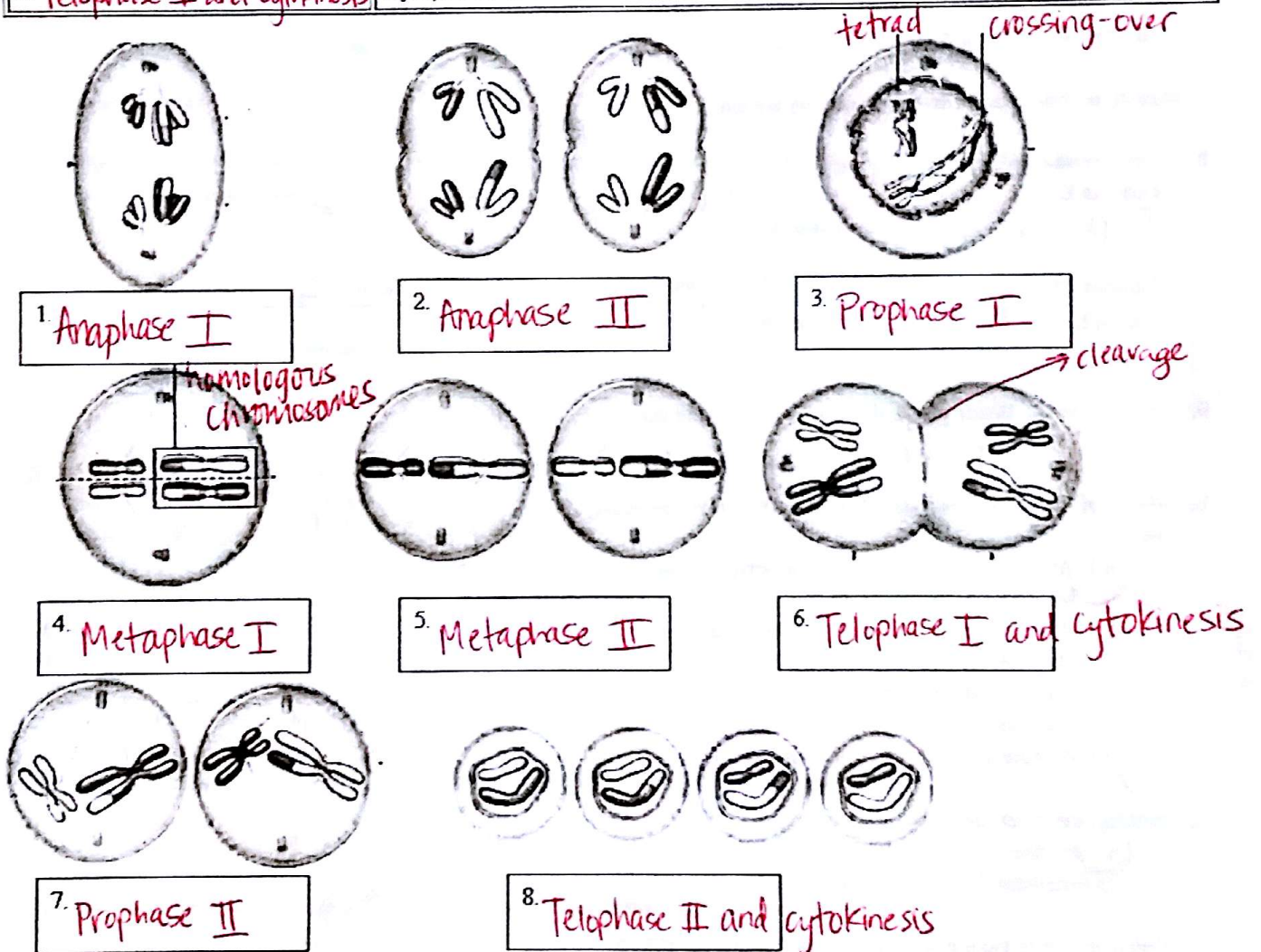


KEY

Name: _____

Phases of Meiosis

Name of Phase	Description
1. Prophase I	Homologous chromosomes pair up and form tetrad
2. Anaphase I	Spindle fibers move homologous chromosomes to opposite sides
3. Telophase II & Cytokinesis	Nuclear membrane reforms, cytoplasm divides, 4 daughter cells formed
4. Metaphase II	Chromosomes line up along equator, not in homologous pairs
5. Prophase II	Crossing-over occurs
6. Anaphase II	Chromatids separate
7. Metaphase I	Homologs line up along equator
8. Telophase I and Cytokinesis	Cytoplasm divides, 2 daughter cells are formed



CP Unit 6 Review: Meiosis

Page _____

1. What type of cell undergoes meiosis? Gamete cells or Somatic cells

2. What are homologous chromosomes?
pairs of chromosomes, 1 from mom and 1 from dad.

3. For each of the following state if the cell is haploid or diploid.
 Sperm cell = Haploid Liver cell = Diploid Egg cell = haploid Stomach cell = Diploid

4. If the diploid number in a liver cell is 52, how many chromosomes are there in the egg of this organism?
26

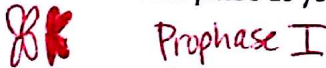
5. During meiosis, the chromosome number:
 a) is doubled b) is reduced c) remains the same d) becomes diploid

6. Cells starting mitosis & meiosis begin with a (haploid or diploid) set of chromosomes.

