K

karyogram: the photographic image of a karyotype

karyotype: the number and appearance of an individual's chromosomes, including the size, banding patterns, and centromere position

kinetic energy: the type of energy associated with objects in motion

kinetochore: a protein structure in the centromere of each sister chromatid that attracts and binds spindle microtubules during prometaphase

L

lactic acid fermentation: the steps that follow the partial oxidation of glucose via glycolysis to regenerate NAD+ and produces the products lactic acid

lagging strand: during replication of the 3' to 5' strand, the strand that is replicated in short fragments and away from the replication fork

law of dominance: in a heterozygote, one trait will conceal the presence of another trait for the same characteristic

law of independent assortment: genes do not influence each other concerning sorting of alleles into gametes; every possible combination of alleles is equally likely to occur

law of segregation: paired unit factors (i.e., genes) segregate equally into gametes such that offspring have an equal likelihood of inheriting any combination of factors

leading strand: the strand that is synthesized continuously in the 5' to 3' direction that is synthesized in the direction of the replication fork

light-dependent reaction: the first stage of photosynthesis where visible light is absorbed to form two energy-carrying molecules (ATP and NADPH)

linkage: a phenomenon in which alleles that are located in close proximity to each other on the same chromosome are more likely to be inherited together

lipids: a class of macromolecules that are nonpolar and insoluble in water

litmus paper: filter paper that has been treated with a natural water-soluble dye so it can be used as a pH indicator

locus: the position of a gene on a chromosome

lysosome: an organelle in an animal cell that functions as the cell's digestive component; it breaks down proteins, polysaccharides, lipids, nucleic acids, and even worn-out organelles

M

macroevolution: a broader scale of evolutionary changes seen over paleontological time

macromolecule: a large molecule typically formed by the joining of smaller molecules

mass number: the number of protons plus neutrons in an atom

matter: anything that has mass and occupies space

meiosis I: the first round of meiotic cell division; referred to as reduction division because the resulting cells are haploid

meiosis II: the second round of meiotic cell division following meiosis I; sister chromatids are separated from each other, and the result is four unique haploid cells

mesophyll: the middle layer of cells in a leaf

messenger RNA: messenger RNA; a form of RNA that carries the nucleotide sequence code for a protein sequence that is translated into a polypeptide sequence

metabolic pathway: a series of related chemical reactions is referred to as a

metabolism: all the chemical reactions that take place inside cells, including those that use energy and those that release energy

metaphase plate: the equatorial plane midway between two poles of a cell where the chromosomes align during metaphase

metaphase: the stage of mitosis during which chromosomes are lined up at the metaphase plate

microevolution: the changes in a population's genetic structure (i.e., allele frequency)

microfilaments: the thinnest of the cytoskeletal fibers and function in moving cellular components and maintaining cell structure

microscope: the instrument that magnifies an object

microtubules: the thickest fibers that make up the cytoskeleton and can dissolve and reform quickly.

migration: the movement of individuals of a population to a new location; in population genetics it refers to the movement of individuals and their alleles from one population to another, potentially changing allele frequencies in both the old and the new population

mitochondria: (singular: mitochondrion) the cellular organelles responsible for carrying out cellular respiration, resulting in the production of ATP, the cell's primary energy-carrying molecule

mitosis: the period of the cell cycle at which the duplicated chromosomes are separated into identical nuclei; includes prophase, prometaphase, metaphase, anaphase, and telophase

mitotic phase: the period of the cell cycle when duplicated chromosomes are distributed into two nuclei, and the cytoplasmic contents are divided; includes mitosis and cytokinesis

mitotic spindle: the microtubule apparatus that orchestrates the movement of chromosomes during mitosis

modern synthesis: the overarching evolutionary paradigm that took shape by the 1940s and is generally accepted today

molecule: a chemical structure consisting of at least two atoms held together by a chemical bond

monohybrid: the result of a cross between two true-breeding parents that express different traits for only one characteristic

monomers: the single subunits, or building blocks that make up polymers

monosaccharide: a single unit or monomer of carbohydrates

monosomy: an otherwise diploid genotype in which one chromosome is missing

mutation: a permanent variation in the nucleotide sequence of a genome

N

natural selection: the greater relative survival and reproduction of individuals in a population that have favorable heritable traits, leading to evolutionary change

neutron: a particle with no charge that resides in the nucleus of an atom; has a mass of 1

nitrogenous base: a nitrogen-containing molecule that acts as a base; often referring to one of the purine or pyrimidine components of nucleic acids

noncompetitive inhibition: a general mechanism of enzyme activity regulation in which a regulatory molecule binds to a site other than the active site and prevents the active site from binding the substrate; thus, the inhibitor molecule does not compete with the substrate for the active site; allosteric inhibition is a form of noncompetitive inhibition

nondisjunction: the failure of synapsed homologs to completely separate and migrate to separate poles during the first cell division of meiosis

nonpolar covalent bond: a type of covalent bond that forms between atoms when electrons are shared equally between atoms, resulting in no regions with partial charges as in polar covalent bonds

nuclear envelope: the double-membrane structure that constitutes the outermost portion of the nucleus

nuclear pores: control the passage of ions, molecules, and RNA between the nucleus and the cytoplasm

nucleic acid: a biological macromolecule that carries the genetic information of a cell and carries instructions for the functioning of the cell

nucleoid: a central region in a prokaryotic cell where DNA is found

nucleolus: the darkly staining body within the nucleus that is responsible for assembling ribosomal subunits

nucleotide: monomers of nucleic acids. Consist of a five-carbon sugar, phosphate group, and nitrogenous base