

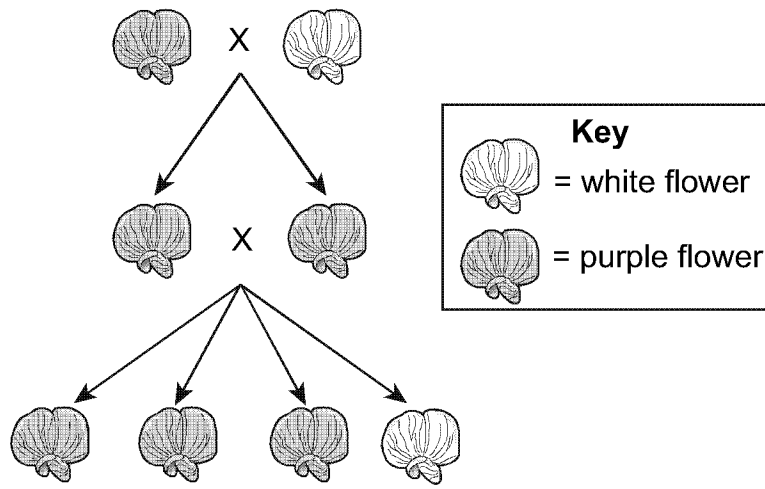
Keystone Biology

Pea Flower Color

Handscoring Anchor Set

Use the diagram below to answer question

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

Pea Flower Color Scoring Guide

3	The response demonstrates a <i>thorough</i> understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by: • identifying the pattern of inheritance shown in the pea flower color cross and • explaining how the cross shows this pattern and • explaining how farmers could ensure that they only grow white flowers. The response is clear, complete, and correct.
2	The response demonstrates a <i>partial</i> understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by fulfilling two of the three bullets listed under the 3-point response. The response may contain some work that is incomplete or unclear.
1	The response demonstrates a <i>minimal</i> understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by fulfilling one of the three bullets listed under the 3-point response. The response may contain some work that is incomplete or unclear.
0	The response provides <i>insufficient</i> evidence to demonstrate any understanding of the concept being tested.
Non-scorables	B – No response written or refusal to respond. F – Foreign language K – Off task U – Unreadable

Note: No deductions should be taken for misspelled words or grammatical errors.

Responses that will receive credit:

Part A (2 points):

- Purple color is dominant; white color is recessive.
- Dominant/recessive inherited pattern

AND

- When the purple is crossed with the white, the offspring (F1 generation) are both purple, because purple is dominant. But each offspring also received the allele for white color; so, when the F1 peas were crossed, the F2 generation had three offspring with purple color and one with white color (see Punnett square).

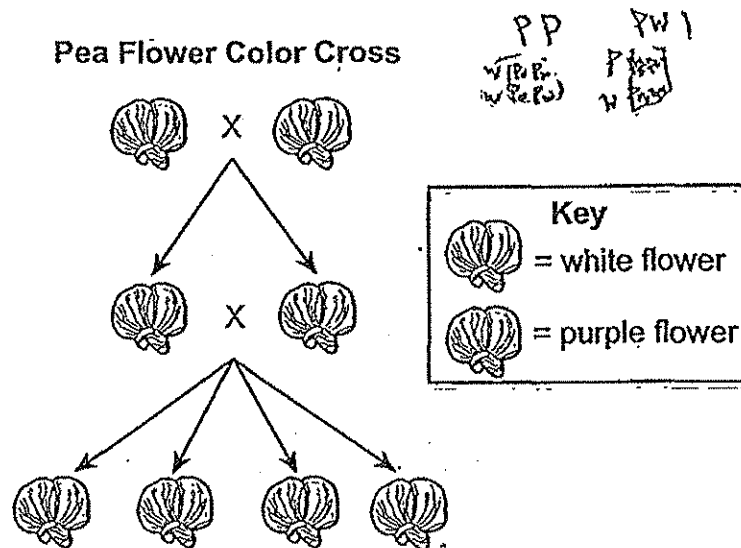
Heterozygous F1 Generation Cross

	P	p
P	PP	Pp
p	Pp	pp

Part B (1 point):

- If farmers want only white flowers, they should only cross white-flowered plants; because these are homozygous for white flowers (they only have alleles for white flowers).

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The purple pea flower is a homozygous dominant, while the white is a homozygous recessive. The cross shows the pattern below if PP is crossed with ww , there will be all Pw , making it all purple since it's dominant, so 100% chance, and second generation is 100% purple. Now take these plants (now $Pw \times Pw$) and you get 3/4 chance of purple, and 1/4 (ww), which is shown on last generation, 3 purple 1 white.

Continued. Please refer to the previous page for task explanation.

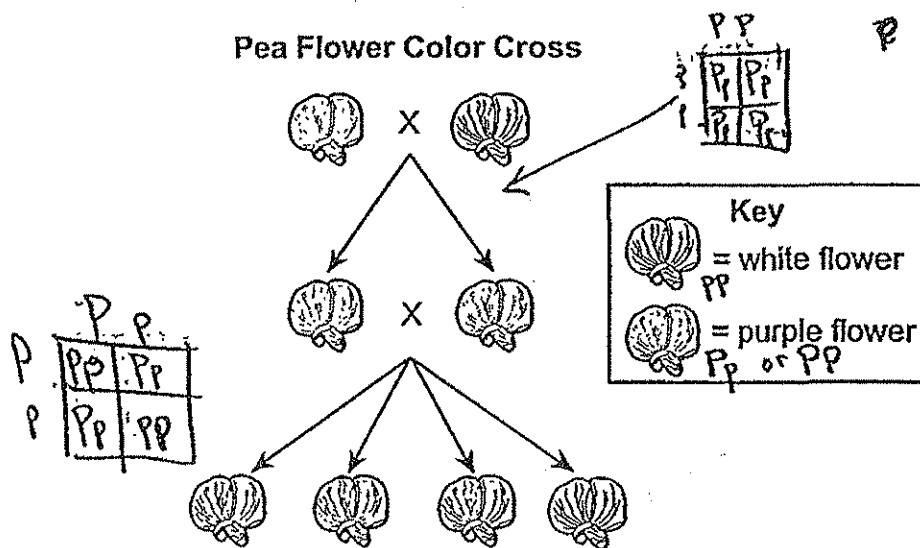
Part B: Explain how farmers could ensure that they only grow white flowers.

only crossing the homozygous recessive white plants (ww) with each other will only ensure to get 100% chance of other white pea plants.

A-1 Score Point: 3

This response demonstrates a thorough understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing the all tasks presented in the item. The student identifies the inheritance pattern by stating “the purple pea flower is homozygous dominant, while the white flower is homozygous recessive.” The explanation provided correctly identifies the genotypes of each flower and follows the cross from top to bottom. The student goes on to explain that farmers could ensure that they grow only white flowers by “only crossing the homozygous recessive white plants (ww) with each other.” This response is complete and correct.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

if purple was the dominant flower color in pea plants (represented by P), and white the recessive gene (p), then the original 2 flowers would most likely be PP and pp, crossing in the following fashion: $\begin{array}{c} PP \\ P \\ P \\ P \end{array} \begin{array}{c} P \\ P \\ P \\ P \end{array}$. The next flowers would be purple with recessive trait of white, crossing in the following fashion: $\begin{array}{c} P \\ P \\ P \\ P \end{array} \begin{array}{c} P \\ P \\ P \\ P \end{array}$ and resulting in one homozygous purple flower, two heterozygous purple flowers, and one homozygous white flower.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

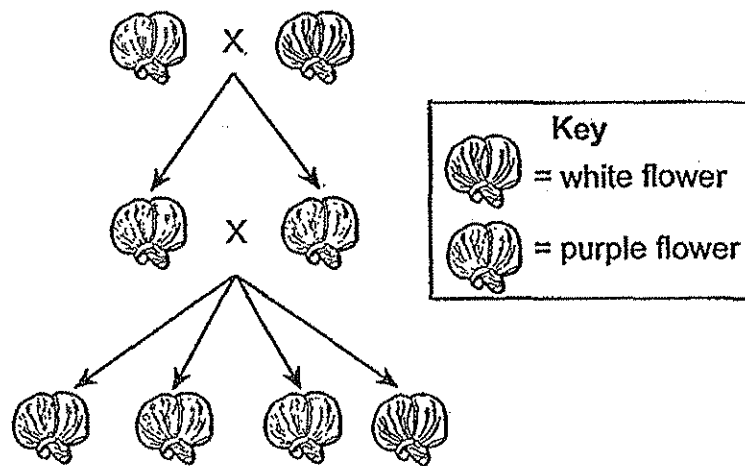
Farmers could ensure that they only grow white flowers by crossing only white flowers. As long as white is the recessive gene for color, then all flowers would be homozygous white and all crosses would result in only homozygous white flowers as well.

