

Form	BA - 1, Science, Grade 8, SY 24-25
Identifier	F-BO07WQ_C49696

Item	BA-1_Grade 8_1_Impact of Animal Behaviors and Plant Structures on Successful Reproduction
Identifier	I-SCI-F-S000026_C73763
Standards	SCI.6-8.MS-LS1-4

Impact of Animal Behaviors and Plant Structures on Successful Reproduction

In a study done in a tropical rainforest, scientists watched a type of bird called the Golden-winged Warbler (*Vermivora chrysoptera*) during its breeding season.



Scientists noticed that male warblers did special flight patterns and sang beautiful songs to attract female mates. After the courtship, if females were interested in the male, the female warblers checked the nests that the males had built, which were made of twigs, leaves, and feathers, before deciding to lay eggs with that male as a mate. This behavior helped ensure that the warblers reproduced successfully and showed how important good nests are for the survival of their chicks.

Considering the behaviors described in the passage, which scientific explanation best accounts for the role of vocalization and aerial displays in the reproductive success of the Golden-winged Warbler?

- A These behaviors deter other males from entering the territory, reducing competition.
- B These behaviors communicate the male's health and genetic fitness to potential female mates.
- C These behaviors help the male warblers establish dominance within the flock, leading to increased mating opportunities.
- D These behaviors confuse predators, allowing the warblers to mate safely.

Item	BA-1_Grade 8_2_Impact of Animal Behaviors and Plant Structures on Successful Reproduction
Identifier	I-SCI-F-S000026_C87251
Standards	SCI.6-8.MS-LS1-6

Impact of Animal Behaviors and Plant Structures on Successful Reproduction

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Which argument is best supported by the empirical evidence provided in the passage regarding the importance of nest quality in the Golden-winged Warbler's reproductive success?

- A High-quality nests attract more female warblers, increasing the chances of multiple females choosing the same male.
- B High-quality nests are more durable and better protect the chicks from harsh weather conditions.
- C High-quality nests are more likely to be built in safer locations, reducing the risk of predation.
- D High-quality nests reflect the male warbler's fitness, leading to a higher probability of successful reproduction.

Item	BA-1_Grade 8_3_Impact of Animal Behaviors and Plant Structures on Successful Reproduction
Identifier	I-SCI-F-S000026_C14476
Standards	SCI.6-8.MS-LS1-4

Impact of Animal Behaviors and Plant Structures on Successful Reproduction

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Scientists noticed that male warblers did special flight patterns and sang beautiful songs to attract female mates. After the courtship, if females were interested in the male, the female warblers checked the nests that the males had built, which were made of twigs, leaves, and feathers, before deciding to lay eggs with that male as a mate. This behavior helped ensure that the warblers reproduced successfully and showed how important good nests are for the survival of their chicks.

Based on the passage, which of the following behaviors is most directly related to the reproductive success of the Golden-winged Warbler?

- A The male warblers' special flight patterns and songs to attract mates.
- B The female warblers building a sturdy nest for the eggs.
- C The male warblers' defense of their territory during the breeding season.
- D The female warblers' selection of mates based on physical appearance.

Item	BA-1_Grade 8_4_Environmental and Genetic Influences on Growth of Organisms
Identifier	I-SCI-F-S000026_C51544
Standards	SCI.6-8.MS-LS1-5

Environmental and Genetic Influences on Growth of Organisms

Students design an experiment to investigate the effect of temperature on the growth height of bell pepper plants (*Capsicum annuum*). The experimental setup will try to determine whether varying temperature conditions significantly influence the height of bell pepper plants over a specified growth period. Bell pepper seeds were planted in identical pots with uniform soil and distributed across five temperature-controlled environments as shown in the data table. All other growth conditions, including light exposure and watering, were kept consistent across the groups. The height of the plants was after six weeks. Data analysis involved calculating the average plant height in each temperature group and comparing these averages to identify trends related to temperature.

Temperature (°C)	Height of Bell Pepper Plant (cm)
20	15
25	18
30	22
35	20
40	17

Based on the data table, describe the relationship between temperature and the height of the bell pepper plants.

- A The height of the bell pepper plants remains constant regardless of temperature changes. The height of the bell pepper plants increases as the temperature increases up to a certain point, then decreases.
- B The height of the bell pepper plants decreases as the temperature increases.
- C The height of the bell pepper plants increases as the temperature increases up to a certain point, then decreases.
- D There is no apparent relationship between temperature and the height of the bell pepper plants.

Item	BA-1_Grade 8_5_Environmental and Genetic Influences on Growth of Organisms
Identifier	I-SCI-F-S000026_C72363
Standards	SCI.6-8.MS-LS1-5

Environmental and Genetic Influences on Growth of Organisms

A farmer notices that two varieties of corn plants, A and B, grow at different rates when planted in the same field under identical conditions. Corn variety A grows taller and faster than variety B.



Based on this observation, which of the following explanations best accounts for the difference in growth?

- A Corn variety A is likely receiving more water and nutrients than variety B.
- B Corn variety A may have genetic traits that promote faster growth compared to variety B.
- C The temperature in the field might be more suitable for corn variety A than for variety B.
- D Corn variety B is likely planted in an area with less sunlight than variety A.

Item	BA-1_Grade 8_6_Environmental and Genetic Influences on Growth of Organisms
Identifier	I-SCI-F-S000026_C41575
Standards	SCI.6-8.MS-LS1-5

Environmental and Genetic Influences on Growth of Organisms

A researcher is studying the growth of a certain plant species in two different environments: a drought-prone area and a well-watered area. The researcher finds that the plants in the well-watered area grow significantly larger.

Which of the following explanations is most consistent with the evidence?

- A The plants in the well-watered area have a genetic mutation that causes them to grow larger.
- B The soil quality in the well-watered area is better, leading to larger plant growth.
- C The plants in the drought-prone area likely have weaker genetic traits.
- D The availability of water is a critical environmental factor that influences plant growth.

Item	BA-1_Grade 8_7_Structural Changes to Genes (Mutations)
Identifier	I-SCI-F-S000026_C75082
Standards	SCI.6-8.MS-LS3-1

Structural Changes to Genes (Mutations)

A scientist models a mutation in a gene responsible for the color of a flower. The mutation leads to a change in the protein that controls pigment (color) production.

Based on this model, what are the potential effects of the mutation on the flower's color?

- A The flower will definitely become a different color, regardless of other factors.
- B The mutation might cause the flower to produce a different color, or it might have no effect if the protein's function remains the same.
- C The flower's color will not change because mutations cannot affect pigment proteins.
- D The flower will lose its color completely due to the mutation.

Item	BA-1_Grade 8_8_Structural Changes to Genes (Mutations)
Identifier	I-SCI-F-S000026_C56391
Standards	SCI.6-8.MS-LS3-1

Structural Changes to Genes (Mutations)

In a model of genetic mutation, a single change in one part of a gene leads to the production of a nonfunctional protein which will no longer perform the correct function of that protein.

How might this mutation affect the organism's overall health and function?

- A The organism will experience no changes since functional proteins are not crucial for survival.
- B The mutation will always be beneficial, as it creates new opportunities for the organism to adapt.
- C The nonfunctional protein might lead to a buildup of substances that the protein would normally break down, potentially causing harmful effects.
- D The organism will become stronger and more resilient due to the mutation.

Item	BA-1_Grade 8_9_Structural Changes to Genes (Mutations)
Identifier	I-SCI-F-S000026_C09465
Standards	SCI.6-8.MS-LS3-1

Structural Changes to Genes (Mutations)

Consider a model where a mutation in a gene results in a protein that is more efficient at binding to oxygen.

How might this mutation affect the organism?

- A The protein might enhance the organism's oxygen-carrying capacity, which could be beneficial under certain conditions.
- B The mutation will definitely be harmful, reducing the organism's ability to survive.
- C The mutation will have no effect, as oxygen-binding efficiency does not influence the organism's health.
- D The organism will immediately become sick due to the mutation, as changes to proteins are always damaging.

