

Name Key Date \_\_\_\_\_ Period \_\_\_\_\_

### Biology Final Exam REVIEW June 2014

1. What are the concepts included in Darwin's theory of natural selection?  
over production, competition, variation, survival of fittest
2. A study of the position and shape of the bones in the forelimbs of a flying squirrel, a bat, and a beaver showed that the beaver and the flying squirrel appear to be most closely related. This determination was most likely based on a study in the field of comparative anatomy.
3. A man lifts weights and develops large arm muscles. His son has larger muscles than his father had at the same age. According to Lamarck's theory, this situation is due to inheritance of acquired char.
4. Identify different examples of natural selection.
5. What factors (requirements) cause a single species to evolve in to two different species?  
isolation of species (geographic, reproductive, etc.)
6. According to the theory of natural selection, a species that lacks the variations necessary to adapt to a changing environment will most likely become extinct.
7. How do scientists determine the ages of fossils?  
Radioactivity
8. What do similarities in nitrogen base sequences in DNA reveal about organisms?  
more similarities, the more closely related.
9. In a certain area of undisturbed layers of rock, fossils of horseshoe crabs may be found in the upper layer, and a lower layer contains fossils of trilobites. Trilobites are extinct aquatic arthropods resembling modern horseshoe crabs. This information suggests that horseshoe crabs may have evolved from trilobites.
10. Spraying DDT to kill mosquitoes became less effective each year the pesticide was used. Explain this in terms of Natural Selection.  
DDT-resistant mosquitoes passed on this trait to offspring.
11. Compare the benefits of asexual and sexual reproduction. (list the pros and cons)  
Sexual → ↑ variation      asexual → more offspring
12. What is the difference between an experimental group and a control group?  
experimental group contains the variable.
13. A scientist designed an experiment to test the effect of temperature on bacterial growth. He grew three different cultures of the bacterium *E. coli* under three heat lamps at different temperatures. What was the independent variable in this experiment?  
temperature

15. A cell that has 0.9% NaCl is placed in a beaker filled with a solution of 5% NaCl. ~~Which of the following will happen?~~ What will happen?

cell will lose  $H_2O$  and shrink. (solution is hypertonic)

15. Compare eukaryotic cells to prokaryotic cells.

eukaryotic cells have nuclei & organelles.

16. What structure could a cellular organism use to move through its environment?

flagellum

17. Where can you find ribosomes in a cell?

free in cytoplasm and on Endoplasmic Reticulum.

18. What part of a eukaryotic cell that allows it to remain separate from the outside environment?

cell membrane

19. What are the levels of organization in living things, starting with cells?

cells, tissue, organ, system

20. The plasma membrane of a cell is selectively permeable. What does that mean?

allows only some things to pass

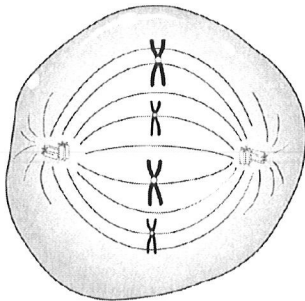
21. What are the stages of the cell cycle?

G<sub>1</sub>, S, G<sub>2</sub>, M

Interphase = G<sub>1</sub>, S, G<sub>2</sub>

M = mitosis

- 22.



What phase of mitosis is represented by the diagram shown above?

Metaphase

23. What is the order of events that occur in Cellular Respiration?

Glycolysis, Krebs cycle, Electron Transport

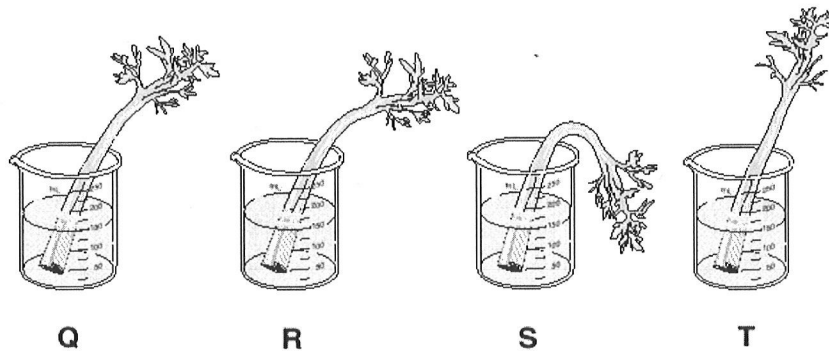
24. When during the cell cycle are chromosomes visible?

during cell division

25. Compare aerobic and anaerobic respiration. Which one has a greater energy yield?

aerobic yields more energy than anaerobic.  
(36 ATP) (2 ATP)