A-2 Score Point: 3

This response demonstrates a thorough understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing the all tasks presented in the item. The student identifies the inheritance pattern ("if the purple was the dominant flower color in pea plants...and white the recessive gene"). The explanation provided follows each generation of the cross from top to bottom and correctly identifies the genotypes of all of the pea flowers. The explanation how farmers could ensure that they grow only white flowers is complete and contains no error in content. This response is complete and correct.

Use the diagram below to answer question

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The pattern of inheritance shown begins with a homozygous dominant and a homozygous recessive. Then, the next generation is heterozygous, and the next generation then has heterozygous, and both homozygous dominant and recessive.

$AA \times aa$

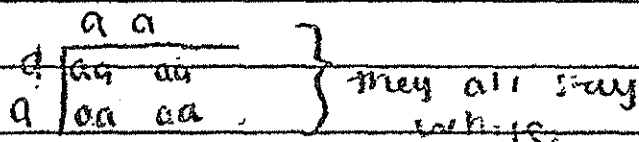
$Aa \times Aa$

$AA \quad Aa \quad Aa \quad aa$

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

Farmers could ensure that they only grow white flowers by breeding homozygous recessive plants only.



A-3 Score Point: 3

This response demonstrates a thorough understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing the all tasks presented in the item. The student states “the pattern of inheritance shown begins with a homozygous dominant and a homozygous recessive” which is enough to identify the inheritance pattern. The explanation describes the genotype of all of the pea flowers in the cross and follows the inheritance from top to bottom. The student explains “farmers could ensure that they only grow white flower by breeding homozygous recessive plants only.” The Punnett square clarifies that the white flowers are homozygous recessive plants. This response is complete and correct.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

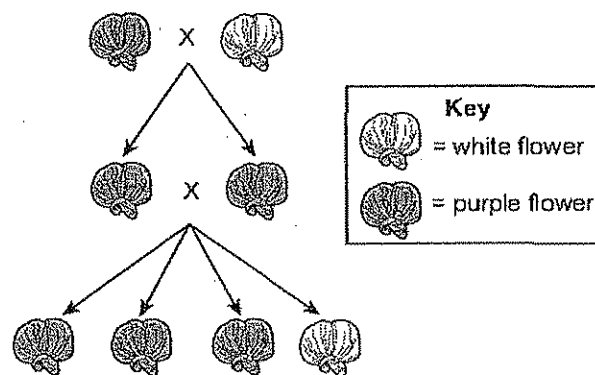
They could cross white flowers with
only white flowers

A-4 Score Point: 2

This response demonstrates a partial understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing the two of the three tasks presented in the item. The student states that “the purple flower is dominant over the white flower” which is enough to imply that the white flower is recessive (There is enough information that we would not assume co-dominance or incomplete dominance). The student does not provide enough additional information to explain how the cross shows the pattern. “They (the farmers) could cross white flowers with only white flowers” is an acceptable explanation how farmers could ensure that they only grow white flowers. This response contains work that is incomplete and receives partial credit.

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The second generation are heterozygas and the third generation is half heterozygas 1 homozygas dominant and 1 homozygas resesive

129 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

breed white flowers with white flowers

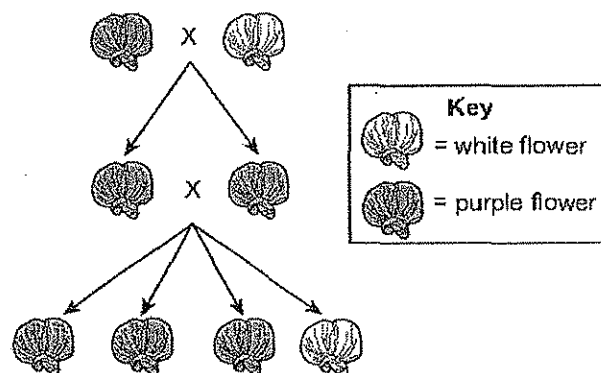
38 / 1000

A-5 Score Point: 2

This response demonstrates a partial understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing the two of the three tasks presented in the item. The student does not clearly identify the pattern of inheritance shown. The student provides an acceptable explanation how the cross shows a pattern by correctly identifying the genotypes of the pea flowers from the second and third generation. The explanation that [to] "breed white flowers with white flowers" could ensure that famers only grow white flowers is enough for credit. The response contains work that is incomplete and receives partial credit.

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

There is a white flowered pea plant and a purple flowered pea plant. The white flowered pea plant is being crossed with a purple flowered pea plant. The purple flowered pea plant is dominant over the white flowered pea plant which contains the recessive allele. Therefore most of the pea plants will be purple colored as compared to be white.

342 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

Farmers should eliminate all purple flowered pea plants so the white flowered pea plants can not cross pollinate with the purple flowered pea plants. If that is done then there will only be white flowered pea plants. The purple flowered pea plants contains the dominant allele and the white flowered pea plants contains the recessive allele. With all of the purple flowers gone there can be only white flowered pea plants.

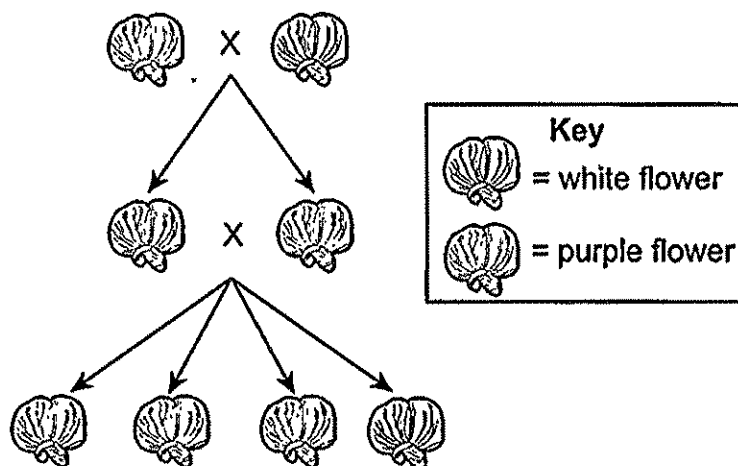
422 / 1000

A-6 Score Point: 2

This response demonstrates a partial understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing the two of the three tasks presented in the item. The student gets credit for identifying the inheritance pattern ("the purple flowered pea plant is dominant over the white flowered pea plant which contains the recessive allele"). The information in the response is not enough to explain how the cross shows the pattern. "Farmers should eliminate all purple flower plants so the white flowered pea plants cannot cross pollinate with the purple flowered pea plants" is an acceptable explanation how farmers could ensure that they grow only white flowers. The response contains work that is incomplete and earns partial credit.

