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Winter 2021 - Finals week

Winter 2021 - LIFESCI7B-1 - PIRES

Started on	Monday, 1 February 2021, 1:27 PM PST
State	Finished
Completed on	Monday, 1 February 2021, 2:48 PM PST
Time taken	1 hour 21 mins
Grade	105.00 out of 123.00 (85 %)

Information

[Questions 1-4] Imagine an autosomal co-dominant trait with three different alleles: A, B, and C. For each of the following families, identify the possible nondisjunction events (rare mistakes during meiosis) that could explain the genotype of the offspring.

Question 1	
Correct	
3.00 points out of 3.00	

Parent 1 has genotype AB and Parent 2 has genotype BC. They have a triploid offspring that has genotype BBC.

This could have occurred through non-disjunction in meiosis II of Parent 1.

Select one:

■ True

False

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Create a pedigree from a scenario

Week 1 handout and clicker questions

Week 3 clicker questions







Parent 1 has genotype AB and Parent 2 has genotype BC. They have a triploid offspring that has genotype BBC.

This could have occurred through non-disjunction in meiosis I of Parent 2.

Select one:

True

False X

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Create a pedigree from a scenario

Week 1 handout and clicker questions

Week 3 clicker questions

The correct answer is 'True'.

Question 3

Correct

3.00 points out of 3.00

Parent 1 has genotype AB and Parent 2 has genotype BC. They have a triploid offspring that has genotype ABC.

This could have occurred through non-disjunction in meiosis I of Parent 1.

Select one:

■ True

False

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Create a pedigree from a scenario

Week 1 handout and clicker questions

Week 3 clicker questions









3.00 points out of 3.00

Parent 1 has genotype AB and Parent 2 has genotype BC. They have a triploid offspring that has genotype ABC.

This could have occurred through non-disjunction in meiosis II of Parent 2.

Select one:

True

■ False

Distinguish between sister chromatids and homologous chromosomes

Visualize how meiosis produces four haploid gametes

Create a pedigree from a scenario

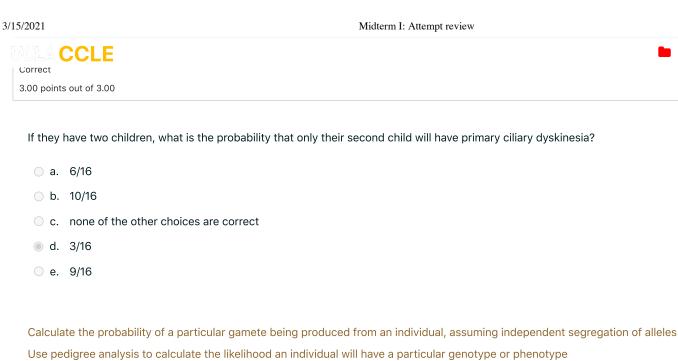
Week 1 handout and clicker questions

Week 3 clicker questions

The correct answer is 'False'.

Information

[Questions 5 - 7] You are a genetic counselor and are meeting with a couple where both individuals are heterozygous for primary ciliary dyskinesia (a rare recessive autosomal disorder). They are planning on starting a family and are interested in knowing the probability that their children may or may not have primary ciliary dyskinesia.



Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Weeks 1 and 2 clicker questions

Lab Weeks 3 and 4

The correct answer is: 3/16

Question 6

Incorrect

0.00 points out of 3.00

If they have two children, what is the probability that both children will be affected?

a. 3/16

b. 9/16

- oc. none of the answer choices is correct
- d. 12/16
- e. 7/16

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Weeks 1 and 2 clicker questions

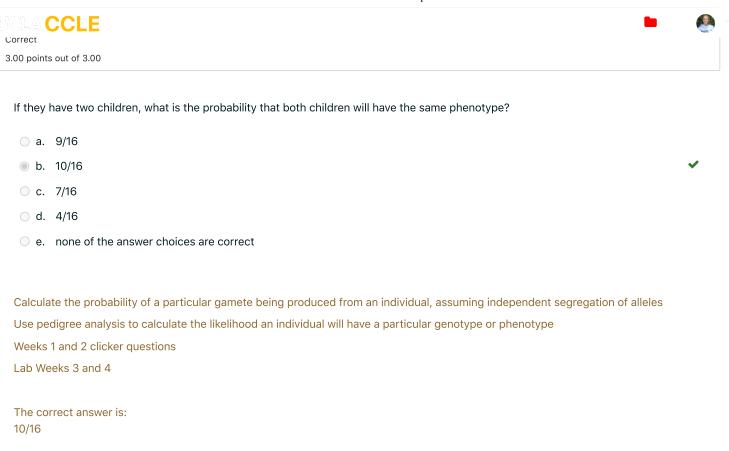
Lab Weeks 3 and 4

The correct answer is:

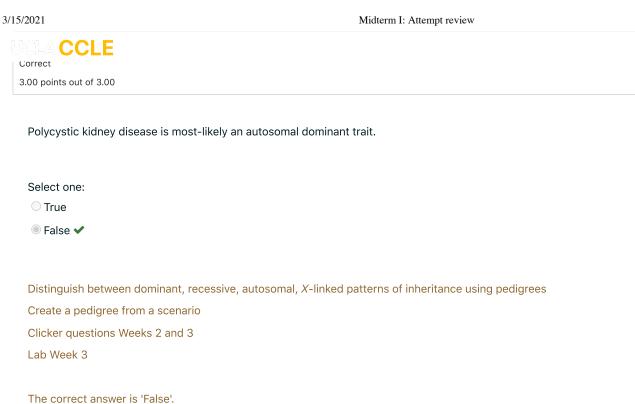
none of the answer choices is correct



Information



[Questions 8-11] Natalie (an XX individual) and Daniel (an XY individual) are concerned about having a child with polycystic kidney disease, which causes cysts to develop on the kidneys and loss of kidney function over time. This condition, which is very rare, has affected both Natalie's uncle (her mother's brother) and Daniel's sister. No one else in either family has the condition.



Question 9 Incorrect 0.00 points out of 3.00

Based on their family history, what is the probability Natalie and Daniel's first child will be a carrier for polycystic kidney disease?

a. 4/36 × ob. 2/36 o. 6/36

od. 9/36

The correct answer for this is: 14/36 or 7/18

e. none of the answer choices are correct

Distinguish between dominant, recessive, autosomal, X-linked patterns of inheritance using pedigrees

Create a pedigree from a scenario

Clicker questions Weeks 2 and 3

Lab Week 3

The correct answer is: none of the answer choices are correct









The couple is also concerned about their child inheriting hemophilia, another rare disease, which is X-linked. Natalie's brother and Daniel's father, and sister both have hemophilia. No one else in either family has the condition.

The probability that Natalie and Daniel's first child has hemophilia is 1/2.
Select one:
○ True
False ✓
Distinguish between dominant, recessive, autosomal, X-linked patterns of inheritance using pedigrees
Create a pedigree from a scenario
Clicker questions Weeks 2 and 3
Lab Week 3
The correct answer is 'False'.
Question 11
Correct
Correct 3.00 points out of 3.00
3.00 points out of 3.00 The couple is also concerned about their child inheriting hemophilia, another rare disease, which is X-linked. Natalie's brother and Daniel's father, and sister both have hemophilia. No one else in either family has the condition.
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The correct answer is 'True'.

Lab Week 3

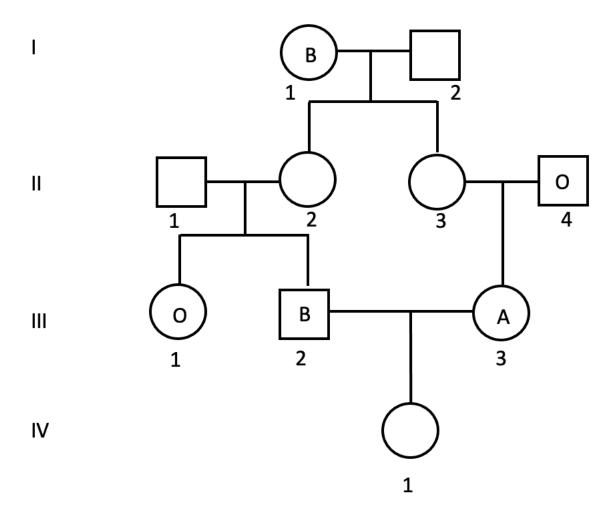
Clicker questions Weeks 2 and 3

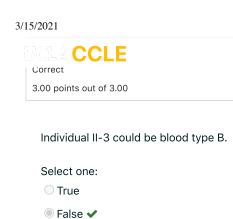






[Questions 12–13] Recall that ABO blood groups exhibit a co-dominant pattern of inheritance: I^A and I^B are codominant and i is recessive to both I^A and I^B . A human pedigree and the ABO blood types of some of the members of the family are shown in the figure below.





Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'False'.

Question 13

Correct

3.00 points out of 3.00

Individual IV-1 has an equal probability of being blood type O or blood type A.

Select one:

True

False X

Everyone received the points for this question, because some necessary information was missing from the pedigree. To answer this question, you needed to know the phenotype of either individual II-1 or II-2.

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'True'.

Information

[Questions 14-18] Ben and Sarah are two people who are considering having children together. Ben, his father, and his mother all have blood type B. His younger sister and his brothers have blood type O. Sarah, her mother, and her younger brother all have blood type A. Sarah's sister and older brother both have blood type O, and her father has type B.









The probability that their first child will have blood type A is 1/3

Select one:

True

False

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Create a pedigree from a scenario

Week 2 clicker questions

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'False'.

Question 15

Correct

3.00 points out of 3.00

The probability that their first child will have blood type O is 1/2.

Select one:

True

False

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Create a pedigree from a scenario

Week 2 clicker questions

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'False'.







The probability that their first child will have blood type B is 1/3.

Select one:

- True
- False

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Create a pedigree from a scenario

Week 2 clicker questions

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'True'.

Question 17

Correct

3.00 points out of 3.00

The probability that their first child will have blood type AB is 1/3.

Select one:

■ True

False

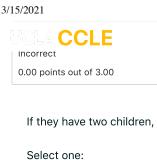
Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

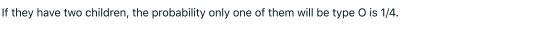
Create a pedigree from a scenario

Week 2 clicker questions

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule



True False X



Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Create a pedigree from a scenario

Week 2 clicker questions

Pre-class objective: Define the addition (i.e., sum) rule and the multiplication (i.e., product) rule

The correct answer is 'True'.

Question 19

Correct

3.00 points out of 3.00

Individuals that are heterozygous for four loci AaBbCcDd and AaBbCcDd are crossed. Assuming independent segregation and complete dominance for each trait, the expected proportion of the progeny that will have at least one dominant allele at each locus is:

a. 81/256

o b. 27/64

c. 9/16

d. 12/16

Visualize how meiosis produces four haploid gametes

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles Week 2 clicker questions

The correct answer is:

81/256









Individuals with the genotypes AaBbCcDdeeff and AabbccDDEeFf are crossed. Assuming independent segregation and complete dominance for each trait, the expected proportion of the progeny that will be homozygous for all of the genes is 0.

Select one:

True

■ False

Visualize how meiosis produces four haploid gametes

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles Week 2 clicker questions

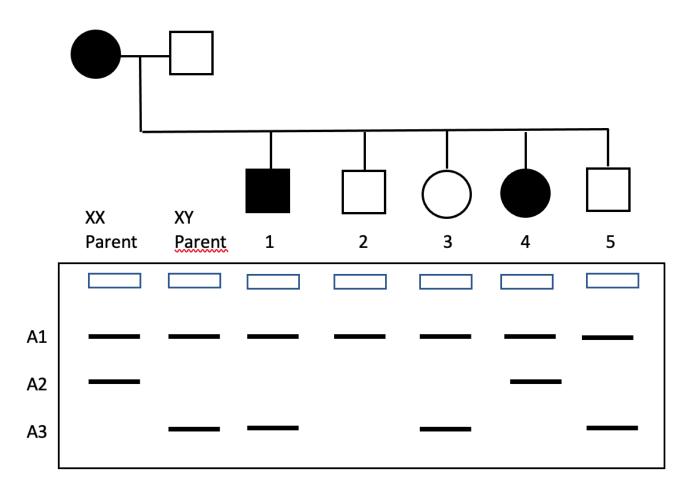
The correct answer is 'False'.

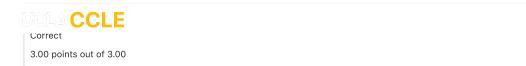






[Question 21-24] Porphyria is an autosomal dominant disease that disrupts how oxygen-binding molecules in red blood cells are produced. To help with genetic diagnosis, a VNTR region near the porphyria locus that has three alleles is used as a genetic marker to detect the allele causing porphyria. Below is a pedigree from a family affected by porphyria, where shaded symbols indicate an affected individual (individuals XX Parent, 1 and 4) and their associated VNTR analysis.