7. How many times do cells divide during meiosis? 2

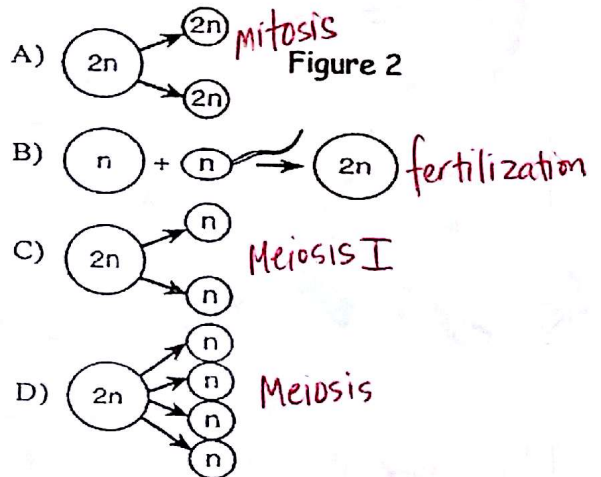
8. What are the stages of meiosis called?
 Meiosis I: Prophase I, Metaphase I, Anaphase I, Telophase I / cytokinesis
 Meiosis II: Prophase II, Metaphase II, Anaphase II, Telophase II / cytokinesis

9. Draw a tetrad: What phase do you first see this in?



10. Which of the following best describe the term "crossing over"?

- a) An exchange of information between two homologous chromosomes
- b) A molecular interaction between two sister chromatids
- c) A molecular interaction between two non-sister chromatids
- d) A separation of two sister chromatids



11. Crossing-over can be found in the stage of

- a) Prophase I b) Prophase II
- c) Anaphase I d) Anaphase II

12. Which letter in figure #2 represents meiosis? Why?

D - You start w/ one 2N cell and end w/ 4 haploid cells

13. Which letter in figure #2 represents mitosis? Why? A - Start w/ $2N$ cell and make 2 diploid daughter cells

14. Is DNA copied before Meiosis II? No

15. How many cells form at the end of Meiosis II and how many chromosomes do they contain?

4 N

16. A sperm cell is a (gamete, zygote), and is (haploid, diploid).

17. When a sperm cell and an ovum/egg merge, they undergo the process of fertilization, and give rise to a (gamete, zygote), which is (haploid, diploid).