Item	BA-1_Grade 8_10_Genetic Variation in Offspring from Asexual and Sexual Reproduction
Identifier	I-SCI-F-S000026_C12181
Standards	SCI.6-8.MS-LS3-2

Genetic Variation in Offspring from Asexual and Sexual Reproduction

In a study conducted by scientists, two separate populations of a species of freshwater Hydra were observed. One population reproduced asexually through a process called budding, where a small outgrowth develops on the parent organism and eventually detaches to form a new individual. The other population reproduced sexually, where specialized cells containing genetic information from two parents combined to form offspring. The scientists collected genetic data from offspring in both populations and compared the level of genetic variation present.



Reproduction Method	Offspring Genetic Variation
Asexual	Low
Sexual	High

The data clearly shows that offspring resulting from asexual reproduction have nearly identical genetic information, while offspring from sexual reproduction exhibit a wide range of genetic variation.

Based on the data presented, explain why offspring resulting from asexual reproduction have low genetic variation compared to those resulting from sexual reproduction.

- A Offspring from asexual reproduction inherit genetic material from only one parent, resulting in limited variation.
- B Offspring from asexual reproduction undergo random mutations that increase genetic similarity.
- C Offspring from asexual reproduction receive genetic material from multiple parents, reducing variation.
- D Offspring from asexual reproduction have higher rates of genetic recombination, leading to decreased variation.

Item	BA-1_Grade 8_11_Genetic Variation in Offspring from Asexual and Sexual Reproduction
Identifier	I-SCI-F-S000026_C63438
Standards	SCI.6-8.MS-LS3-2

Genetic Variation in Offspring from Asexual and Sexual Reproduction

In a study conducted by scientists, two separate populations of a species of freshwater Hydra were observed. One population reproduced asexually through a process called budding, where a small outgrowth develops on the parent organism and eventually detaches to form a new individual. The other population reproduced sexually, where specialized cells containing genetic information from two parents combined to form offspring. The scientists collected genetic data from offspring in both populations and compared the level of genetic variation present.



Reproduction Method	Offspring Genetic Variation
Asexual	Low
Sexual	High

The data clearly shows that offspring resulting from asexual reproduction have nearly identical genetic information, while offspring from sexual reproduction exhibit a wide range of genetic variation.

Propose a hypothesis for why genetic variation is important for the survival of a species in changing environments based on the results of this study.

- A Genetic variation leads to increased competition among individuals, promoting species extinction in changing environments.
- B Reduced genetic variation ensures that species remain unchanged and well-adapted to their current environment.
- C Increased genetic variation provides a greater pool of traits for natural selection to act upon, increasing the likelihood of individuals adapting to environmental changes.
- D Genetic variation results in decreased fitness and reproductive success in changing environments.

Item	BA-1_Grade 8_12_Genetic Variation in Offspring from Asexual and Sexual Reproduction
Identifier	I-SCI-F-S000026_C39928
Standards	SCI.6-8.MS-LS3-2

Genetic Variation in Offspring from Asexual and Sexual Reproduction

A Punnett square is used to model the genetic outcomes of sexual reproduction.

	R	r
R	RR	Rr
r	Rr	rr

Which of the following conclusions can be drawn from the Punnett square about genetic variation in offspring?

- A The Punnett square shows that sexual reproduction always produces offspring with identical genetic information.
- B The Punnett square proves that sexual reproduction results in offspring with fewer genetic differences than their parents.
- C The Punnett square demonstrates that offspring inherit only dominant traits from their parents, resulting in no genetic variation.
- D The Punnett square illustrates how different combinations of alleles from each parent can lead to genetic variation in the offspring.

Item	BA-1_Grade 8_13_Impact of CRISPR-Cas9 Technology on Inheritance of Desired Traits in Organisms
Identifier	I-SCI-F-S000026_C30305
Standards	SCI.6-8.MS-LS4-5

Impact of CRISPR-Cas9 Technology on Inheritance of Desired Traits in Organisms

A recent study conducted at the University of Science has shown the profound impact of CRISPR-Cas9 technology on the inheritance of desired traits in organisms. This revolutionary gene-editing tool has transformed the field of genetics by allowing scientists to precisely modify DNA sequences in a variety of species. Researchers utilized CRISPR-Cas9 to introduce a beneficial gene associated with drought resistance into a strain of corn plants. The genetically modified corn plants exhibited enhanced drought tolerance compared to the control group, showcasing the potential of this technology in crop improvement strategies.

