

MEIOSIS WEBQUEST

Name: _____ Per. _____

Objective: Discover how the process of meiosis produces four genetically unique haploid daughter cells. Before beginning, use the Learning Scale below to rate your knowledge. Place a check in the before box.

Before Lesson	Learning Scale	After Lesson
	4 I can conduct a discussion describing how the process of meiosis, including independent assortment and crossing over, results in the formation of genetically unique haploid gamete cells.	
	3 I can describe how the process of meiosis, including independent assortment and crossing over, results in the formation of genetically unique haploid gamete cells.	
	2 I can define the process of meiosis, independent assortment, and crossing over, and identify the phases of meiosis. I can explain how these processes result in the genetically unique haploid gamete cells.	
	1 With help, I can define the process of meiosis, independent assortment, and crossing over, and identify the phases of meiosis. I can somewhat explain how these processes result in the genetically unique haploid gamete cells.	
	0 I cannot describe how the process of meiosis, including independent assortment and crossing over, results in the formation of genetically unique haploid gamete cells.	

Task 1: Introduction to Meiosis

Use the link below to watch the “Meiosis” video by the Amoeba Sisters. As you watch, answer the following questions. Full URL: <https://www.youtube.com/watch?v=VzDMG7ke6gg> TinyURL: <https://tinyurl.com/ybm853wu>

1. What does the process of meiosis contribute to? _____
2. What type of cells does meiosis produce? _____
3. How many chromosomes does a human sperm cell or egg cell contain? _____
4. Describe why meiosis is a “reduction division”. _____

5. Which phase must take place before meiosis starts? _____
6. How many times is “PMAT” carried out in meiosis? _____
7. Describe what happens during prophase. _____

8. What happens during crossing over? _____

9. Where are the chromosomes during metaphase I? _____
10. What happens during anaphase I? _____
11. How many cells exist after Meiosis I? _____
12. What is pulled away by the spindle fibers during anaphase II? _____
13. What happens during telophase II? _____
14. Why do siblings from the same parents look different from each other? _____

15. What does nondisjunction lead to? _____



Task 2: Chromosomes and Meiosis Interactive Game

Use the link below to complete the Snurfle Meiosis and Genetics Game. Read the introduction to the game by clicking through the first three screens until you come to the main menu. Click on the “Chromosome Quandary!” tab. Answer the questions or fill in the blanks as you move through this activity. Tiny URL: <http://tinyurl.com/j86x2xo>
Full URL: <https://www.biomanbio.com/HTML5GamesandLabs/Genegames/snurflemeiosishtml5page.html>

Chromosome Quandary!

16. Chromosomes are made of _____. DNA is the molecule that has _____ that determine all of your traits.

17. DNA is a _____ molecule. In order to _____ it around the cell during meiosis, the DNA is _____ up and packaged to make _____.

18. The picture on the right is one _____ that consist of two _____ sister _____. Draw and label each type of chromosome in the boxes below. Label each chromosome and any sister chromatids.

Chromosome (On Left)	Chromosome (On Right)

19. When you split the chromosome, each _____ is now called a _____.

20. Each cell at the end of meiosis has _____ the number of chromosomes as the cell at the start of meiosis.

Meiosis Interactive!

Return to the Main Menu. Click on the “Meiosis Interactive!” tab. Fill in the blanks and answer the questions below as you move through this section of the game.



Interphase

21. Before Meiosis, comes _____. During interphase, the cell does _____ cell activities, like making _____ for example.

22. Uncoiled stringy DNA is called _____.

23. You get _____ of your DNA from your mother, and _____ of your DNA from your father.

24. Chromatin DNA has _____ that determine the _____ of an organism. The “G” and “g” represent two different forms or _____ of the gene for _____ color. “G” is the allele for _____ fur. ‘g’ is the allele for _____ fur.

25. Before meiosis can occur, the DNA must _____.

26. The purpose of meiosis is to make _____, sperm in _____ and eggs in _____.

27. The two divisions of meiosis are named _____ and _____.

28. The phases for Meiosis I are: _____.

29. The phases for Meiosis II are: _____.

Prophase I

30. One important event of Prophase I is that the chromosomes _____ and become _____. This means that the _____ gets packaged up so it is _____ to move around.

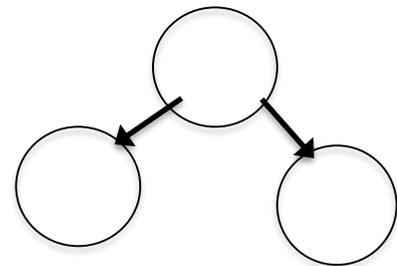
31. After prophase I you have _____ chromosomes. These chromosomes are called _____ because they are the same _____ and have the same _____.