Use the diagram below to answer question

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

~~the~~ well the Purple rose at the top
is RR and the white is rr. and its offspring
are Rr Rr and there are RR, Rr, Rr,
rr.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

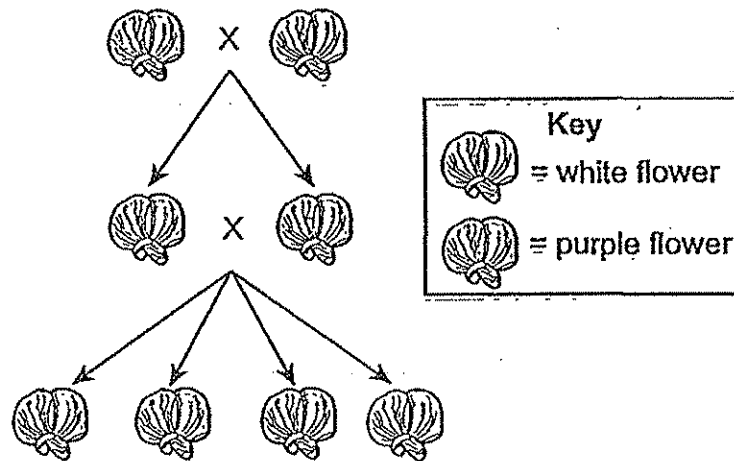
only Put White Flowers down

A-7 Score Point: 2

This response demonstrates a partial understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing the two of the three tasks presented in the item. The student does not identify the pattern of inheritance, but they do correctly explain how the cross shows a pattern. The student describes the genotype of each flower and follows the cross from top to bottom. Additionally, the student states a farmer could ensure that they only grow white flowers by “only put[ting] white flowers down.” This response contains work that is incomplete and earns partial credit.

Use the diagram below to answer question

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The purple flower is the dominant one.

Continued. Please refer to the previous page for task explanation.

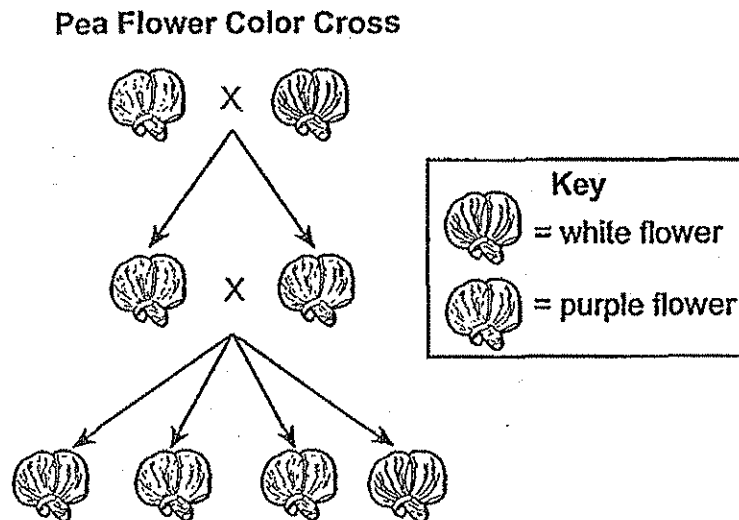
Part B: Explain how farmers could ensure that they only grow white flowers.

only have white flowers.

A-8 Score Point: 1

This response demonstrates a minimal understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing one of the tasks presented in the item. The student does not completely identify the pattern of inheritance by only identifying the purple flower as dominant. In order to receive credit the student must make it clear that the purple flower is dominant over the white, or that the white flower is recessive. There is no additional explanation provided. "Only have white flowers" is an acceptable response to explain how farmers could ensure that they only grow white flowers. This response is incomplete, but demonstrates minimal understanding.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

Purple would be the more dominant color. It would take over, therefore more pea plants would be purple than white.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

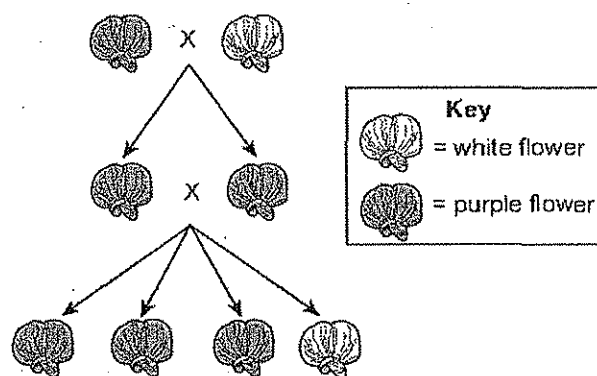
They should only plant
white flowers. Keep the
purple flowers very far from
the white flowers.

A-9 Score Point: 1

This response demonstrates a minimal understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing one of the tasks presented in the item. The identification of the pattern of inheritance is unclear. The student states that "purple would be the more dominant color" and does not make it clear that the white flower would not be partially dominant. The response does not provide a sufficient explanation how the cross shows the pattern. The explanation that "they should only plant white flowers" is an acceptable answer. The response contains work that is unclear and incomplete, but contains enough information to demonstrate minimal understanding.

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

in every new generation theres one more purple flower in the family.

69 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

they could mix two white flowers to make most of the flowers white.

68 / 1000

A-10 Score Point: 0

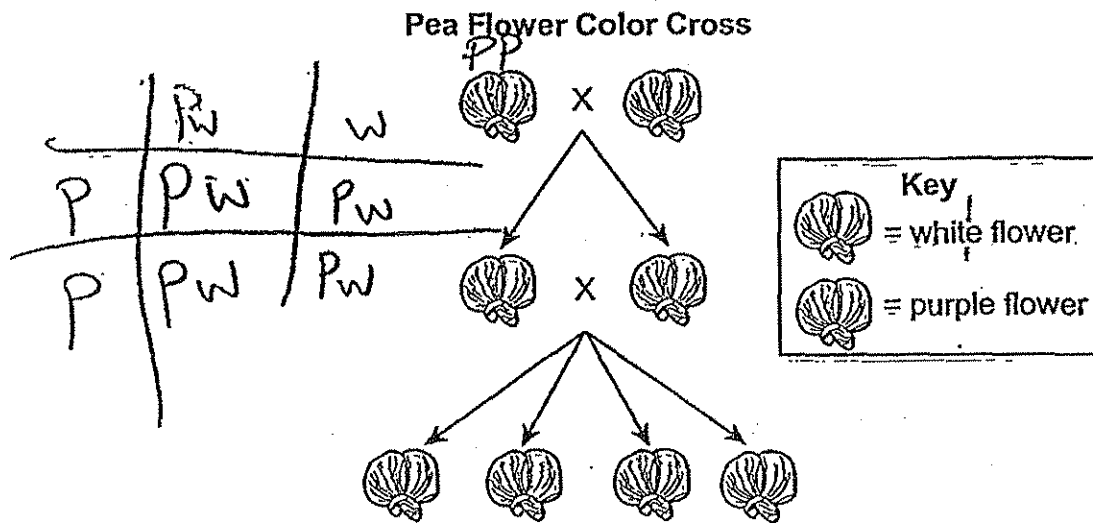
This response demonstrates an insufficient understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by not completing any of the tasks in the item. The student does not provide sufficient information to identify the pattern of inheritance or explain how the cross shows the pattern. The explanation of how farmers could ensure that they only grow white flowers is unclear. The student states that “they could mix two white flowers” but incorrectly states that “most of the flowers would be white”. The additional part of the response demonstrates misunderstanding and detracts from the correct response. This response does not complete any of the tasks and receives no credit.

Keystone Biology

Pea Flower Color

Handscoring Training Set 1

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The purple flower had a dominant gene and the white flower had a recessive gene and both flowers were purple in the next generation with ^{recessive gene} white as the recessive gene. This is how the one white flower was made in the 3rd generation.

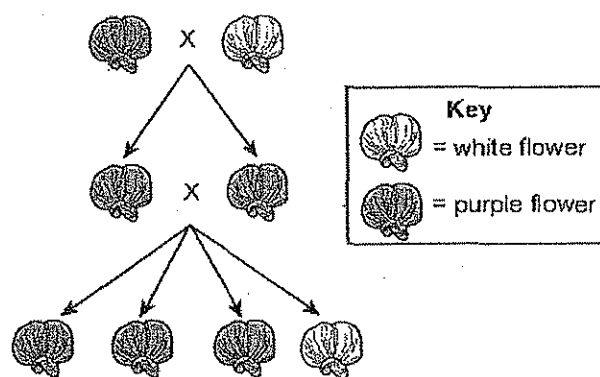
Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

They would only cross white flowers
to ensure that they would get all
white flowers.

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

one of the flowers in family 2 has an Aa and the other must have an Aa. to make the white flower we needed an aa.

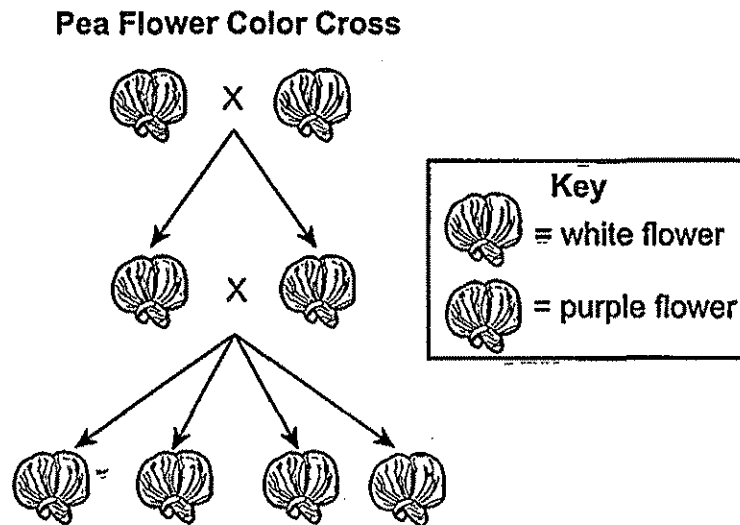
113 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

make sure hes only growing white flowers because they contain aa.

65 / 1000

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

In the pea flower color cross, the white flower always skip a generation of inheritance.

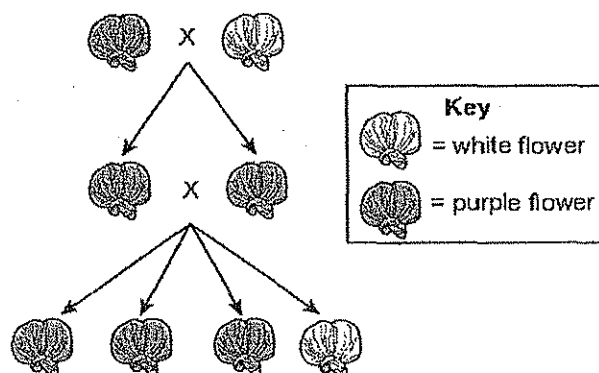
Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

Farmers could ensure that they only grow white flowers only using 2 purple parent genes to produce white flowers.

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The 1st pea plants were XX and Xx. The 2nd were Xx and Xx. The 3rd were XX, Xx, Xx, and xx.

91 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

They could mate the white flowers with other white flowers. xx and xx always make a flower with xx.

99 / 1000

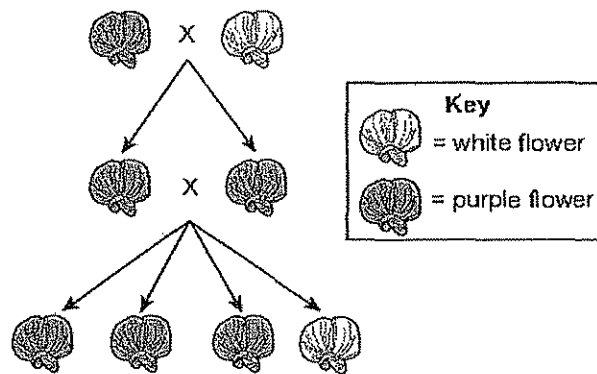
Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

The Farmers could use pollen from only white flowers to pollinate other pea plants for several years, & eventually the recessive genes would be spread throughout the population.

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

0 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

Since the white flower is a recessive trait the farmer would have to cross homozygous recessive plants with other homozygous recessive plants.

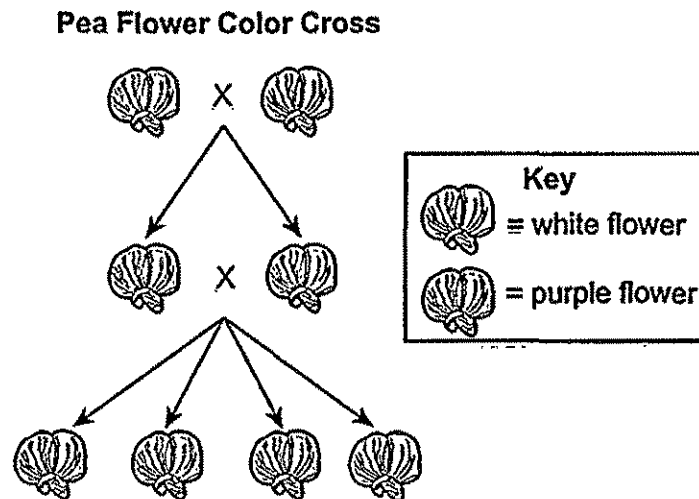
142 / 1000

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

The farmers could only grow 2 whites
together to get more white results.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The purple flower is dominant and the white is recessive. The first generation has a purple and a white, but the next generation got both purple.

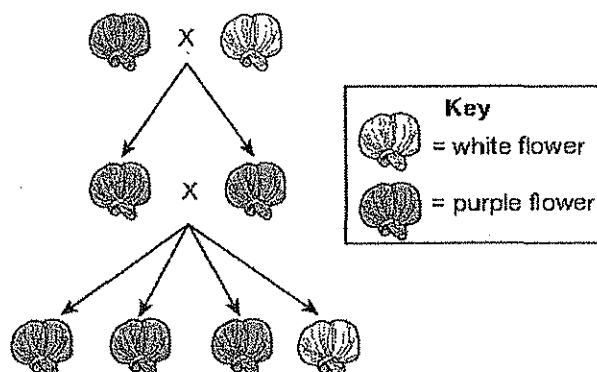
Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

mix white with white, and they
would both be dominant so the
chances of getting a purple is
very unlikely

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

In this pea flower cross, the purple flower is dominant and the white flower is recessive. The first cross we can assume that the purple flower is homozygous dominant (PP) and the white flower is homozygous recessive (ww). This would produce two heterozygous dominant offspring (Pw). When the two heterozygous dominant (Pw) flowers are crossed, the result is one homozygous dominant offspring (PP), two heterozygous dominant offspring (Pw), and one homozygous recessive offspring (ww).

485 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

If a farmer wished to only grow white flowered pea plants, then he should only cross white flowered plants. This is because the white flower allele is recessive to the purple flower allele, so when a dominant purple flower is present in any case, the resulting flower will be purple.

283 / 1000

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

Farmers could cross-pollinate white flowers to ensure only the growth of white flowers. This is because every white flower has genes containing alleles for only white flowers.

Name _____

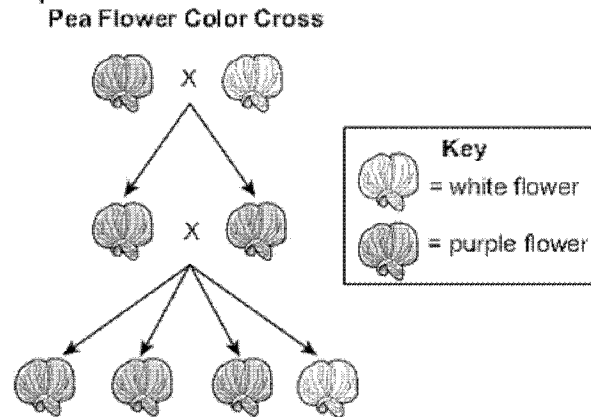
Number	Score	Notes
T1-1		
T1-2		
T1-3		
T1-4		
T1-5		
T1-6		
T1-7		
T1-8		
T1-9		
T1-10		

Keystone Biology

Pea Flower Color

Handscoring Training Set 2

Use the diagram below to answer the question.