Describe the main technology highlighted in the scientific study. How does CRISPR-Cas9 impact the inheritance of desired traits in organisms?

- A CRISPR-Cas9 is a gene-editing tool that allows scientists to precisely modify DNA sequences, enabling the introduction of desired traits into organisms.
- B CRISPR-Cas9 is a method used to clone organisms with desired traits, ensuring inheritance of specific genetic characteristics.
- C CRISPR-Cas9 is a technique for hybridizing organisms to create offspring with desired traits inherited from both parents.
- D CRISPR-Cas9 is a process of genetic recombination that alters the inheritance patterns of traits in organisms.

Item	BA-1_Grade 8_14_Impact of CRISPR-Cas9 Technology on Inheritance of Desired Traits in Organisms
Identifier	I-SCI-F-S000026_C17768
Standards	SCI.6-8.MS-LS4-5

Impact of CRISPR-Cas9 Technology on Inheritance of Desired Traits in Organisms

A recent study conducted at the University of Science has shown the profound impact of CRISPR-Cas9 technology on the inheritance of desired traits in organisms. This revolutionary gene-editing tool has transformed the field of genetics by allowing scientists to precisely modify DNA sequences in a variety of species. Researchers utilized CRISPR-Cas9 to introduce a beneficial gene associated with drought resistance into a strain of corn plants. The genetically modified corn plants exhibited enhanced drought tolerance compared to the control group, showcasing the potential of this technology in crop improvement strategies.

What were the specific findings of the study conducted at the University of Science regarding the use of CRISPR-Cas9 technology in corn plants for drought resistance?

- A The genetically modified corn plants exhibited reduced growth rates compared to the control group.
- B The genetically modified corn plants showed no significant difference in drought tolerance compared to the control group.
- C The genetically modified corn plants displayed enhanced drought tolerance due to the introduction of a beneficial gene associated with drought resistance.
- D The genetically modified corn plants experienced increased susceptibility to drought stress compared to the control group.

Item	BA-1_Grade 8_15_Impact of CRISPR-Cas9 Technology on Inheritance of Desired Traits in Organisms
Identifier	I-SCI-F-S000026_C76890
Standards	SCI.6-8.MS-LS4-5

Impact of CRISPR-Cas9 Technology on Inheritance of Desired Traits in Organisms

A recent study conducted at the University of Science has shown the profound impact of CRISPR-Cas9 technology on the inheritance of desired traits in organisms. This revolutionary gene-editing tool has transformed the field of genetics by allowing scientists to precisely modify DNA sequences in a variety of species. Researchers utilized CRISPR-Cas9 to introduce a beneficial gene associated with drought resistance into a strain of corn plants. The genetically modified corn plants exhibited enhanced drought tolerance compared to the control group, showcasing the potential of this technology in crop improvement strategies.

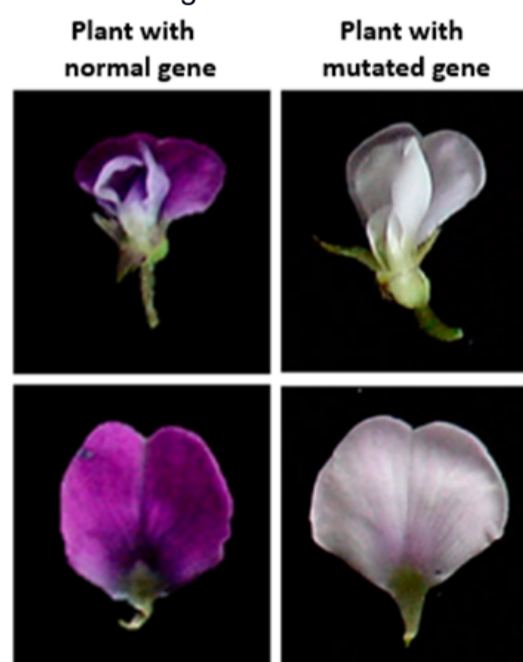
How does the information gathered from this study contribute to our understanding of how technologies have changed the way humans influence the inheritance of desired traits in organisms?