The A2 allele is linked with the disease-causing allele in the XX Parent.

Select one:

- True
- False

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Analyze VNTR DNA fingerprinting data to determine the genotypes and/or relatedness of individuals

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Visualize how meiosis produces four haploid gametes

CQs Week 3

PEQs Week 3

The correct answer is 'True'.

Question 22

Correct

3.00 points out of 3.00

Allele A2 could serve as a marker allele for the disease allele.

Select one:

- True
- False

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Analyze VNTR DNA fingerprinting data to determine the genotypes and/or relatedness of individuals

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Visualize how meiosis produces four haploid gametes

CQs Week 3

PEQs Week 3







Individual 2 indicates a recombination event between the marker allele and the disease-causing allele.

Select one:

True

■ False

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Analyze VNTR DNA fingerprinting data to determine the genotypes and/or relatedness of individuals

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Visualize how meiosis produces four haploid gametes

CQs Week 3

PEQs Week 3

The correct answer is 'False'.

Question 24

Incorrect

0.00 points out of 3.00

If the dominant disease allele is designated as D and the recessive allele for the disease is designated as d, then the genotype for Individual 1 would be A1D/A3d.

Select one:

True

False X

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Analyze VNTR DNA fingerprinting data to determine the genotypes and/or relatedness of individuals

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Visualize how meiosis produces four haploid gametes

CQs Week 3

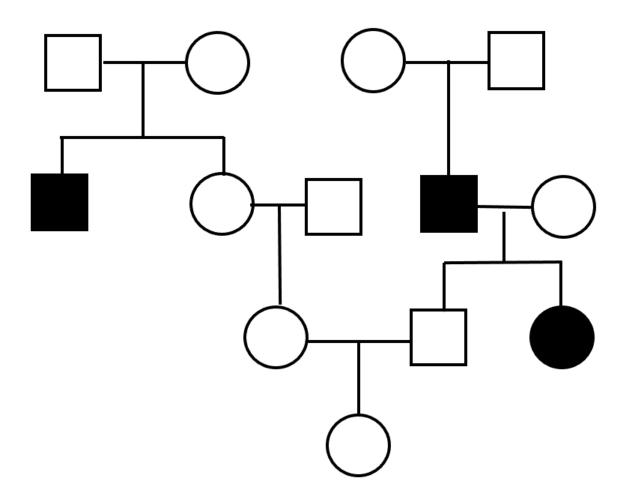
PEQs Week 3







[Question 25] Consider the pedigree. Shaded circles or squares indicate individuals who are affected.



Question 25

Correct

3.00 points out of 3.00

This disease could be autosomal dominant.

Select one:

O True

False

Distinguish between dominant, recessive, autosomal, X-linked patterns of inheritance using pedigrees

Week 3 lab

The correct answer is 'False'.

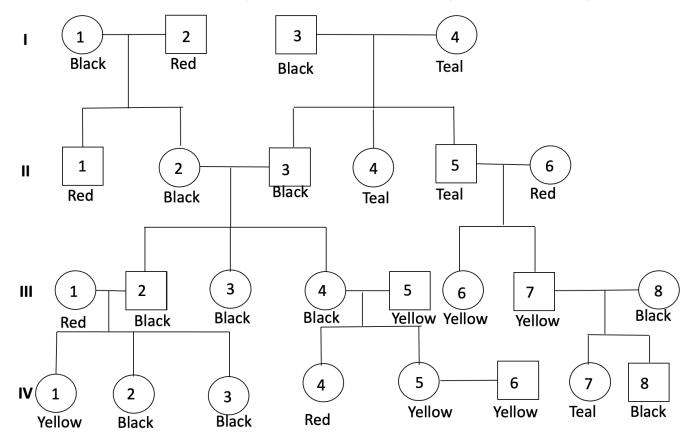








[Questions 26-29] There is a dewclaw on each of the front legs of the Danang cat. The pedigree below shows the inheritance of dewclaw color in Danang cat. There are four different dewclaw colors: black, red, teal, and yellow. Dewclaw color in Danang cat is determined by **a single autosomal gene** with **three alleles** that exhibit an unknown hierarchy of dominance. Genetic testing shows that individuals I-2, I-4, and II-6 are each homozygous. Use this information and the pedigree to answer the following questions.









