

You may need to make notes on another sheet of paper to study for the test. In addition, you need to review all tests, notes, and quizzes.

### **Nature of Science (NOS)**

- 1) Steps of the Scientific Method:  
Observation, Question, Hypothesis, Experiment, Data Analysis, Conclusion, Share Results
- 2) Why do scientists repeat experiments done by other scientists?  
To verify results-makes data more valid
- 3) What is the difference between a theory and a law? Can they both change? Explain.  
Theory explains how and why-based on evidence-can be changed with new information  
Law-describes something in nature-a pattern that is always true-does not change  
What is the difference between a theory and a hypothesis?  
A theory is based on evidence-explains how and why, while a hypothesis describes what a researcher predicts will result from experimentation.
- 4) Give an example of how newly discovered information can change existing knowledge.  
Pluto was reclassified from a planet to a dwarf planet when new information was discovered on Pluto's motion
- 5) Why do we often use models in science? What are some limitations of models?  
We use models when something is too big, too small, too dangerous. Models do not always work like the real thing, may not be to scale
- 6) Are there different kinds of scientific investigations? Do they all involve an experiment? Explain  
Yes, experiments done in a lab, experiments done in the field, observational studies (ex-Jane Goodall), making and using models
- 7) Fredrick thinks that coffee will make his plants grow taller. Explain a way that he could test his hypothesis.  
Set up 2 groups: plants that receive only water (control group)  
Plants that receive coffee (experimental group)  
IV: type of fluid plants receive, DV: plant growth  
Constants: amount of fluid, amount of sunlight, same type of plant, same type and amount of soil

### **Energy-Chapters 8, 9, 10**

- 8) Look at the diagram on pg. 304 and read the section above it. What types of energy come from the sun?  
Visible light, Ultraviolet light, Infrared light (heat)
- 9) What type of energy is found in the electromagnetic spectrum? (chap. 8)  
Gamma, x-rays, ultraviolet, visible light, infrared, microwaves, radio waves
- 10) Which part of the spectrum can we see? Visible light only
- 11) List the colors in the visible spectrum in order from the longest to shortest wavelength. What can we use to remember the order of the colors? Red, orange, yellow, green, blue, indigo, violet ROYGBIV
- 12) What property of waves makes the types of waves in the spectrum different?  
wavelength

13) List and describe types of wave interactions. (chap. 9).

Reflection- a wave bounces off a surface

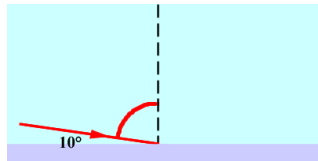
Refraction- a wave changes direction (bends) when it moves into a different medium

Diffraction- a wave changes direction (bends) when it moves around an obstacle or opening

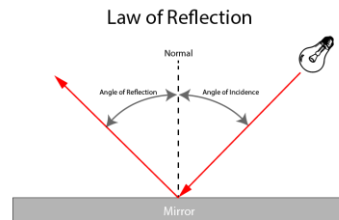
14) What does the Law of Reflection state?

Angle of incidence=angle of reflection

15) What would the angle of reflection be for the following reflected wave?



80 degrees



16) Which type of wave interaction explains why objects look different under water? Why does this occur?

Refraction-light waves change speed and direction as they move from air to water, objects look bigger than they are

17) Waves carry energy, not matter.

18) How does heat affect molecular motion? Heat causes the molecules to move faster (increase in temperature and kinetic energy), removing heat-molecules slow down (decrease in temp)

19) Describe how heat and phase change of matter are related.

In order for a phase change to occur heat must be added (increase in temp) or removed (cooled)

20) What is the difference between heat and temperature?

Heat is a form of energy (thermal) while temperature is a measure of the kinetic energy (movement) of the molecules in a substance

21) Describe the direction in which heat transfers from one object to another.

Heat moves from objects that have more thermal energy (hotter) to objects with less thermal energy (cooler)

22) Describe photosynthesis (plants making their own food-sugar) as it relates to energy transfer.(see diagram pg. 568)

Energy from sun (radiant energy) absorbed by plant-chloroplast of cell, cells make sugars (chemical energy) for plant food

23) List the types/forms of energy.

Sound, nuclear, thermal (heat), radiant (light), chemical, mechanical (motion), and electrical

24) How do most power plants generate electricity?

Mechanical energy from moving wind, steam, water spins a turbine, turbine spins generator, generator produces electricity

25) What does a prism do to light?

Splits white light into its component colors (light is refracted as it passes through prism-like the glasses)

26) Describe the relationship between speed of waves and the type of medium (material) they pass through.

Waves move fastest through solids (except light), slowest through gases

Light moves fastest through a vacuum

27) Why is there a delay in the time someone sees lightning and the time they hear thunder?

Light travels faster than sound

### Earth Science (Chapters 1-7 & 13)

28) List the layers of the Earth from inside the Earth to the surface. (see pg. 23)

Inner core, outer core, mantle, crust

29) What is a convection current?

A circular current of molten rock found in the mantle in which hot material rises towards the crust, cools, and sinks down towards the outer core and is heated again.