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The purple color is dominant over the white color, because a white and purple flower produce purple flowers. The white flower skipped the next generation.

154 / 1000

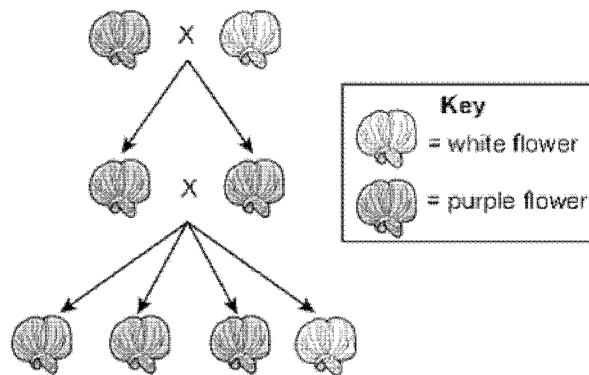
Part B: Explain how farmers could ensure that they only grow white flowers.

Do not breed white and purple flowers together.

47 / 1000

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

the purple flower is dominant to the white flower. the purple flowers still have the recessive trait imbedded in their genetics. during the f2 generation, the white shows up again because of the genetic recessive trait.

219 / 1000

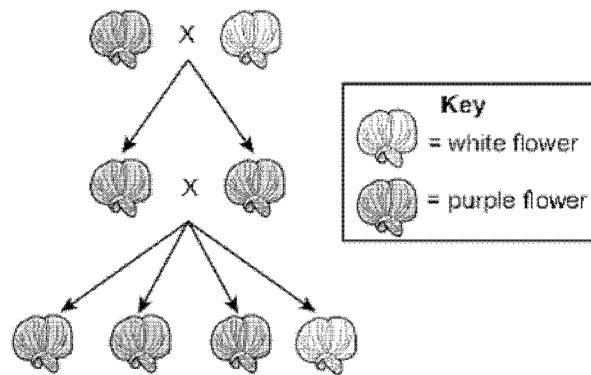
Part B: Explain how farmers could ensure that they only grow white flowers.

if they only let white flowered plants reproduce with white flowered plants, since white is recessive, there isn't a chance in the world, unless it's mutated, that the white flowering plants will produce a purple flower.

219 / 1000

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

In the first generation, the cross would be PP x pp. Then in the second generation the cross would be PP x Pp. Then in the third generation the would be PP x Pp again.

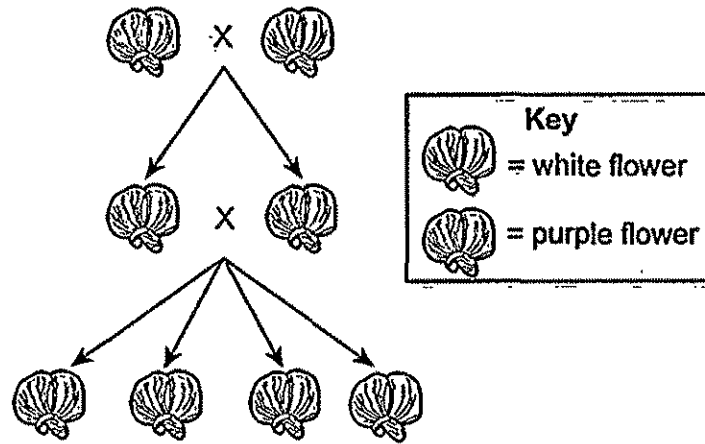
167 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

The farmers could ensure that they only grow white flowers because all the white flower gene is gone.

102 / 1000

Pea Flower Color Cross



Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

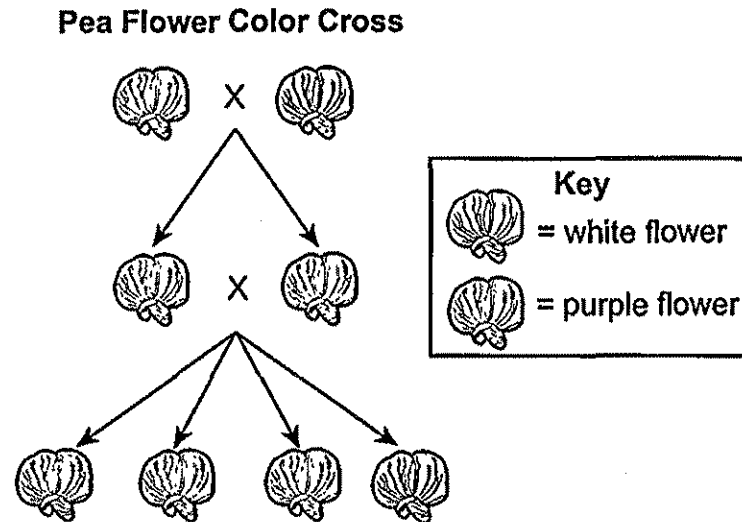
This shows incomplete dominance because the recessive allele was carried down until there was one totally white flower in the 3rd generation.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

To ensure the growth of white flowers only, farmers must find two white flowers which both contain 2 recessive alleles.

Use the diagram below to answer question .



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

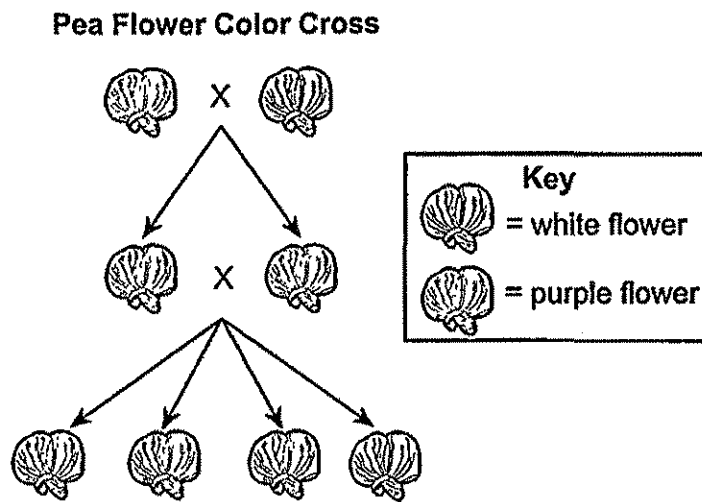
The pattern is very interesting. It shows that purple is dominant and white is recessive. That being said most of the offspring is purple. Although there is a weak link being the white flower in the third generation.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

The farmer would have to buy strictly white flowers. White flowers are recessive (rr), so the offspring will always be recessive and white also.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

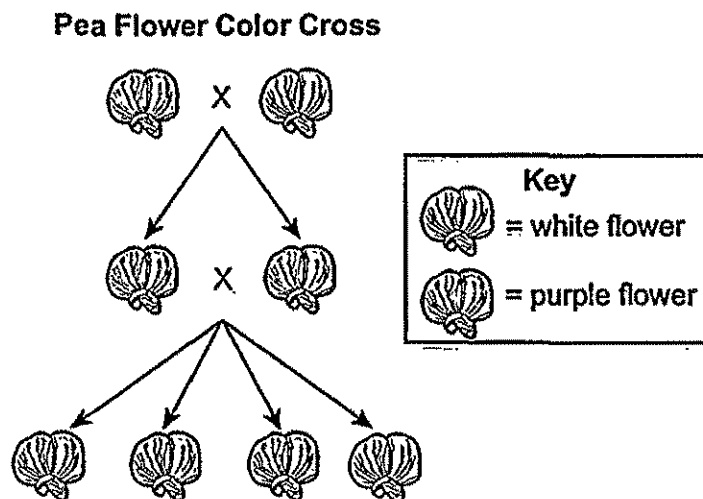
The pattern is if you multiply by the same kind, the majority of the flowers will come out that color.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

They could ensure that by only planting and growing
white flower seeds so that no purple ones will
grow.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The first generation that was crossed was dominant for purple and recessive for white. When they are crossed (P =purple, p =white) the next generation is Pp . When that generation is crossed the genotype ratio is 25% PP , 50% Pp , and 25% pp . The diagram accurately shows this generation crosses.

