Genetic Change Notesheet C. Kohn, Waterford WI

Name: Hour Date:

Date Assignment is due: Why late? Score: + ✓ -
 Day of Week Date If your project was late, describe why**Directions**: Use the accompanying PowerPoint (*available online*) to complete this sheet. This sheet will be due upon the completion of the PowerPoint in class. These assignments are graded on a +/✓/- scale.

1. How is artificial selection different from domestication?
2. What are the five causes of genetic change? ,

 , ,
3. What is the main goal of domestication?
4. Summarize how each of the following affect the rate and precision of genetic change that occurs:

Selection Accuracy:

Selection Intensity:

Genetic Variation:

Genetic Interval:
5. Between the 1960s and 2000s, the amount of milk produced per cow in America has increased by lbs.

while the from US dairy cattle have shrunk by % since 1944.
6. What are four ways that US farmers have enabled the quick rate of change and improvement in dairy cattle?
7. What is the difference between artificial insemination and natural insemination?
8. What are three major advantages of artificial insemination?
9. How do breed associations and dairy herd improvement associations enable farmers to increase the rate of genetic change?
10. What is a sire summary?
11. What is a PTA?
12. If a bull has a PTA value of +2000 lbs. for milk production, what does this mean?
13. What are four examples of traits that can be reported as a PTA?
14. Use the clip from the sire summary shown right to answer the questions below.

	1. If the average milk production for cows is 20,000 lbs. per year, how much milk on average could we expect per year from the daughters of this bull? Show your work in the blank below.
	2. How many more pounds of **protein** will the daughters of this bull produce per year on average?
	3. How many more pounds of **fat** will the daughters of this bull produce per year on average?
15. What is an STA?
16. How is a STA similar to a PTA and how is it different?
17. A STA ranks a bull using standard deviation. What is standard deviation?
18. What is the mean of the data?
19. What is a bell curve?
20. What are outliers?
21. The daughters of a bull produce an average of 25,000 lbs. of milk per year. Based on the graph on the right, what would be this bull’s STA score for milk production?
	1. -2 b. -1 c. 0 d. +1 e. +2
22. If the daughters of a bull produced 40,000 lbs. of milk on

average, this bull would be an \_\_\_\_ \_\_\_\_\_ for this trait.
23. If a bull’s offspring averaged 15,000 lbs. of milk production per year, what would be this bull’s STA?
24. If a bull’s offspring averaged 30,000 lbs. of milk production per year, what would be this bull’s STA?
25. How do STA values make it easier to assess the genetic value of a bull?
26. A bull that scores a +3 for a trait could be described as while a bull that scores a 0 is .
	1. One of the best for that trait / One of the worst for that trait.
	2. Average for that trait / One of the worst for that trait.
	3. One of the best for that trait / Average for that trait.
	4. One of the worst for that trait / Average for that trait.
27. In order to improve the genetic value of each generation of cows, a farmer has to
28. This requires the farmer to be skilled in their ability
29. What does it mean to genetically evaluate an animal?
30. One of the easiest methods of genetic evaluation is through .
31. What are three common records kept on dairy farms?
32. What is an SCC measurement and what does this indicate to a farmer?
33. What are five visual traits that indicate that a cow has good genetic value?
34. What is genetic correlation?
35. Genetic correlation is very similar to .
36. What is a positive correlation?
37. How is the ‘dip’ in the forehead of a cow a positive correlation to production of valuable milk?
38. What is a negative correlation?
39. How is a neck of a cow with loose skin a negative correlation to high production of milk?
40. How does the physical appearance of dairy cattle differ from beef cattle (see the image on slide 18)?
41. What is a linear evaluation?
42. What is the most important trait that is assessed in a linear evaluation?

What is the second most important trait that is assessed in a linear evaluation?
43. What is genomics?
44. What is a genome?
45. Genomic testing allows a farmer to

 by enabling them to

that codes for the that are responsible for
46. A cow on farm can have its sequenced for as little as $ an animal.
47. T or F: very few cows have had their DNA sequenced because this is very new technology. \_\_\_\_ Explain:
48. What is a SNP?
49. Usually a SNP is what?
50. Draw a SNP in the space below:
51. What kind of tissue is used for genomic sequencing?
52. Do farms usually have all of their animals sequenced?
53. How can genomics be useful for helping a farmer to make informed breeding decisions?
54. How can genomics be useful for helping a farmer to make informed management decisions?
55. The process of genomic evaluation of cattle is complicated by the fact that most traits in dairy cattle are polygenetic. What does polygenetic mean?
56. How does the fact that most traits are polygenetic affect genomic testing of cattle?
57. What is heritability?
58. How does heritability complicate the process of assessing the genetic value of an animal?

1. If a trait has high heritability, what does this mean?
2. On what scale is heritability measured? . A highly-heritable trait would have what score?

 A trait with low heritability would have what score?
3. If a farmer needs to improve a highly-heritable trait, they would be most likely to be successful if they
4. For traits with very low heritability (0.1 or less), a farmer is more likely to be successful if they

**===============================*Unit Wrap-up*===============================**
5. What is a topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, etc. to help you remember this particular concept:
6. What is a 2nd topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, etc. to help you remember this particular concept:
7. What is a 3rd topic or concept from this unit that you found to be more challenging? Write or describe below:

In the space below, create a mnemonic, rhyme, analogy, etc. to help you remember this particular concept: