

8th Grade Science
2nd Semester Study Guide

Waves and Information Transfer

Know a wave transfers energy, not matter.

Know how to identify the properties of transverse and longitudinal waves.

Know the amount of energy transferred in a given time is proportional to the frequency.

Know energy of a wave is proportional to square of the amplitude of the wave.

Know waves will be reflected, absorbed, or transmitted when they interact with matter in a medium.

Know the properties of the matter in a medium (e.g., its density, state of matter, luster) affect the wave (e.g. speed of wave) and how the wave will interact with the medium (e.g. reflection, absorption, and transmission of wave).

Know a mechanical wave requires a medium to travel while EMR does not.

Know the term “light waves” includes all electromagnetic radiation (EMR), not just visible light.

Know EMR is classified by the wavelength of the wave. (Students do not need to memorize bands of the spectrum or their properties.)

Know digital signals are discrete packages of information (0s and 1s or on/off).

Know analog signals have a larger range of possible signals that are sent continuously.

Know interference affects how signals are sent and received.

Know sending and receiving digital signals is more reliable than sending and receiving analog signals.

Know digital signals are capable of sending large amounts of data faster than analog signals can.

Heredity

Know genes are located on chromosomes and contain genetic instructions for the formation of proteins.

Know genes code for proteins that determine expressed traits.

Know the function of a protein is determined by its structure.

Know mutations produce changes in genes.

Know mutations can have harmful, beneficial, or neutral effects on structure and function of organisms.

Know asexual reproduction results in offspring with identical genetic information, while sexual reproduction results in offspring with genetic variation.

Know asexual reproduction results in the inheritance of chromosomes from one parents, while in sexual reproduction, the inheritance of chromosomes is from two parents.

Know in sexually reproducing organisms, each offspring gets one set of chromosomes from each parent, resulting in offspring that have the same number of chromosomes, and therefore genes, as their parents.

Know humans can change the genetic make-up of organisms through artificial selection technologies such as genetic modification, animal husbandry, selective breeding in plants, or gene therapy.

Know the ability to change the genetic make-up of organisms through artificial selection impacts society.

Know that the understanding of trait inheritance has led to advances in technologies resulting in a higher probability of being able to influence the inheritance of desired traits.

Natural Selection and Adaptation

Know fossils are commonly found in sedimentary rocks.

Know the natural laws (e.g., erosion, rock deposition, radioactive decay, etc.) operate today as they did in the past.

Know radioactive dating methods have the ability to date and age fossils and rock types.

Know patterns of changes in anatomical structures in organisms (e.g. increases in complexity of anatomical structures) in the fossil record can show change over time.

Know mass extinctions have occurred in the past and are the result of natural causes.

Know the overall diversity and complexity of organisms on Earth has increased.

Know organisms that share a pattern of anatomical features are likely to be more closely related than are organisms that do not share a pattern of anatomical features, due to the relationship between genetic makeup and anatomy. (Note: Emphasis is on homologous structures.)

Know anatomical similarities and differences among organisms can be used to infer evolutionary relationships.

Know organisms within a given species have the same pattern of embryological development.

Know organisms can show similar patterns of embryological development that may not be evident in adult forms.

Know organisms that show similar patterns of embryological development have closer evolutionary histories.

Know any population contains a variety of available, inheritable genetic traits.

Know genetic variation occurs in a population, resulting in a variation of traits among individuals in the population.

Know organisms produce more offspring than the environment can support, which leads to competition for resources.

Know genetic variations can affect the survival rates of organisms in a particular environment.

Know some traits are advantageous in a specific environment, based on its limited resources.

Know individuals with genetic variations well-suited to an environment can produce more offspring than individuals with variations less-suited to the environment.

Know that as an environment's conditions change, different traits could be advantageous, disadvantageous, or have no impact on an organism's survival and reproduction based on the new environment.

Know natural selection can cause increases and decreases of specific traits in populations, not individual organisms.

Know that, through natural selection, traits that better support survival and reproduction are more common in a population than those traits that are less effective for survival and reproduction.

Know increases or decreases of some traits within a population can have more than one environmental cause.

Know that, when environmental shifts are too extreme, populations do not have time to adapt and may become extinct.