All black individuals must be heterozygous.

Select one:

True

■ False

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'False'.

Question 27

Incorrect

0.00 points out of 3.00

II-2 and II-3 cannot produce a yellow offspring.

Select one:

True X

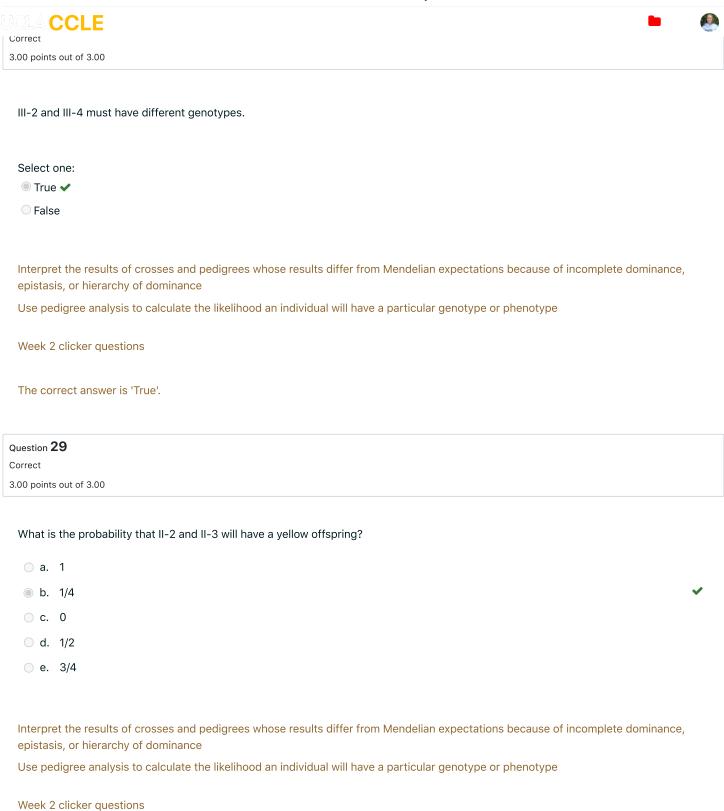
False

Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Use pedigree analysis to calculate the likelihood an individual will have a particular genotype or phenotype

Week 2 clicker questions

The correct answer is 'False'.





The correct answer is:

1/4







[Questions 30-33] You are doing a breeding experiment with fruit flies. In the parental generation, you cross two true-breeding flies. The female parent is brown and wingless (BBnn) and the male parent is black with wings (bbNN). All of the flies in the F1 generation are brown and have wings.

Question 30	
Correct	
3.00 points out of 3.00	

The genotype of all flies in the F1 generation is BbNn.

Select one:

True

False

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Calculate genetic map distances among linked genes from the frequencies of progeny with recombinant phenotypes, and construct a genetic map from data provided

Week 2 lab

Week 2 and 3 clicker questions







You now take an F1 female and cross her to a true-breeding black, wingless male. This male's genotype is: bbnn. You count 1200 offspring in the F2 generation. If the wing and the color traits were linked and no recombination occurred, you would expect to count:

0 brown, winged flies (of the genotype BbNn)

600 black, winged flies (of the genotype Bbnn)

600 brown, wingless flies (of the genotype bbNn)

0 black, wingless flies (of the genotype bbnn)

Select one:





Everyone received the points for this question because we had a typo that mismatched the genotypes and phenotypes of the 2nd and 3rd lines. (i.e. It should have read: black, winged flies are bbNn & brown, wingless flies are Bbnn.) If you looked at just the stated phenotype OR just the stated genotype you could still get the correct answer, but the unintentional mismatch caused some confusion.