Continued. Please refer to the previous page for task explanation.

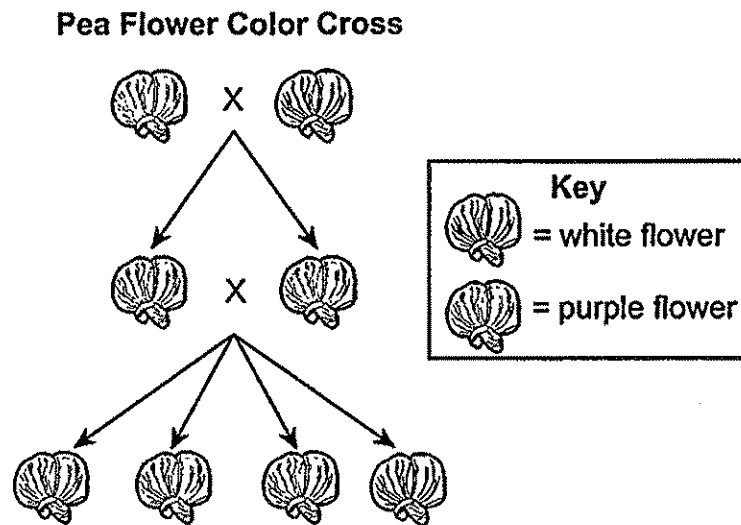
Part B: Explain how farmers could ensure that they only grow white flowers.

Farmers could cross pollinate their plants and find 2 flowers that are true-bred for the color white. He would keep breeding them to only make white flowers. This process is called true-breeding.

Part B: Explain how farmers could ensure that they only grow white flowers.

Farmers could ensure that only white flowers are grown if they cross only recessive pea plants that have white flowers.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

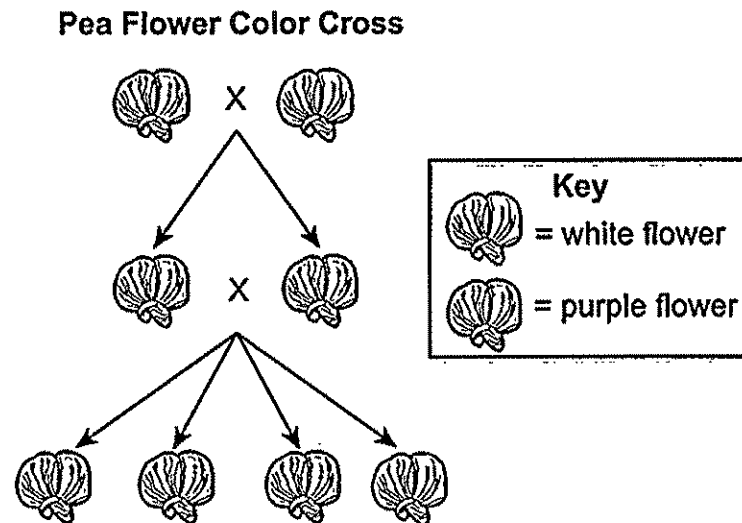
The purple and white flower produced 2 purple flowers, which produced 3 purple flowers and a white flower. The purple flower must have been the dominant flower. The offspring still carried the white flower trait and they produced one white flower and three purple.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

They should only cross white flowers. They might be able to use a pink flower, too.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The pea flower color cross shown here, shows that the purple flower gene is most dominant. I can tell this because of the large amount of purple shown throughout the generations, and the very little white shown.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

If farmers wanted to make
sure that they only grew white flowers,
then they would need to get plants
with dominant genes of white flowers.

Subject: **Biology**

Item: **Pea Flower Color**

Grade HS

Name _____

Number	Score	Notes
T2-1		
T2-2		
T2-3		
T2-4		
T2-5		
T2-6		
T2-7		
T2-8		
T2-9		
T2-10		

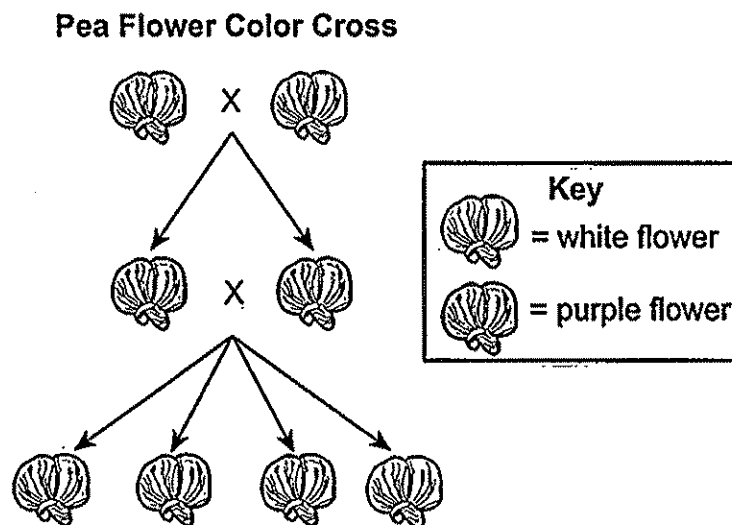
Keystone Biology

Pea Flower Color

Handscoring Practice Set^{*}

*Responses in this set do not have true scores. Apply scores based on scoring criteria.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

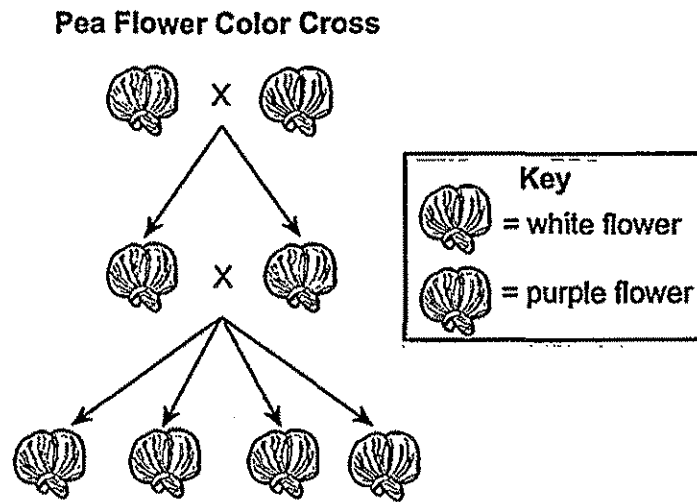
It shows that purple is dominant over white

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

pollinate white with white.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

In the first generation the purple flower had the dominant gene, in the second generation both color genes were recessive.

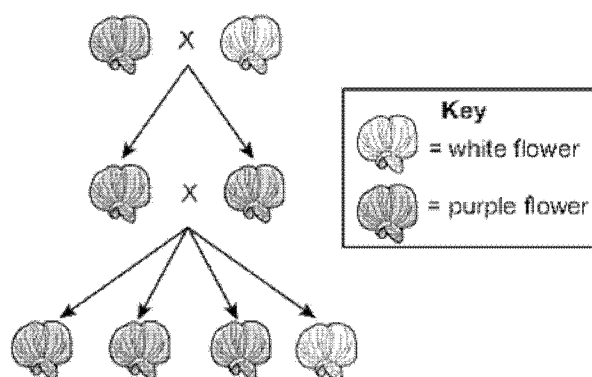
Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

They could ensure they had white flowers by pollinating white flowers with white flowers-

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The first generation of pea plants starts as a purple and a white. They make two other pea plants which are both purple meaning that purple is the dominant color. Those two plants then make four other, three are purple and one is white. Both of the original two plants were heterozygous which means that both of the next two were homozygous purple. Two homozygous plants made four plants, one would have been heterozygous purple, two would have been homozygous purple and one would have been heterozygous white.