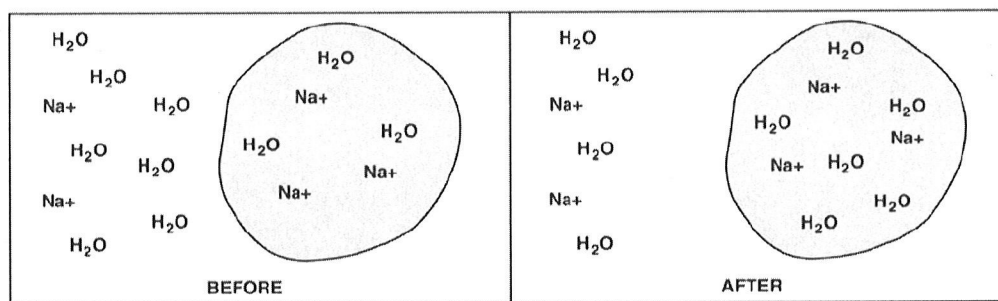
26.



Turgor is the internal cytoplasmic pressure that results from the amount of water absorbed by plant cells. The picture shows a turgor pressure demonstration using stalks of celery in different salt solutions. Which of these shows the celery stalks in order from the one with the most turgor pressure to the one with the least turgor pressure?

T, Q, R, S

27.



The diagram is showing the process of

OSMOSIS

28. What makes up a nucleotide found in DNA?

Deoxyribose, phosphate, nitrogen base (A, T, C, G)

29. Which RNA is involved in transcription?

mRNA

30. If given the % of a nitrogen base in DNA, calculate the % of the rest of the bases using Chargaff's Rule.

use Rule  $\%A = \%T$  All must add to 100%  
 $\%C = \%G$

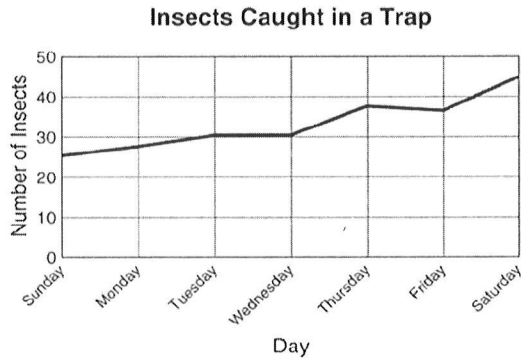
29. What is a sex-linked trait? What are specific characteristics of sex-linked traits?

carried on X-chromosome  
 \* Unique pattern Mothers pass trait to sons.

31. Why is there competition between organisms in an ecosystem?

there are limited resources

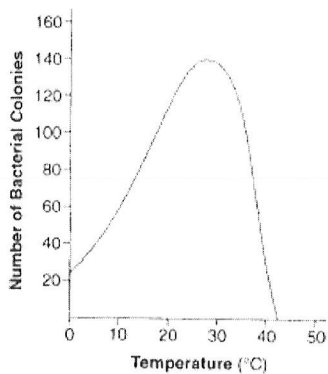
32.



Insects are gathered in a field trip. The number of insects was recorded for a week on the graph above. What pattern do you see in the graph?

# of insects collected is increasing

33. The graph below shows the results of an investigation in which an unknown species of bacteria was cultured for 24 hours. With the exception of temperature, all conditions influencing the growth of this bacterium remained constant.



What is the **experimental variable** in this investigation?