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Calculate genetic map distances among linked genes from the frequencies of progeny with recombinant phenotypes, and construct a genetic map from data provided

Week 2 lab

Week 2 and 3 clicker questions







When you count the F2 generation, you really get:

65 brown, winged flies

520 black, winged flies

560 brown, wingless flies

55 black, wingless flies

Based on this result, you can determine that the genetic distance between the color and wing genes is 10%

Select one:



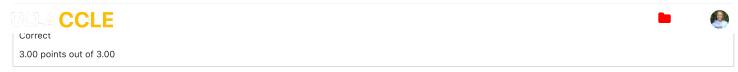
False

Determine if and where homologous recombination has occurred based on combinations of linked alleles

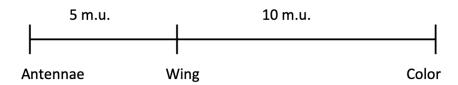
Calculate genetic map distances among linked genes from the frequencies of progeny with recombinant phenotypes, and construct a genetic map from data provided

Week 2 lab

Week 2 and 3 clicker questions



A series of fruit fly matings shows that the recombination frequency between the gene for wing size and the gene for antenna length is 5% (i.e. the genetic distance between them is 5 map units). The figure shows a correct genetic map for the three genes:



Select one:

■ True

False

Determine if and where homologous recombination has occurred based on combinations of linked alleles

Calculate genetic map distances among linked genes from the frequencies of progeny with recombinant phenotypes, and construct a genetic map from data provided

Week 2 lab

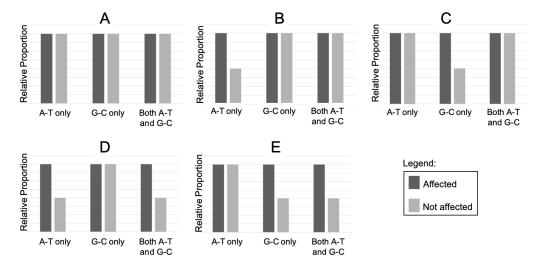
Week 2 and 3 clicker questions





[Questions 34-35] Use the figure below to answer questions 34 and 35.

The graphs shown depict the relative proportions of individuals affected with a certain condition (darker shaded bar) and individuals not affected (lighter bar) for individuals carrying only A-T, only G-C, or both A-T and G-C alleles of a single-nucleotide polymorphism (SNP).





Which graph shows a pattern that suggests that the G - C allele is a risk factor for a dominant disease?

- a. Graph A
- ob. Graph B
- oc. Graph C
- d. Graph D
- e. Graph E

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Week 3 Clicker questions

The correct answer is: Graph E









Which graph shows a pattern that suggests that the A - T allele is a risk factor for a recessive disease?

- a. Graph A
- b. Graph B
- c. Graph C
- d. Graph D
- e. Graph E

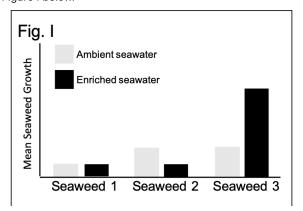
Evaluate whether a specific SNP or VNTR is associated with a specific disease