515 / 1000

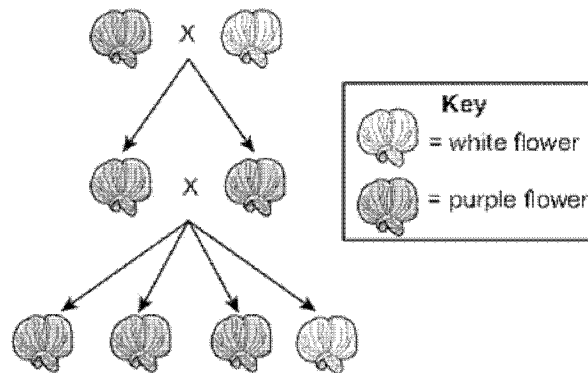
Part B: Explain how farmers could ensure that they only grow white flowers.

The white color in the flowers is the recessive trait meaning that if farmers only started with white flowers, they would only ever have white flowers.

151 / 1000

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The purple pea flower is dominant over the white pea flower. A dominant flower is crossed with a recessive flower and the outcome is two dominant flowers. Next, the two dominant flowers cross and the outcome is 3 dominant flowers and one recessive flower. This is because the genotype of a dominant flower can still carry a recessive gene, which makes it possible to have a white flower.

389 / 1000

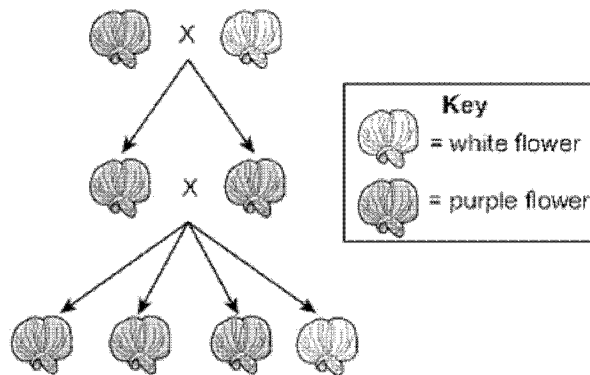
Part B: Explain how farmers could ensure that they only grow white flowers.

Farmers could ensure to grow white flowers by crossing to recessive plants and no matter what the outcome must be recessive(white.)

131 / 1000

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The purple flower is obviously dominant to the white flower. The white flower gene completely skips the second generation of pea flowers due to its recessive nature. It reappears in the third generation however, mostly by chance. This proves that the second generation carried the gene for white flowering pea plants in their genotype even though it did not appear in their phenotype.

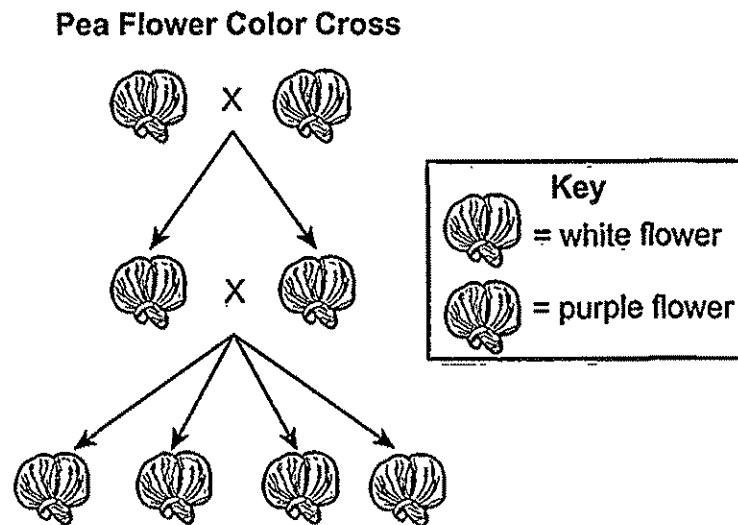
385 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

Recessive traits only appear when both alleles are for that trait. A farmer would first have to breed a couple of generations of flowers to ensure that the flowers they are going to use to breed purely white flowers are pure of any dominant qualities. The farmer could then take their pure flowers and use them to create more pure white flowers.

344 / 1000

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

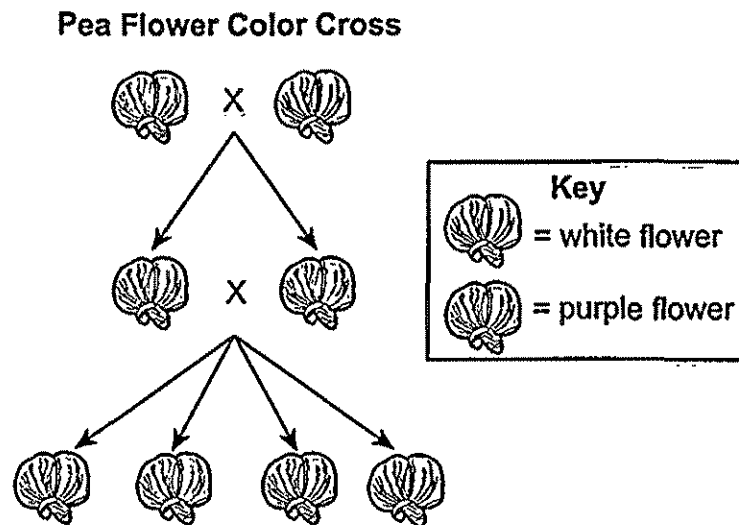
both sets of parents were homozygous recessive, when they passed on both recessive traits the white flower trait didn't show up until the third generation.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

They would only mix white flowers
pollen together or only plant seeds
with a dominant allele for the
white color.

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

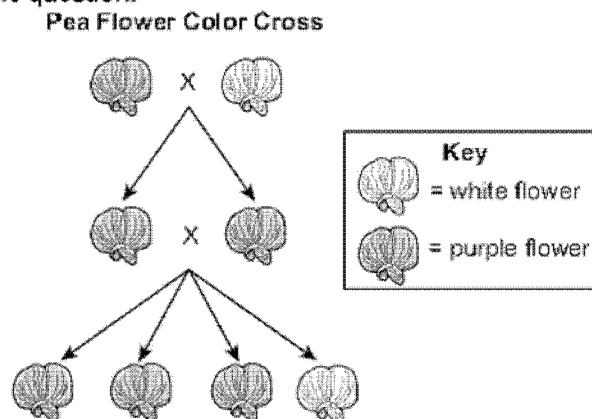
The purple flower is dominant.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

Leave the white flowers by themselves so
they aren't dominated by another colored
flowers.

Use the diagram below to answer the question.



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

The pattern is shown that the purple flower is dominant and the white flower is recessive. So to get a white flower you would have to get "ww" to get a white flower and all the other possibilities like "Pw" and so on would be a dominant trait. Your chances of getting a purple flower are a lot higher than those of a white.

321 / 1000

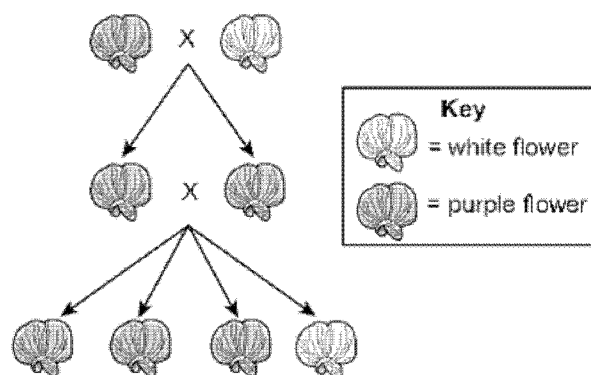
Part B: Explain how farmers could ensure that they only grow white flowers.

They would have to get two white flowers and cross breed them so there isn't any crossing in the purple flower trait.