- A It demonstrates the limitations of CRISPR-Cas9 technology in modifying genetic traits in organisms.
- B It highlights the potential of CRISPR-Cas9 technology in enhancing desired traits, such as drought resistance, in crops.
- C It indicates that traditional breeding methods are more effective than CRISPR-Cas9 technology in improving crop traits.
- D It suggests that CRISPR-Cas9 technology has no significant impact on the inheritance of desired traits in organisms.

Item	BA-1_Grade 8_16_Impact of a Mutation on the Coloration of Flower Petals
Identifier	I-SCI-F-S000026_C77936
Standards	SCI.6-8.MS-LS3-1

Impact of a Mutation on the Coloration of Flower Petals

Recent research on the plant species *Arabidopsis thaliana* has found a gene on chromosome 5 that controls the production of a pigment in the flower petals. This pigment is what gives the petals their bright purple color. Scientists conducted experiments that caused a mutation in this gene, leading to a change in its structure. As a result, the mutated gene produces a different protein that alters the pigment production. The flower petals of plants with this mutation now show a range of colors from pale lavender to almost white, instead of the deep purple seen in the normal plants. This change in color shows how alterations in gene structure can affect the proteins and traits of an organism.



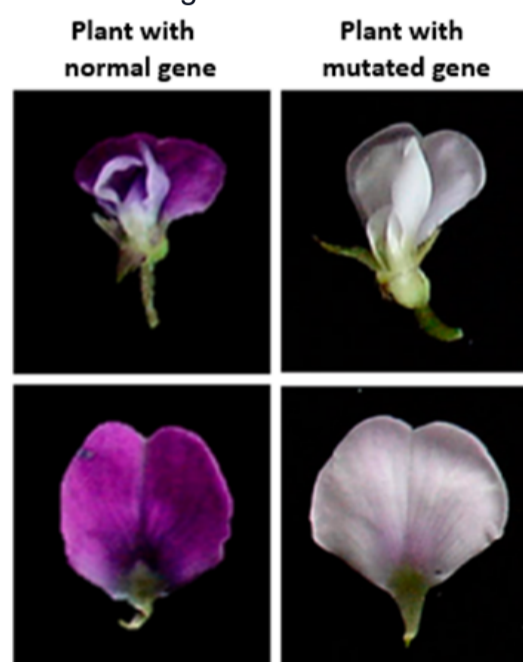
How did the mutation induced in the gene on chromosome 5 affect the coloration of the flower petals in *Arabidopsis thaliana*?

- A The mutation resulted in increased pigment production, leading to deeper purple coloration.
- B The mutation caused the complete loss of pigment production, resulting in white flower petals.
- C The mutation altered the structure of the pigment, resulting in a range of colors from pale lavender to almost white.
- D The mutation had no effect on the coloration of the flower petals.

Item	BA-1_Grade 8_17_Impact of a Mutation on the Coloration of Flower Petals
Identifier	I-SCI-F-S000026_C43341
Standards	SCI.6-8.MS-LS3-1

Impact of a Mutation on the Coloration of Flower Petals

Recent research on the plant species *Arabidopsis thaliana* has found a gene on chromosome 5 that controls the production of a pigment in the flower petals. This pigment is what gives the petals their bright purple color. Scientists conducted experiments that caused a mutation in this gene, leading to a change in its structure. As a result, the mutated gene produces a different protein that alters the pigment production. The flower petals of plants with this mutation now show a range of colors from pale lavender to almost white, instead of the deep purple seen in the normal plants. This change in color shows how alterations in gene structure can affect the proteins and traits of an organism.