temperature

30. What are the different genotypes of the A, B O blood types? Which blood type allele is dominant? Recessive?

A =  $I^A I^A$ ,  $I^A i$   
B =  $I^B I^B$ ,  $I^B i$

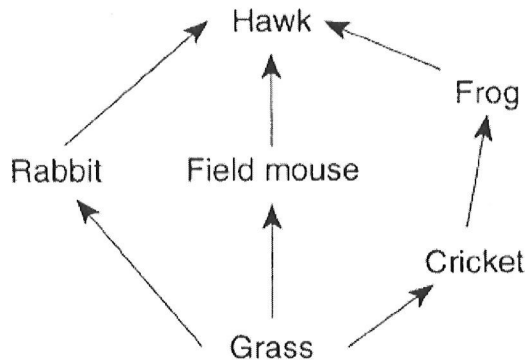
O =  $ii$   
AB =  $I^A I^B$

A = dominant  
B = dominant  
O = recessive

35. What is the energy-transferring molecule used by cells?

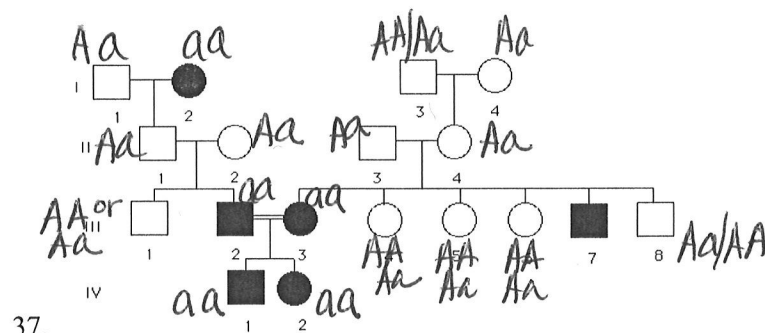
ATP

36. A food web is shown in the diagram below



- grass will increase  
- hawks may decrease

What would be a direct result of a decrease in the rabbit population due to disease?



- 37.

What are the genotypes of the people in the pedigree? The trait is recessive.

39.  $F$  represents the gene for brown coat color and  $f$  represents the gene for white coat color. In the cross between  $FF \times ff$ , all the offspring have a brown coat. Which genetic principle is illustrated by this cross?

principle of dominance

40. **Sperm** cells of the Russian dwarf hamster, *Phodopus sungorus*, contain **14 chromosomes**. What is the total number of chromosomes that would be contained in a normal, newly formed **zygote** of this species?

28

41. Meiosis results in greater genetic variation than asexual reproduction. Why?

recombination of genetic material occurs during crossing over in metaphase I.

42. If a corn plant has a genotype of  $Tt yy$ , what are the possible genetic combinations that could be present in a single grain of pollen (sperm) from this plant?

$Ty, ty$

43. In fruit flies, the gene for red eye color ( $R$ ) is dominant to the gene for white eye color ( $r$ ). The trait is sex-linked. What would be the genotype of a white-eyed female?

$X^r X^r$

44.  $TT \times tt$

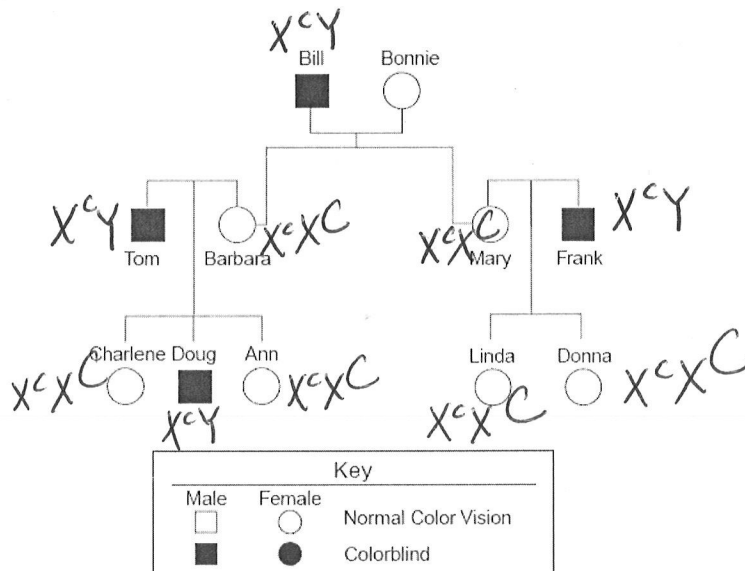
In pea plants, the trait for tall ( $T$ ) is dominant over the trait for being short ( $t$ ). What is the expected phenotypic outcome of the  $F_1$  generations in the cross shown above?

all tall (100%)

45. A dominant gene that codes for white hair is represented by the symbol  $W$ . If a parent with the genotype  $WW$  is crossed with a parent of genotype  $Ww$ , what percent of their offspring will have white hair?

100%

- 46.



Colorblindness is a sex-linked trait. Fill in the genotypes of the individuals in the pedigree.

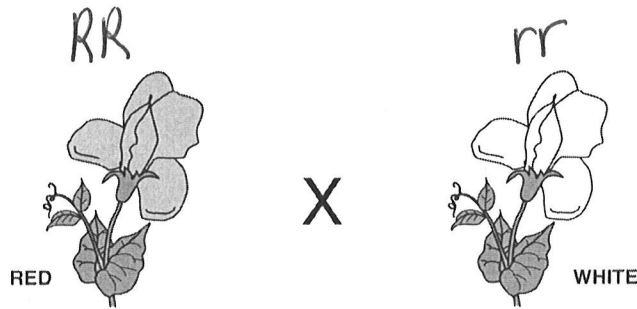
47. In guinea pigs, the trait for ruffled fur is dominant over the trait for smooth fur. If a heterozygous male is crossed with a homozygous recessive female, what percent of the offspring would be expected to have ruffled fur?