117 / 1000

Use the diagram below to answer the question.

Pea Flower Color Cross



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

In the first gen. there was a pure white flower and a pure purple. In the second generation you have a carrier purple and a pure purple, that carrier purple passes its genes to the 3rd gen. in which produces a pure white flower.

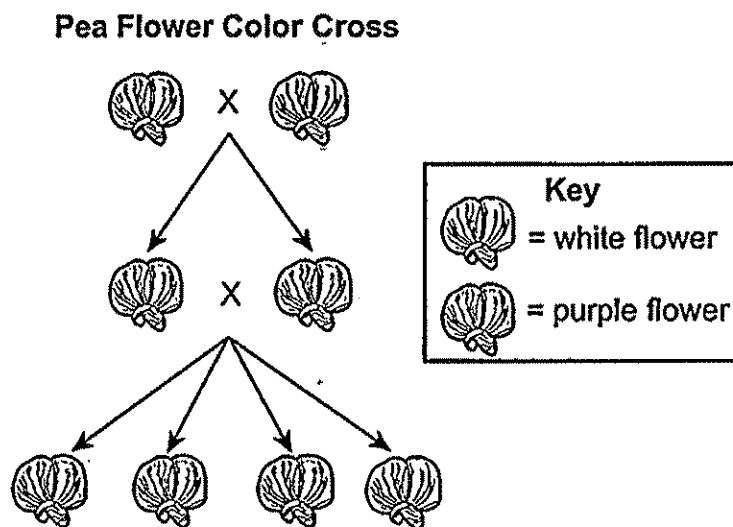
229 / 1000

Part B: Explain how farmers could ensure that they only grow white flowers.

only plant pure white flowers.

30 / 1000

Use the diagram below to answer question



In pea plants, the flowers can be purple or white. The diagram shows three generations of pea plant crosses.

Part A: Using the pea flower color cross, identify the pattern of inheritance shown and explain how the cross shows this pattern.

It makes one white with alot of Purples.
it shows this pattern by purple being dominant.

Continued. Please refer to the previous page for task explanation.

Part B: Explain how farmers could ensure that they only grow white flowers.

By making white dominant.

Practice Set*

Subject: **Biology**

Item: **Pea Flower Color**

Grade **HS**

Name _____

Number	Score	Consensus	Annotation
P-1			
P-2			
P-3			
P-4			
P-5			
P-6			
P-7			
P-8			
P-9			
P-10			

***Responses in this set do not have true scores. Apply scores based on scoring criteria.**

Keystone Biology

Pea Flower Color

Handscoring
Training Sets 1 and 2
True Scores/Annotations

Training Set 1

Paper	Score	Comments
T1-1	3	Pt A: Identifies dominant/recessive, explanation is acceptable (not a strong explanation) Pt B: Only cross white flowers is correct
T1-2	2	Pt A: Explanation is acceptable for 1pt, no inheritance pattern identified Pt B: "Only growing white flowers" is acceptable
T1-3	0	This response demonstrates an insufficient understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by not completing any of the tasks in the item. The student fails to identify the pattern of inheritance and provides a very general explanation how the cross shows a pattern. In Part B, the student incorrectly explains how crossing 2 purple flowers would produce white flowers. This response contains work that is incomplete or unclear.
T1-4	1	Pt A: Nothing for credit – contains error, should be XX and xx (not Xx) Pt B: Correct for credit
T1-5	3	Pt A: White – recessive, purple – dominant, explanation is enough for credit – student uses 'gene' in place of 'allele' Pt B: Use pollen from only white flowers to pollinate is acceptable
T1-6	1	Pt A: Incomplete Pt B: Since white flower is recessive trait -> cross homozygous recessive plants is acceptable
T1-7	1	Pt A: 0 pts – inheritance pattern , none identified, explanation is not enough for credit Pt B: 1 pt – grow 2 whites together to get more white results is acceptable explanation
T1-8	1	Pt A: 1 pt – inheritance pattern , purple flower is dominant, white is recessive, explanation is not complete for credit Pt B: 0 pts – identifying white as dominant is not acceptable
T1-9	3	This response demonstrates a thorough understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing the all tasks presented in the item. The student correctly identifies the pattern of inheritance (the purple flower is dominant and the white flower is recessive). In addition, the student correctly explains how the cross shows the pattern by describing the genotypes of the parent flowers and following the inheritance pattern down the two additional generations. Finally, the student explains that by crossing only white flowered pea plants, the farmer would only grow white flowers. The additional explanation contains additional correct information, but is not needed for credit. The response is complete, clear and correct.
T1-10	2	Pt A: Pattern is identified, explanation is not enough for credit – 1pt Pt B: Farmers could cross-pollinate white flowers is correct for credit

Training Set 2

Paper	Score	Comments
T2-1	1	Pt A: 1 pt – inheritance pattern , the purple color is dominant over the white color is acceptable identification, explanation is not enough for credit Pt B: 0 pts – incomplete explanation, could you cross purple flowers with purple flowers to create only white flowers?
T2-2	3	Pt A: 2 pts – inheritance pattern , the purple flower is dominant to the white flower, purple flowers (line 2) have a recessive trait embedded in their genetics, during the F2 generation (line 3) the white shows up again because of the recessive trait is acceptable explanation Pt B: 1 pt – only let white flowered plants reproduce with white flowered plants, additional information not incorrect
T2-3	0	Pt A: 0 pts – inheritance pattern , <u>not</u> identified, explanation contains an error, PP x Pp should be Pp x Pp and keeps student from earning credit Pt B: 0 pts – explanation is unclear, if all the white flowers are gone, how do we get any white flowers?
T2-4	1	This response demonstrates a minimal understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by completing one of the tasks presented in the item. The student incorrectly identifies the pattern of inheritance as incomplete dominance and the explanation of the how the cross shows the pattern is not enough for credit (though the student does correctly state the recessive allele is carried down to the third generation). The explanation of how farmer could ensure they grow only white flowers is acceptable for credit. Finding only white flowers which both contain 2 recessive alleles is correct. This response contains work that is incomplete or unclear.
T2-5	2	This response demonstrates a partial understanding of observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles) by fulfilling two of the tasks presented in the item. The student accurately identifies the pattern of inheritance (purple is dominant and white is recessive), but provides an incomplete explanation how the cross shows the pattern. The explanation how farmers could ensure they only grow white flowers is acceptable for credit. The student correctly states the farmer would have to buy strictly white flowers. Doing so would produce offspring that will always be recessive and white. This response contains some work that is incomplete or unclear.
T2-6	1	Pt A: 0 pts – inheritance pattern , not identified, explanation is not correct Pt B: 1 pt – only planting and growing white flower seeds is acceptable explanation
T2-7	3	Pt A: 2 pts – inheritance pattern , dominant for purple and recessive for white, explanation of the patten is acceptable Pt B: 1 pt – find 2 true bred for the color white, and keep breeding them (identifying “true breeding” is not necessary, but not incorrect)
T2-8	2	Pt A: 1 pt – inheritance pattern , purple flower is dominant, recessive pea plants that have white flowers (from Pt B) is acceptable in a 2 paper; Pt B: 1 pt – cross only recessive pea plants that have white flowers

Training Set 2 (*cont.*)

T2-9	1	Pt A: 1 pt – inheritance pattern, <u>not</u> complete, white flower not identified as the recessive trait, explanation is acceptable, purple flower must have been dominant, offspring (of the first) line still carried the white flower trait Pt B: 0 pts – they might be able to use pink flowers is incorrect (only cross white flowers would be acceptable)
T2-10	0	Pt A: 0 pts – inheritance pattern, <u>not</u> complete, white flower not identified as recessive, purple only identified as <u>most</u> dominant Pt B: 0 pts – identifying the white flower as dominant (need to get plants with dominant genes of white flowers) is considered an error and demonstrates a misunderstanding that cannot be ignored