18. What is the ultimate goal/purpose of mitosis? What term do we use to describe the new cells?
~~to replace~~ to produce identical body cells \hookrightarrow daughter cells

19. Be able to identify pictures of Meiosis I and Meiosis 2.

20. Describe cancer. abnormal cell growth

21. What is the difference between chromosomes, chromatids, and homologous chromosomes? You may draw a picture as your answer.

homologous = pairs of chromosome, 1 from mom, 1 from dad
chromatids = $\frac{1}{2}$ of chromosome

22. How are DNA and chromosomes related?

chromosomes are made of DNA

23. What is the difference between a haploid, diploid, and zygote?

Haploid: N , $\frac{1}{2}$ set

Diploid: $2N$, Full

Zygote: fertilized egg ($2N$)

24. How does Meiosis differ from Mitosis?

Meiosis produces gametes - 4 different N cells

Mitosis produces 2 identical daughter cells ($2N$)

25. What does Meiosis create? Haploids or Diploid? Somatic cells or gametes?

Meiosis creates haploid cells, gametes.

26. What is a gamete? How do we represent the chromosome number: $2n$ or n ?

gamete = sex cell, N

27. What is crossing over? When does it happen? Draw a picture.

crossing-over = occurs in prophase 2 I
portion of chromatids on homologous chromosomes switch ~~place~~ places

Darwin and His Theory of Evolution

Circle the correct answer.

1. The variety of living things is called biological / anatomical / physical diversity.
2. During his travels, Darwin made numerous observations and collected multiple rocks / specimens / shells that led him to propose a hypothesis.
3. The Galapagos Islands are located to the west of North America / South America / Africa.
4. The preserved remains of ancient organisms are descendants / homologs / fossils.
5. Darwin noted that many of the birds on the islands had differently shaped feathers / beaks / feet.
6. Darwin wondered if the animals living on the islands were once members of the same species / fossil / specimens.
7. Most people in Darwin's day believed the earth was only a few million / thousand / hundred years old.
8. Most Europeans believed that neither the planet nor its living species had stayed the same / changed over time.
9. Based on Hutton and Lyell's work, the earth's age is thought to be millions / thousands / hundreds of years old.
10. Darwin thought that if the earth could change over time, then why not fossils / living things / extinctions.
11. Lamarck's hypothesis was proven to be correct / incorrect.
12. The birds Darwin found turned out to be all finches / robins / water birds.
13. Alfred R. Wallace / James Hutton / Thomas Malthus gave Darwin an incentive to publish.
14. The title of Darwin's book is Evolution Theory / On the Origin of Species / Natural Selection.
15. The process by which humans decide which organisms reproduce is called natural / artificial / heritable selection.
16. Individuals that are not well suited to their environment, reproduce / survive / die.
17. Over time, natural selection results in changes in / speciation of the inherited characteristics of a population, which increase a species' variation / extinction / fitness in its environment..
18. If we look far enough back in history, we could find the common ancestor of all living things. This is known as the principle of speciation / extinction / common descent.
19. Darwin argued that living things have been staying the same / changing on Earth for millions of years.
20. Evidence for this process could be found in the fossil / species record, the geographic distribution of living species, body structures of living organisms, and similarities in early development, or geology / biology / embryology.
21. Darwin saw whales / fossils / finches as a record of the history of life on Earth.
21. Researchers have discovered many hundreds of transitional fossils that document various intermediate stages in the evolution of modern species from organisms that are now extinct / alive / decaying.
22. Structures that have different mature forms but develop from the same embryonic tissue are called homologous / vestigial / Malthusian structures.
23. Individual organisms differ, some of this variation / speciation / fitness is heritable.
24. Organisms produce more offspring than can breathe / survive / die.
25. Because more organisms are produced than can survive, they compete for / gather / destroy

Adapted from http://www.biologycorner.com/worksheets/dragonfly/15-1_puzzle.html and http://www.biologycorner.com/worksheets/dragonfly/15-3_darwin.html

limited resources.

26. Each unique organism has different advantages and disadvantages. Individuals best suited for their environment survive and reproduce / die / move.

