

Given an example strand, tell the complementary strands of RNA to DNA and DNA to DNA

RNA - UAACGGCUACAU

DNA - ACTCGTAGCC

DNA - ATTGCCGAUGTA

DNA - TGAGCATCGG

DNA Replication, Translation, and Transcription- Where it occurs, what happens, and how it happens

- Replication - in nucleus, DNA is copied, makes an exact copy
 - Transcription - in nucleus, DNA is template to make RNA, happens repeatedly during a cell cycle
 - Translation - in ribosomes in the cytoplasm, RNA is the template for making proteins (polypeptides)
- What happens first when DNA is "unzipped"?
Free nucleotides pair with the unzipped exposed bases

What message does mRNA carry?

the genetic code that when it is translated, makes a protein
it delivers DNA's instructions for making proteins

What is the function of tRNA?

bring amino acids from the cytoplasm to the ribosomes

How many bases code for an amino acid?
→ Also called a nucleotide

3 bases code for an amino acid
called a codon

ex. reading frame begins with the first base
CAUUGAAGC codes for 3 amino acids
AA AA AA

How are the bases in DNA and RNA held together?

hydrogen bonds hold base pairs together

What are the DNA bases, the RNA bases?

DNA - A - adenine
G - guanine
T - thymine
C - cytosine

RNA - A - adenine
G - guanine
U - uracil
C - cytosine

How many amino acids make up all the proteins in a human body?

20

Describe Mitosis and meiosis. How are they different and how are they the same?

Mitosis - exact copy, result in diploid cells, autosomal cells

Meiosis - increases diversity, result in haploid cells, sex cells

What is a haploid cell? What is a diploid cell?

haploid cells contain one copy of each chromosome pair, only in gametes (sex cells)
diploid cells contain 2 copies of each chromosome pair, autosomal cells (autosomal cells)

What is the central dogma of molecular biology?

DNA to RNA to Proteins

Who are Watson and Crick? Why are they famous?

they with other scientists discovered that 2 strands of DNA join together to form a double helix

What are the parts of the cell cycle?



Gap 1 - growing

Synthesis - replicating genetic information

Gap 2 - growing

Mitosis - cell divides

What is the difference between how a eukaryote carries its DNA and how a prokaryote carries theirs?

eukaryotes carry their DNA in the nucleus, prokaryote cells lack a nucleus so they carry their DNA in the cytoplasm

What is the waste product of photosynthesis?

O₂ it is crucial to humans

photosynthesis is important to plants because it provides them with sugar

Cellular respiration is the breakdown of what and what is its purpose?

the breakdown of sugar (glucose) to obtain energy

What does it mean to be heterozygous for a trait? Homozygous?

heterozygous - 2 different alleles

homozygous - 2 of the same alleles

Hh

HH or hh

What is the difference between recessive traits and dominant traits?

recessive are only expressed when 2 copies of the recessive allele for the trait are present
dominant are expressed when at least one dominant allele is present

A phenotype is dependent on chromosome location, range of dominance, and what?

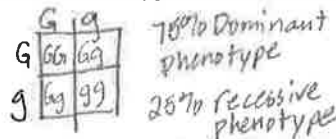
the environment as evidenced by identical twins raised apart

What is codominance and incomplete dominance? When given an example know what the offspring will look like.

codominance - blending of traits
red flower and white flower produce pink flowers

incomplete dominance - both traits show up
red flower and white flower produce red and white spotted flowers

Know how to do Punnett squares for homozygous/ heterozygous individuals and for dominant/ recessive/ codominant/ incomplete dominant.



What is a sex-linked trait? Which chromosome is the trait carried on? Who inherits the sex-linked traits.

the most and why? The trait is carried on the X or Y chromosome. For a female to have the recessive trait, she must have 2 recessive alleles. A male will show the trait with only one recessive allele if it is on the X chromosome, that's why more males will show a sex-linked trait

How many pairs of chromosomes do humans have?

23 pairs of chromosomes

22 pairs of autosomes (body cells) and 1 pair of sex chromosomes (gametes)

How are traits expressed in homozygous individuals and heterozygous?

someone who is homozygous for a recessive

Give an example of a polygenic trait. Are most traits polygenic?

Unlike Mendel's traits in the pea, most traits are polygenic (many different alleles produce the trait) eye color, skin color and hair color are examples

What is the focus of ecology?

interactions among organisms

Relate a food web to a food chain.

Food webs show networks of feeding relationships, food chains are one chain within the web, they show a single sequence of feeding relationships

What happens to energy as it moves up a trophic level? Does it all transfer, why or why not?

Some energy is lost as heat

What is a trophic level? How do you know how many trophic levels an organism is?

an energy level. In a food chain the number of individuals is the number of trophic levels ex. oak tree - grasshopper - mouse - snake - hawk
1 2 3 4 5 trophic levels

What are 5 factors that lead to evolution?

Natural selection gene flow mutation
Sexual selection genetic drift

What are the 4 main principles of natural selection?

variation, over production, adaptation, descent with modification

Organisms that have shared protein sequences suggests what?

the protein sequences resemble each other and they show shared ancestry

Organisms that have shared DNA sequences suggests what?

Shared DNA is evidence of molecular evolution, & organisms that are related will have very similar DNA sequences

What are the must haves in order to apply the Hardy-Weinberg equilibrium?

Very large population, no emigration or immigration, no mutations, random mating, no natural selection

What is the formula to calculate population density?

the number of individuals living in a defined space divided by the area of the space

Be able to read and interpret related graphs.

What is another name for the water cycle?

The hydrologic cycle - water moves from the atmosphere to the surface, below ground, and back

What cycle are fossil fuels in?

the carbon cycle

What are the differences between convergent and divergent evolution?

Divergent evolution - 2 species had common ancestors, but have become increasingly different

Convergent evolution - 2 species have the same ecological niche, look similar, perform similar functions, but are not closely related

State Darwin's Theory.

He theorized that species can adapt to their environment

What is the selective agent for natural selection?

The environment

What does more genetic variation assure?

the more likely that some individuals will survive

What is a region's climate?

the long-term pattern of weather conditions

Describe normalizing stabilization, disruptive stabilization, and directional stabilization.

stabilizing selection - both extreme phenotypes shift toward the middle

Which theory united the fields of Biology, Geology, and Ecology?

the theory of evolution