$Rr \times rr$

	R	r
r	Rr	rr
r	Rr	rr

50%

48.



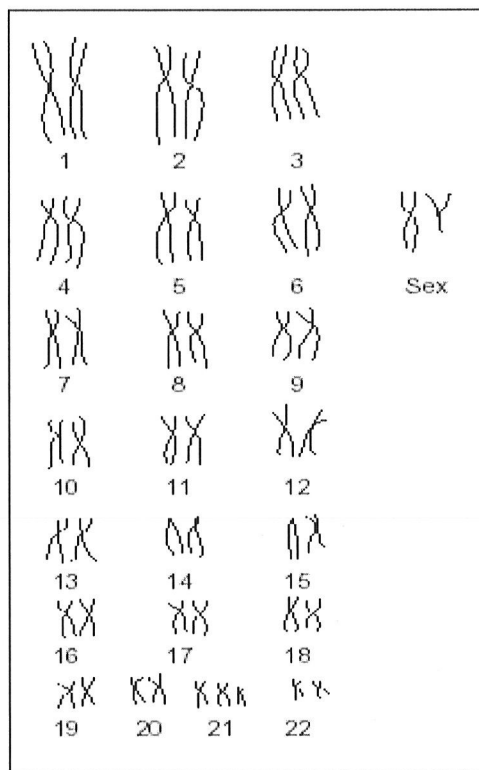
The trait for flower color in the plants above is controlled by incomplete dominance. What percentage of the offspring will have pink flowers?

100% Pink

49. What is a karyotype used for?

study the # of chromosomes

50.



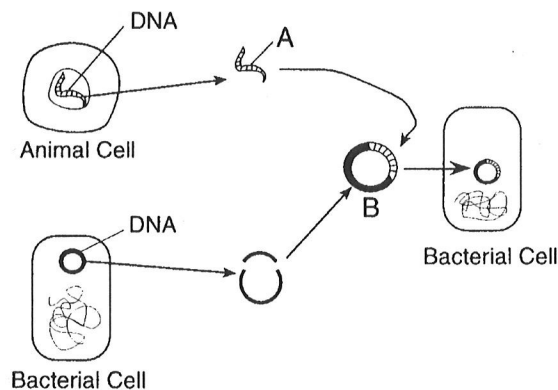
Why is this human karyotype is unusual?

#21 has an extra (3 chrom.)

51. Genetic engineering has produced goats whose milk contains proteins that can be used as medicines. Explain how this was done.

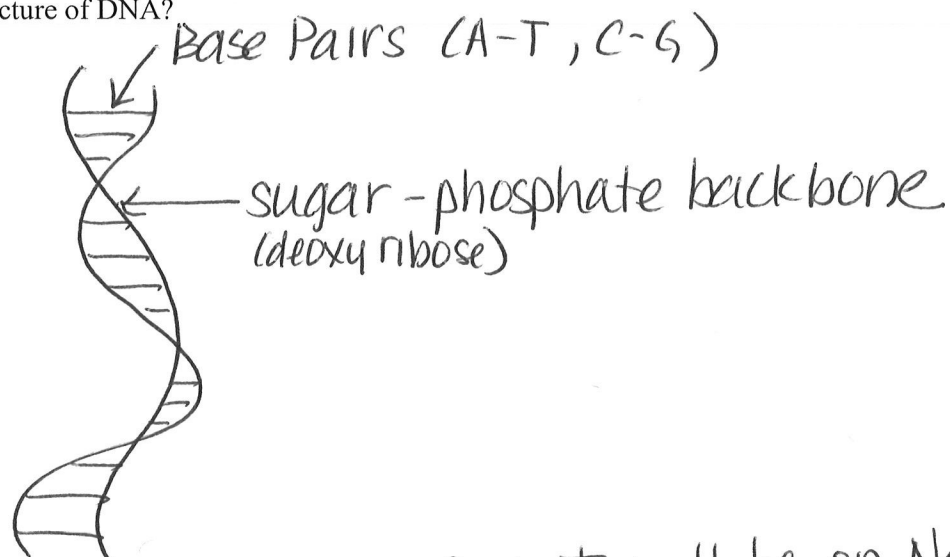
Inserting the genes into fertilized goat eggs.  
The offspring will be able to produce the medicinal milk.

52.



The technique illustrated in the diagram is known as genetic engineering.

53. What is the structure of DNA?



\* Part II will be on Natural Selection & types of selection.