27. Species alive today are common / varied / descended with modification from ancestral species.

Short Answer

28. What is evolution? change over time

29. Lamarck was the first to recognize what? traits could be passed to offspring

30. Describe Lamarck's hypothesis: traits acquired during a lifetime could be passed on & those traits were evolving towards perfection

31. According to Lamarck's hypothesis, what would happen to a bird that did not use its wings? It would lose them.

32. Why did Darwin not publish right away? went against common/traditional beliefs.

33. What does the "struggle for existence" mean? competition for limited resources.

34. What is an adaptation? any inherited trait that ↑ fitness

35. Describe vestigial organs. remnants of once useful organs.

36. Give an example of a vestigial organ: appendix

Matching

37. Estimates Earth to be millions of years old. B

38. Set sail on the H.M.S. Beagle C

39. Proposed the idea of inheritance by acquired traits. D

40. Predicted that humans would outgrow their space and food. A

A. Thomas Malthus

B. James Hutton

C. Charles Darwin

D. ~~Charles Lyell~~ - Lamarck

Multiple Choice

41. The ability of an organism to survive and reproduce in its natural environment is called:

A. natural selection

B. evolution

C. homologous

D. fitness

42. Which of the following is an important concept in Darwin's theory of evolution by natural selection?

A. Struggle for Existence

B. Species change over time

C. Descent with modification

D. both A and B

E. all of the above

43. Which would an animal breeder use to produce cows that give more milk?

A. overproduction

B. genetic isolation

C. acquired characteristics

D. artificial selection

44. Fitness is a result of:

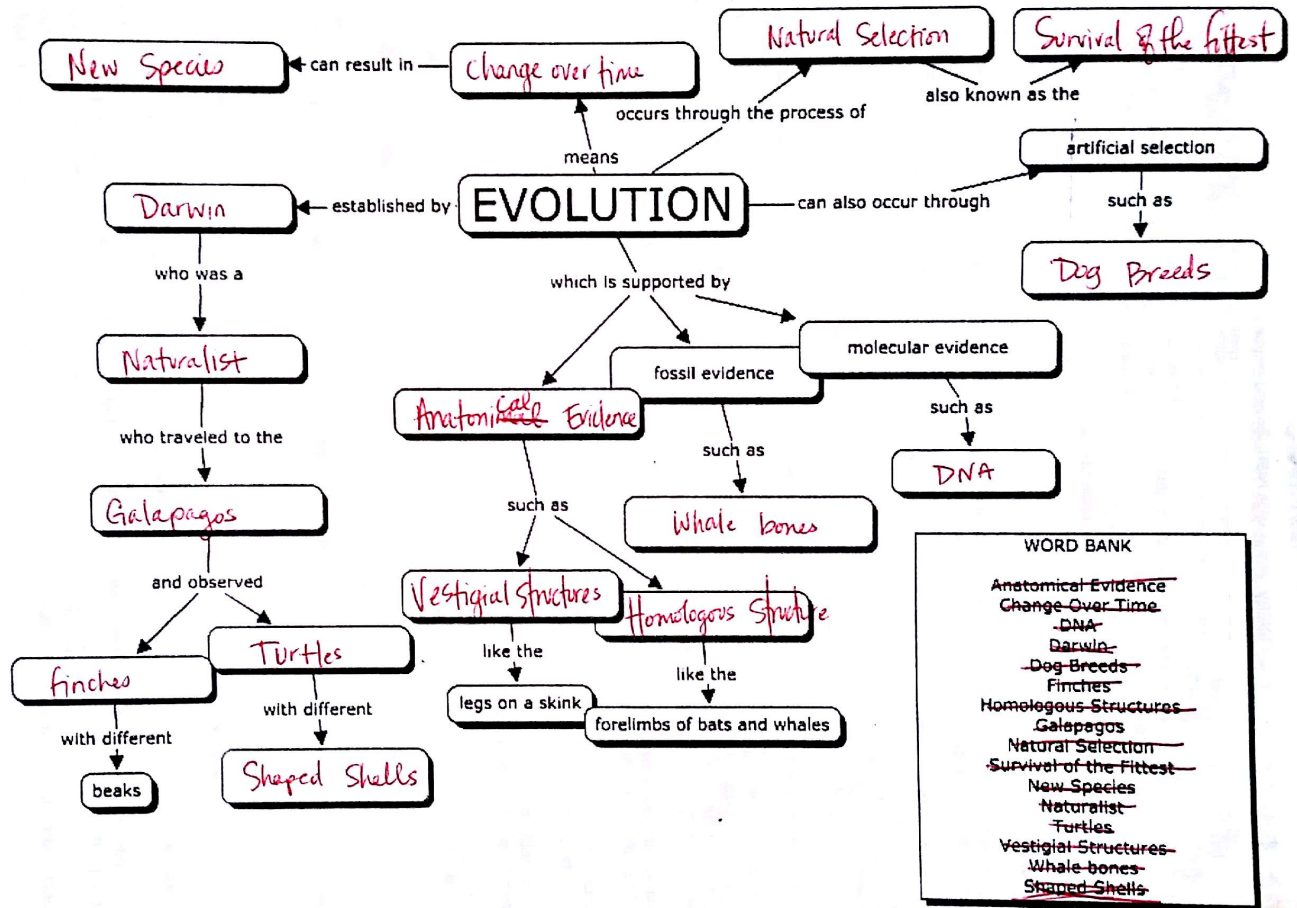
A. adaptations

B. common descent

C. homologies

D. natural selection

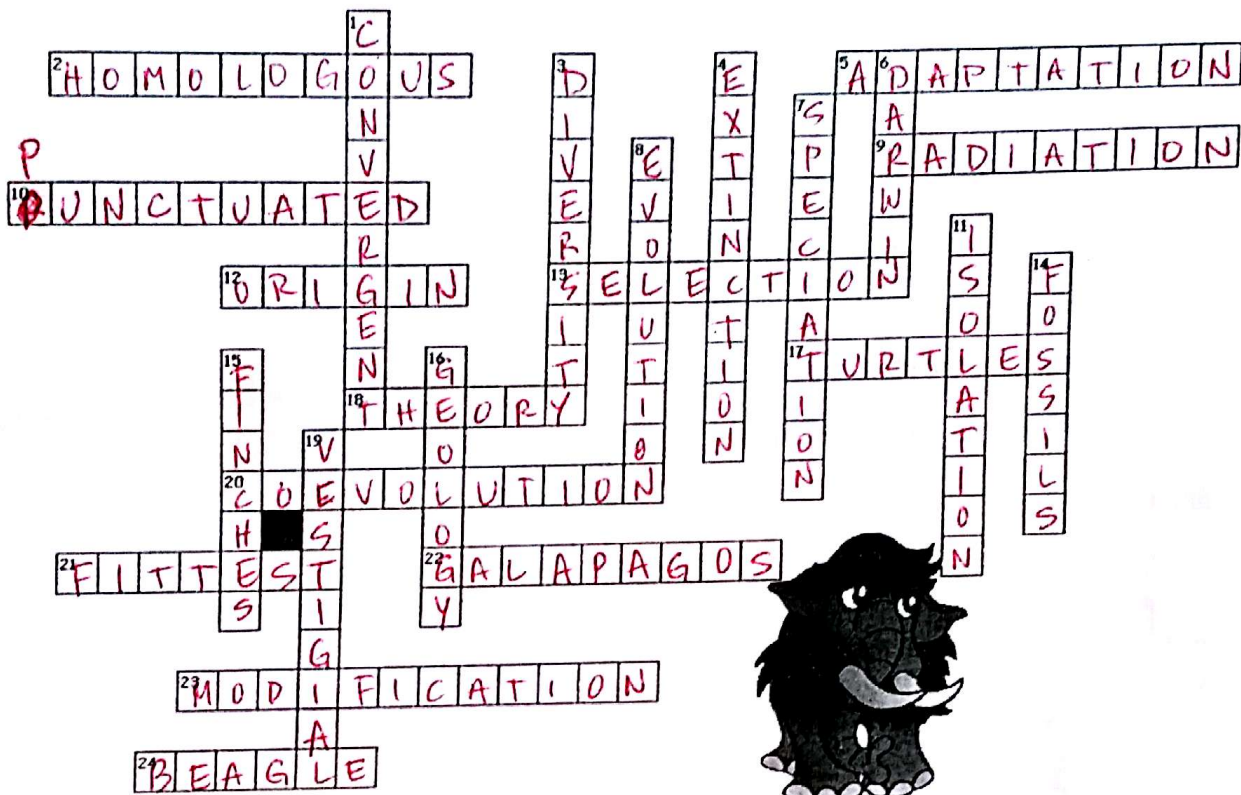
Adapted from http://www.biologycorner.com/worksheets/dragonfly/15-1_puzzle.html and http://www.biologycorner.com/worksheets/dragonfly/15-3_darwin.html