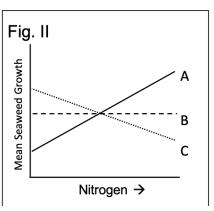
Week 3 Clicker questions

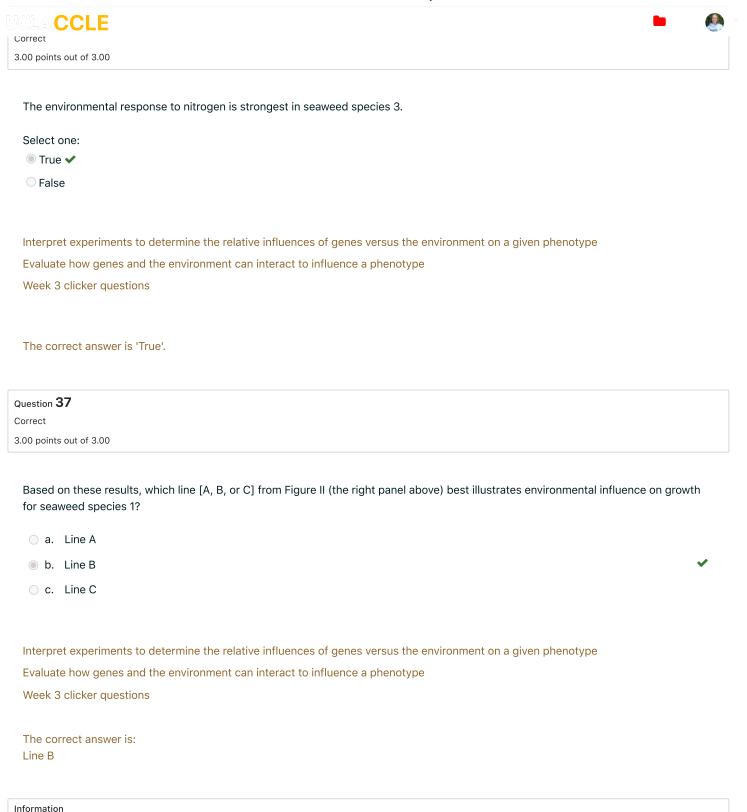
The correct answer is: Graph B

Information

[Questions 36-37] You are studying how seaweed (marine algae) could respond to increased nitrogen that can enter the ocean during a sewage spill. You collect three different species of seaweed (1, 2, and 3) and bring them back to the outdoor lab to run a controlled experiment. You separate each species of seaweed into multiple small individual seawater tanks, where all of the tanks have the same temperature and access to sunlight. For each species, to half of the tanks you give the seaweed ambient seawater (no added nutrients) and in half of the tanks you give the seaweed nutrient enriched water (added nitrogen). The results of your experiment are shown in Figure I below.







[Questions 38-39] You are investigating the petal color of a new species of flowering plant that you discovered. Through a series of breeding experiments you are able to determine that flower color is controlled by two genes. For individuals where both genes are present in the homozygous recessive state, flowers are white. When the dominant allele for either gene is present, the flowers are purple.









When you cross two individuals from the F1 generation (i.e. heterozygous for both genes), what is the expected proportion of F2 generation flowers that could be white?

- a. 15/16
- b. None of these are correct answers.
- c. 1/16
- d. 9/16
- e. 3/16
- f. 6/16
- g. 4/16

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

Week 2 clicker questions

Week 4 lab

The correct answer is:

1/16





3.00 points out of 3.00

If two individuals that are heterozygotes for both genes are crossed, what is the probability that they will have an offspring who is homozygous recessive for one gene and have at least one dominant allele for the other gene?

- a. 15/16
- ob. 3/16
- o. 1/16
- d. 9/16
- e. 6/16
- f. 4/16
- g. None of these are correct answers.

Calculate the probability of a particular gamete being produced from an individual, assuming independent segregation of alleles Interpret the results of crosses and pedigrees whose results differ from Mendelian expectations because of incomplete dominance, epistasis, or hierarchy of dominance

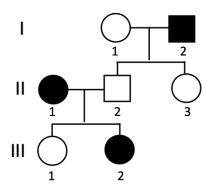
Week 2 clicker questions

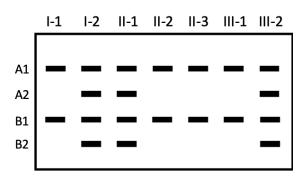
Week 4 lab

The correct answer is: 6/16

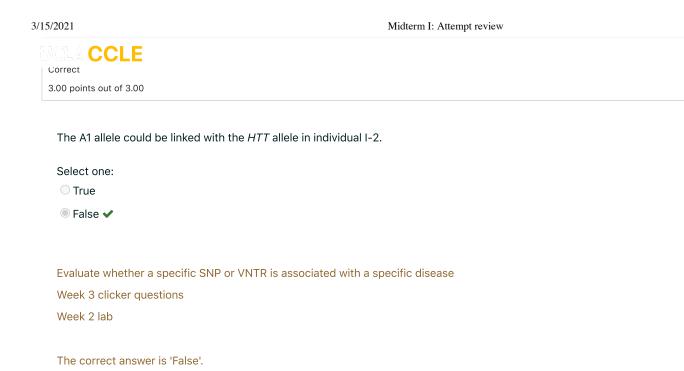
Information

[Questions 40–41] Huntington's disease is a neurodegenerative disease with an autosomal dominant inheritance pattern. The affected gene (*HTT*) is very large, so sequencing the gene to look for mutations is not practical. Instead, you have identified two VNTR regions (A and B) very close to the *HTT* gene that can be readily analyzed using PCR. You test the two VNTR regions to see if there are any VNTR alleles that are linked to mutant alleles of the *HTT* gene that causes Huntington's disease. The pedigree and your gel results are shown below.









Question **41**

Correct

3.00 points out of 3.00

Allele B2 could be used as a genetic marker for Huntington's disease.

Select one:

■ True

False

Evaluate whether a specific SNP or VNTR is associated with a specific disease

Week 3 clicker questions

Week 2 lab

The correct answer is 'True'.

■ Practice questions final exam

Jump to...

Midterm II W 21 LS7B ▶