30) Where are convection currents within the Earth? (see pg. 149) How are they related to heat energy?

In the mantle, when the material is heated, it rises towards the crust. When the material loses heat energy (cools), it sinks.

31) What property of matter caused the Earth to form in layers?

Density of different Earth materials

32) What is the difference between minerals and rocks?

Rocks are composed of 2 or more minerals

33) List the types of rocks and describe their formation

Sedimentary-formed when sediment is pressed together to form rock

Metamorphic-existing rock is heated and undergoes extreme pressure to change rock

Igneous-form from molten rock cooling and crystallizing

34) How do rock types become other rock types? Use the processes in the rock cycle to explain. (see your rock book for rock cycle diagram) \*see rock book

Rocks can undergo weathering and erosion, heating and cooling, heat and pressure

35) All types of rock can be weathered down to sediment

36) In which type of rock are scientists most likely to find fossils? Why?

Sedimentary-fossil won't be destroyed in rock formation as it would in igneous or metamorphic rock

37) What is the Law/ Principal of Superposition and how does it help geologists determine the age of rock layers?

States that in undisturbed rock layers, the oldest layer will be found at the bottom, the youngest at the top

38) What method is used for finding the absolute age of rock layers? For a fossil? (see pg. 512)

Radiometric dating-compares the amounts of parent and daughter isotopes in a sample

Carbon dating can be used on fossils or anything once alive (under 60,000 years old)

39) Who was Alfred Wegener? Why is he important?

Developed hypothesis/theory of continental drift-which led to the theory of plate tectonics. He was the first to outline evidence of a super continent.

40) What is Pangaea? (see diagram on pg. 128)

A supercontinent before continental drift moved the plates

41) What is the theory of plate tectonics?

States the earth is divided into plates that move with respect to each other

42) What evidence supports plate tectonics?

Sea floor spreading at the mid ocean ridge-describe how the plates moved

Evidence that Wegner used: fit of coastline, fossil evidence, rock type evidence, climate clues

43) What causes the Earth's plates to move? (see diagram on pg. 149)

Convection currents in the mantle create forces that move the plates

44) What occurs at the mid ocean ridge? The discovery of activity at the mid ocean ridge confirms what theory? (see pgs. 137 & 147)

Sea floor spreading in which new crust is formed, this discovery confirmed Wegner's theory of continental drift and the revised theory of Plate Tectonics

45) Describe how plate boundaries, earthquakes, and volcanic activity are related. (see diagram pg. 212)

EQ and volcanoes often occur on or near plate boundaries

46) What are faults?

A crack or fracture in the Earth's crust where movement occurs

47) How do seismologists describe the strength of an earthquake?

They use scales of magnitude such as the Richter scale or the modified Mercalli scale for intensity

48) What is deforestation? What are the effects of deforestation?

Removal of plants or tree, can lead to erosion of soil

49) What information do fossils give us?

History of life on earth, how life has changed or evolved over time, how living things are related to each other

50) A paleontologist studies the fossilized remains of two different organisms and notes similar body structure. What do these similarities tell us about those organisms? (see pg. 530)

The organisms might have a common ancestor

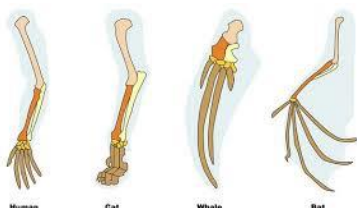
51) What is a homologous structure?

a structure on a living thing with similar form and function-such as an arm/wing

52) What do homologous structures in organisms suggest to scientists?

the species might have a common ancestor

53) Which features of the following animal limbs are similar (in the diagram below)?



bones in the limbs, fingers

54) Charles Darwin developed his theory of Natural Selection based upon the presence of variations within a species. What is genetic variation within a species? Why are these variations important to the survival of the species?

Variations are differences among individuals, variations are important because they allow for survival of some individuals during environmental changes.

### Life Science (Chapters 11, 12, & 14)

55) Review your Venn Diagram comparing mitosis and meiosis. Why are both needed in organisms that use sexual reproduction?

Meiosis is needed to produce the egg and sperm, while mitosis is needed for growth of the fertilized egg into a new organism-produces body cells for replacement, growth or repair

56) Compare the cells produced from mitosis and meiosis. How are they different?

Mitosis- produces body cells, 1 cellular division produces 2 diploid cells

Meiosis-produces the sex cells (egg and sperm), 2 cellular divisions produces 4 haploid cells

57) What are the differences between sexual and asexual reproduction?

Asexual-offspring is identical to parent, requires one parent only ex) fission, budding, regeneration, mitosis

Sexual-offspring is different than parent, requires two parents

58) How many chromosomes are found in human body cells? Sex cells?

46 chromosomes in body cells (diploid), 23 in sex cells (haploid=half)

59) What are some problems associated with cloning?

High cost, not always ethical, long term effect unknown

(Brain Pop)

60) A bird is heterozygous for white body feathers. Is white a dominant or recessive trait? How do you know?