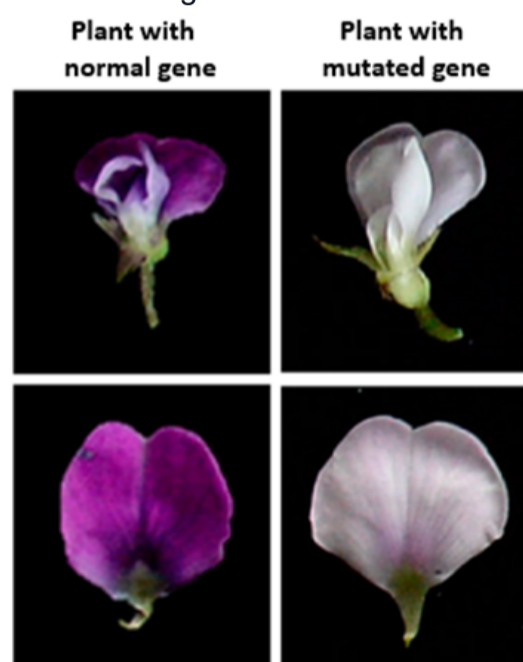
Explain the relationship between the gene, protein, and observable trait changes observed in the flower petals of the mutated plants compared to the wild-type plants.

- A The mutated gene produces a different protein that enhances pigment production, leading to deeper coloration in the flower petals.
- B The mutated gene directly controls the coloration of the flower petals without involving protein production.
- C The mutated gene has no impact on observable trait changes in the flower petals.
- D The mutated gene alters the structure of the protein, affecting pigment production and resulting in varied coloration in the flower petals.

Item	BA-1_Grade 8_18_Impact of a Mutation on the Coloration of Flower Petals
Identifier	I-SCI-F-S000026_C10401
Standards	SCI.6-8.MS-LS3-1

Impact of a Mutation on the Coloration of Flower Petals

Recent research on the plant species *Arabidopsis thaliana* has found a gene on chromosome 5 that controls the production of a pigment in the flower petals. This pigment is what gives the petals their bright purple color. Scientists conducted experiments that caused a mutation in this gene, leading to a change in its structure. As a result, the mutated gene produces a different protein that alters the pigment production. The flower petals of plants with this mutation now show a range of colors from pale lavender to almost white, instead of the deep purple seen in the normal plants. This change in color shows how alterations in gene structure can affect the proteins and traits of an organism.



Hypothesize what other structural changes to genes could lead to different observable effects on the flower petals of *Arabidopsis thaliana*, supporting your answer with scientific reasoning.

- A Changes that increase the efficiency of pigment production, resulting in deeper and more intense colors.
- B Structural changes that inhibit pigment production entirely, leading to completely white flower petals.
- C Structural changes that affect the expression of genes responsible for petal development, leading to changes in size, shape, or texture of the petals.
- D Changes that alter the shape or structure of the proteins that make up the flower pigment, causing unique patterns or color variations.

Item	BA-1_Grade 8_19_Genetic Variations and Survival of Traits in a Population
Identifier	I-SCI-F-S000026_C19532
Standards	SCI.6-8.MS-LS4-4

Genetic Variations and Survival of Traits in a Population

In a study conducted in the Great Barrier Reef, scientists have observed two groups of clownfish (*Amphiprion ocellaris*) living in different coral reefs within the ecosystem.



Bright Orange Clownfish



Pale Orange Clownfish

One group of clownfish has genetic variations that result in brighter orange coloring, which helps them blend in with the vibrant coral reefs abundant in the area. The other group, however, has genetic variations leading to a paler orange coloration, making them stand out more against the coral reefs.

How do the genetic variations in the two groups of clownfish mentioned in the stimulus influence their survival in their respective environments?

- A The genetic variations do not affect survival; clownfish are equally adapted to any environment.
- B Clownfish with brighter orange coloring are more likely to survive as they blend in with the vibrant coral reefs, providing camouflage from predators.
- C Clownfish with paler orange coloration are more likely to survive as they stand out against the coral reefs, deterring predators.
- D Both groups of clownfish have equal chances of survival regardless of their coloration.

Item	BA-1_Grade 8_20_Genetic Variations and Survival of Traits in a Population
Identifier	I-SCI-F-S000026_C04653
Standards	SCI.6-8.MS-LS4-4

Genetic Variations and Survival of Traits in a Population

In a study conducted in the Great Barrier Reef, scientists have observed two groups of clownfish (*Amphiprion ocellaris*) living in different coral reefs within the ecosystem.



Bright Orange Clownfish



Pale Orange Clownfish

One group of clownfish has genetic variations that result in brighter orange coloring, which helps them blend in with the vibrant coral reefs abundant in the area. The other group, however, has genetic variations leading to a paler orange coloration, making them stand out more against the coral reefs.

