briefly describe what is happening to the hydrogen molecules and what is causing this reaction to occur. (p 409)

What are solar winds and what do they define? (p 409)

What causes the northern and southern lights? (p 409)

What are the two categories planets are grouped into? What are distinguishing features of these two categories? (p 410)

What logistical problem prevents a spacecraft from reaching the outer planets? What did NASA develop in order to get around this problem and how were they able to do this? (p 418)

Topic 8

What is the major obstacle that needs to be over come in order for something to leave the Earth's atmosphere? (p 420)

What was the first artificial satellite to orbit the earth and when? (p 420)

What was placed on the Moon during the lunar landing that allows scientists to measure the distance the Moon is from Earth? (p 421)

Why are astronauts weak when they re-enter the Earth's atmosphere? (p 423)

Within the International Space Station scientific experiments of all kinds will be performed. What is the benefit of having experiments done in space rather than on Earth? (p 425)
