Biology Unit Review: Answer Key

1. Describe the basic structure of DNA

two strands wrapped around each other (double helix). Bases (ACTG) make up the "steps" of the ladder. Alternating sugar and phosphate make up the sides of the ladder.

2. What is complementary base pairing?

Adenine always pairs with Thymine, Guanine always pairs with Cytosine

Draw the other side of the DNA molecule showing the complementary base pairs.

C T A A T G T
G A T T A C A

3. How many chromosomes are in the nucleus of a human body cell?

46

4. What is a mutation?

a permanent alteration in the DNA sequence that makes up a gene

5. Name the three types of mutations that can occur.

Addition, Deletion, Substitution

6. What is a mutagen? List several examples.

Environmental factors that cause mutations in DNA.
Ex. UV rays, X rays, cigarette smoke, BBQ, HPV, nitrates

7. Mutations can be ___*positive*____, _____*negative*_____, or ___*neutral*____.

8. A hereditary unit of information is called a __*gene*__ and is passed from parent to offspring.

9. An __*allele*__ is one of the possible versions of the gene, such as the __*purple flower allele*__ for the purple trait or the __*white flower allele*__ for the white trait.

10. An organism always has two genes present for each characteristic – one inherited from each_*parent*__. _____

11. If the alleles on both of the genes are the same, then the organisms is __*homozygous*__.
If the two alleles are different, then the organism is a __*heterozygous*__ for a characteristic such as flower colour.

12. One trait will be dominant (purple) and one will be recessive (white). Only the __*dominant*__ trait is expressed.

13. Phenotype refers to: *appearance of a particular characteristic (white, purple, brown eyes, blonde hair, short, tall etc)*

14. Genotype refers to: *the genetic makeup of an organism (PP, Pp, pp)*

15. Organisms that have matching alleles are said to be __*homozygous*__ for that trait.
If they are purebred for the dominant trait (PP) they are said to be__*homozygous dominant*__, or for the recessive trait (pp) they are said to be___*homozygous recessive*___. Organisms which have non-matching alleles (Pp) are hybrids and are called __*heterozygous*__ for that trait.

16. If the results in the pea height example above were 10 homozygous dominant (PP), 20 heterozygous (Pp) and 10 homozygous recessive (pp), the genotypes of the parents would be ___

	P	p
P	PP	Pp
p	Pp	pp

Genotype	Gene Combination	Description

Homozygous	PP, pp	matching dominant or recessive alleles for a particular trait
Homozygous	PP	matching, dominant alleles
Homozygous recessive	pp	matching, recessive alleles
Heterozygous	Pp	Organisms whose alleles are not the same (hybrid)

17. For each genotype below, indicate whether it is heterozygous **(He)** or homozygous **(Ho)**

AA __**Ho**___ Ee __**He**__ Ii __**He**___ Mm __**He**___
Bb __**He**___ ff __**Ho**___ Jj __**He**___ nn ___**Ho**___

18. For each of the **genotypes** below determine what **phenotypes** would be possible.

Purple flowers are dominant to white flowers.

PP ___*Purple*___ Pp ____*Purple*____ pp ___*White*____

19. For each **phenotype** below, list the **genotypes** (remember to use the letter of the dominant trait)

Brown eyes are dominant to blue: __*BB*__ brown, __*Bb*__ brown, __*bb*__ blue

20. A homozygous dominant round seeded plant is crossed with a homozygous recessive wrinkled seeded plant.

What are the genotypes of the parents? ____*RR*_____ x _____*rr*_____

What percentage of the offspring will also be homozygous? ____*0%*_____

21. A cross between a purebred variety with red flowers (RR) and a purebred variety with white flowers (rr) results in a plant with pink flowers (Rr). Using a Punnett square, show the genotypes and phenotypes of the offspring.

	R	R
r	Rr	Rr
r	Rr	Rr

If 8 flowers are produced from crossing the hybrid offspring, predict how many will have the genotype:

	R	r
R	RR	Rr
r	Rr	rr

RR __*2*___ Rr ___*4*___ rr __*2*___ What type of dominance is shown here? *Incomplete*

22. Draw a Punnett square showing a cross between a father with genotype Ao and a mother with genotype AB.

	A	o
A	AA	Ao
B	AB	Bo

What percentage of the offspring will have blood Type A? __*50%*___

What percentage of the offspring will have blood Type B? __*25%*___

23. A white-eyed female fruit fly is crossed with a red-eyed male. Red eyes are dominant, and **X**-linked.

What type of inheritance is shown here? *Sex-linked Inheritance*

24. Draw a Punnett Square to show the cross of the two fruit flies.

	X^R	Y
X^r	X^RX^r	X^rY
X^r	X^RX^r	X^rY

What are the expected phenotypes of the offspring?

50% Red eyed females

50% white eyed males

25. Describe a genetic technology and list the benefits and ethical considerations associated with this technology.

ex. gene therapy, reproductive technologies, returning extinct species, GMOs, stem cell treatment, forensics etc

26. Define Genetic Drift and give an example.

the change in the frequency of alleles in a population because of the random nature of reproduction or because of the response to random events.

27. Define Natural Selection and give an example.

The process whereby organisms better adapted to their environment tend to survive and produce more offspring.

28. Define artificial selection and give an example.

The intentional reproduction of individuals in a population that have desirable traits.

25. What is an invasive species? Give several examples.

a plant, fungus, or animal species that is not native to a specific location (an introduced species)

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