White is dominant, since the dominant trait will be expressed. Heterozygous means that an organism has 1 dominant and 1 recessive allele (genes), ex) Ww

61) In order for a recessive trait to be expressed or shown in an organism both parent(s) must have 1 recessive allele. Ex genotypes) tt, ww, ss

62) If you cross a short strain of grass (gg) with a medium strain of grass (Gg), what is the probability of getting short strain grass as offspring of these two plants?

	g	g
G	Gg	Gg
g	gg	gg

50% chance of getting short strain of grass (gg)

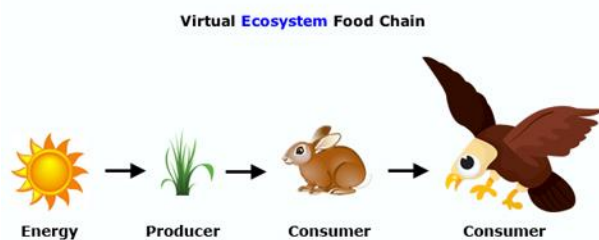
- 63) Determine the possible genotypes and phenotypes of a cross between a heterozygous brown rabbit and a homozygous brown rabbit. Use the letter B to represent the alleles.

	B	b		
B	BB	Bb		
			Genotypes:	Phenotypes:
B	BB	Bb	BB-50%, Bb-50%	brown-100%

- 64) What do the arrows indicate in a food chain or web? (see pg. 570, both diagrams)

Transfer of energy from prey to predator (consumer)

- 65) Draw a simple food chain using the following organisms: hawk, grass, rabbit (make sure your arrows are drawn from the food source to the consumer)



- 66) What are symbiotic relationships?

Close, long term relationship between 2 organisms-usually exchange of food or energy

- 67) Describe 3 types of symbiotic relationships. (see examples on pg. 563)

Mutualism-both organisms benefit (anemone and clown fish)

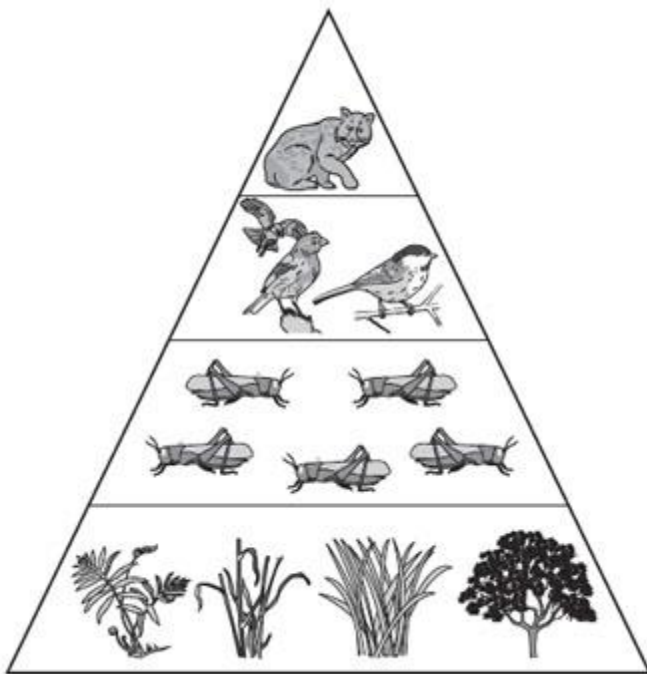
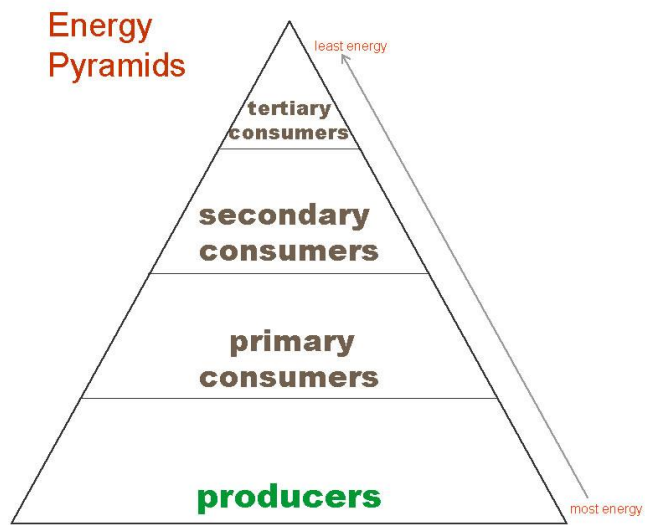
Parasitism-one organism benefits, other is harmed (ex-fleas on dog)

Commensalism-one organism benefits, other is not helped or harmed (ex-barnacles on a whale)

- 68) Burmese Pythons have been released into the Everglades by pet owners that no longer can handle the large snakes. What are these types of non-native animals called? How does this affect the ecosystem?

Invasive species, pythons compete with other predators for the same food sources-impacts native species adversely (not good)

- 69) See the energy pyramid on pg. 571. What happens to the amount of available energy the higher the level on the pyramid? Energy that is available decreases from the bottom of the pyramid to the top



70) Using the same diagram, what would happen to the population of grasshoppers if the birds became extinct?

Grasshopper population would increase and disrupt the natural balance