32. Each chromosome has 2 _____. Each half of a chromosome is called a _____. The sister chromatids of a chromosome are _____.
33. The nucleus disintegrates during _____. Homologous chromosomes _____ up during prophase I. A pair of homologous chromosomes is called a _____.
34. What THREE important events take place during Prophase I? _____

35. A process called crossing over occurs during _____. During _____, homologous chromosomes exchange _____ information.
36. Metaphase I - During Metaphase I, _____ line up down the _____ of the cell.
37. Anaphase I - During Anaphase I, homologous chromosomes _____ and move toward _____ ends of the cells.
38. Telophase I - During Telophase I, chromosomes reach the _____. This is the phase where _____ independent cells form. In Snurfles, each newly forming cell makes a _____.
39. Cytokinesis - During cytokinesis _____ new cells are formed. Each cell is said to be _____ because it has _____ of the _____ that the original cell that started meiosis.

Meiosis I Summary

40. At the start of meiosis I, you had 1 _____ cell.
 At the end meiosis I, you have 2 _____ cells.
 Fill in the circles by drawing what you see on your computer screen.



41. Meiosis II Intro. - Meiosis II happens because each of our new cells has too much _____
42. Prophase II - Chromosomes do _____ line up in Prophase II. The nucleus goes _____, just like in _____
43. Metaphase II - In Metaphase II, the chromosomes line up in _____ down the _____ of the cell. They do _____ pair up.
44. Anaphase II - In Anaphase II, _____ split _____
45. Telophase II - In Telophase II, 4 haploid _____ are being formed. They are called _____. Each newly forming cell makes a nucleus. Chromatins uncoil to make _____ again.
46. What are the final results after Telophase II and Cytokinesis are finished? _____
47. Female gametes are called eggs, or _____. Practice undergoing meiosis for the male Snurfle. What are male gametes called? _____

Task 3: Crossing Over & Independent Assortment Interactive Game

Use the link below to complete the Snurfle Meiosis and Genetics 2 Game. Read the introduction to the game by clicking through the first two screens until you come to the main menu. Click on the "Crossing Over" tab. Answer the questions or fill in the blanks as you move through this activity. TinyURL: <http://tinyurl.com/zkc9hno>
 Full URL: <https://www.biomanbio.com/HTML5GamesandLabs/Genegames/snurflemeiosis2diversityhtml5page.html>

Crossing Over! (Use new link on previous page of this document)

48. At the start of meiosis you have _____ cell. At the end of Meiosis I, you have _____
_____. At the end of Meiosis II, you have _____.

49. If there is no crossing over, the gametes are _____ identical. What is true about such a
cell that does not cross over during meiosis? _____

50. Remember, the letters shown represent _____ for _____. G and g
represent two different alleles for _____. B and b represent two different alleles for
the _____ trait.



G = _____ B = _____
g = _____ b = _____

51. Since the fur color and butterfly wing _____ are the same _____
and are inherited together, we say the genes are _____.

52. Crossing over occurs during _____.
Homologous chromosomes trade _____ information.

53. What trades genetic information during crossing over? _____
More _____ results because there is more _____ in the possible _____
_____ due to _____.

54. Crossing over is sometimes called _____ because linked genes get _____
This forms _____ chromosomes. Gametes with recombinant chromosomes are
called recombinant _____.

55. Recombination allows for more potential _____ of offspring.

56. Crossing over is a _____ event. It can occur in many different _____ along
a chromosome. Since each chromosome has _____ genes, this means that there can be a lot of
different _____ that are possible.

Independent assortment

Return to the Main Menu. Click on the "Independent Assortment" tab. Fill in the blanks and answer the questions
below as you move through this section of the game.

57. Independent assortment also produces _____ of gametes during meiosis. Independent
assortment refers to how the chromosomes _____ during Metaphase _____ and Metaphase _____.

58. The homologous chromosomes are the _____ size and have the same _____.

58. During Metaphase I of Meiosis I, these homologous pairs of chromosomes can line up in several _____
_____ ways. This is known as _____.

60. The way that one pair of chromosomes line up does not affect the way that any other pair _____
_____. Each pair lines up _____, hence the name independent assortment.

61. List the three ways that independent assortment during metaphase I helps to produce diverse gametes.

1. _____
2. _____
3. _____

62. Independent assortment can also happen in cells during meiosis II, specifically during _____

63. Independent assortment during metaphase II, the _____ of each chromosome independently assort. The _____ of sister chromatids for one chromosome does _____ affect the alignment of sister chromatids of other chromosomes.
64. How does independent assortment during metaphase II help to produce diverse gametes? _____
65. Independent assortment produces many _____ possible genetic _____ in the gametes produced by an individual. This genetic _____ in _____ produces genetic _____ in the _____.
66. When combined, independent assortment and crossing over produce a huge amount of _____ in gametes.

Task 4: Let's Help You Out! Chromosome Number Demystified

Use the link below to watch the "Chromosome Numbers During Division Demystified" by the Amoeba Sisters. As you watch, complete the following table to summarize meiosis with mitosis. Write at least 5 details or notes during the video in each column as you watch the video. Tiny URL: <http://tinyurl.com/j7vtkzy>
 Full URL: <https://www.youtube.com/watch?v=gcz1FOWwoCg>

Meiosis	Other Details from Video	Mitosis