- WORD BANK
- ~~Anatomical Evidence~~
 - ~~Change Over Time~~
 - ~~DNA~~
 - ~~Darwin~~
 - ~~Dog Breeds~~
 - ~~Finches~~
 - ~~Homologous Structures~~
 - ~~Galapagos~~
 - ~~Natural Selection~~
 - ~~Survival of the Fittest~~
 - ~~New Species~~
 - ~~Naturalist~~
 - ~~Turtles~~
 - ~~Vestigial Structures~~
 - ~~Whale bones~~
 - ~~Shaped Shells~~

Name: _____

Evolution Crossword



Across

2. structures that are similar
 5. a characteristic that helps an organism survive
 9. when one species evolves into many; adaptive _____
 10. pattern of evolution where a species is stable for a long time then rapidly changes; _____ equilibrium
 12. the name of Darwin's book; the _____ of species
 13. process by which evolution occurs; natural _____
 17. had different shaped shells depending on the island they were from
 18. well-supported testable explanation
 20. when two species evolve together
 21. natural selection is also known as the survival of the _____
 22. islands that Darwin visited
 23. principle that states that living species are descended from ancient ones; descent with _____
 24. the name of the ship that Darwin traveled on

Down

1. when two unrelated organisms look alike (sharks & dolphins)
 3. refers to the variety of living things
 4. when organisms disappear from the earth
 6. proposed the theory of evolution by natural selection
 7. formation of new species
 8. change over time
 11. required for new species to form
 14. preserved remains of ancient organisms
 15. had different shaped beaks depending on the island they were from
 16. the study of the earth
 19. structures that have no current function

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http://www.biologycorner.com/worksheets/evolution_crossword.html

Week 11 List of Prefixes, Suffixes and Roots

Suffix, Root, Prefix	Definition	Example
Agri-	Field, soil	Agriculture
-ary, -arium	Denotes a place for something	Aviary, aquarium
Aster-, astr-	Star	Astrology, astronomy
Audi-	Hear	Auditory nerve
Glut-	Buttock	Gluteus Maximus
Hapl-	Simple	haploid
Sangui-, sanguine-	Of or pertaining to blood	Sanguine
Sarco-	Muscular, fleshlike	Sarcoma, sarcoidosis
Scoli(o)-	Twisted	Scoliosis
-spadias	Slit, fissure	Hypospadias
-stasis	Stopping, standing	Cytostasis, homeostasis
Tetan-	Rigid, tense	Tetanus
Therm(o)-	Heat	Thermophile
Tympan(o)-	Eardrum	Tympanocentesis
Ungui-	Of or pertaining to the nail, a claw	Unguiform, ungula
Vagin-	Of or pertaining to the vagina	Vagina
Ventr(o)-	Of or pertaining to the belly, the stomach cavities	Ventrodorsal
-y	Condition or process of	Surgery
Zym(o)-	Fermentation	Enzyme, lysozyme