If a new predator species were to enter the Great Barrier Reef ecosystem that primarily targeted brightly colored fish, predict how the populations of the two groups of clownfish may be affected over time. Support your answer with evidence from the stimulus.

- A The population of clownfish with paler orange coloration would decline due to increased predation pressure, while the population of brightly colored clownfish may increase.
- B The population of clownfish with brighter orange coloring would decline due to increased predation pressure, while the population of paler orange clownfish may increase.
- C Both populations of clownfish would decline at similar rates as they are equally vulnerable to predation.
- D The populations of both groups of clownfish would remain stable as predation would not significantly impact either group.

Item	BA-1_Grade 8_21_Genetic Variations and Survival of Traits in a Population
Identifier	I-SCI-F-S000026_C42039
Standards	SCI.6-8.MS-LS4-4

Genetic Variations and Survival of Traits in a Population

A population of birds lives in an area where the availability of seeds fluctuates. Some birds have a genetic variation that gives them a larger beak, allowing them to crack open tough seeds.

How might this variation impact the birds' survival during times when only tough seeds are available?

- A Birds with larger beaks are more likely to survive and reproduce because they can access food when only tough seeds are available.
- B Birds with smaller beaks will have a better chance of survival because they do not need as much food.
- C All birds, regardless of beak size, will have the same chance of surviving when tough seeds are available.
- D Birds with larger beaks will not survive because they are more likely to be caught by predators.

Item	BA-1_Grade 8_22_Fur Color Variation in Arctic Hares
Identifier	I-SCI-F-S000026_C58363
Standards	SCI.6-8.MS-LS4-6

Genetic Variations and Survival of Traits in a Population

Generation	Number of Brown Hares	Number of White Hares
1	150	50
2	120	80
3	100	100
4	90	110
5	80	120



Brown Arctic Hare



White Arctic Hare

Based on the data table provided, describe how the population of brown hares changed over generations and explain how this relates to natural selection.

- A The population of brown hares decreased over generations, indicating natural selection favored white hares due to their better camouflage in the snowy environment.
- B The population of brown hares increased over generations, suggesting natural selection favored their fur coloration for better camouflage in the Arctic habitat.
- C The population of brown hares remained constant over generations, indicating no effect of natural selection on fur coloration.
- D The population of brown hares fluctuated over generations, showing random variations unrelated to natural selection.

Item	BA-1_Grade 8_23_Fur Color Variation in Arctic Hares
Identifier	I-SCI-F-S000026_C54406
Standards	SCI.6-8.MS-LS4-6

Genetic Variations and Survival of Traits in a Population

Generation	Number of Brown Hares	Number of White Hares
1	150	50
2	120	80
3	100	100
4	90	110
5	80	120



Brown Arctic Hare



White Arctic Hare

Calculate the total population of hares in each generation.

What trend do you notice in the total population of hares over the five generations?

- A The total population of hares increased steadily over the five generations, reflecting improved adaptation to the environment.
- B The total population of hares remained relatively stable over the five generations, indicating a balance between birth and death rates.
- C The total population of hares decreased over the five generations, suggesting environmental pressures leading to population decline.
- D The total population of hares fluctuated inconsistently over the five generations, showing no clear trend.

Item	BA-1_Grade 8_24_Fur Color Variation in Arctic Hares
Identifier	I-SCI-F-S000026_C47168
Standards	SCI.6-8.MS-LS4-6

Genetic Variations and Survival of Traits in a Population

Generation	Number of Brown Hares	Number of White Hares
1	150	50
2	120	80
3	100	100
4	90	110
5	80	120



Brown Arctic Hare



White Arctic Hare

Hypothesize why there is an increase in the number of white hares over time in this population of Arctic hares.

- A Brown hares face higher predation pressure due to their conspicuous fur coloration, causing their population to decline relative to white hares.
- B White hares have a higher reproductive rate compared to brown hares, resulting in their population growth over time.
- C Environmental changes in the Arctic habitat favor white fur coloration in hares, driving an increase in the number of white individuals in the population.
- D Natural selection favors white hares as predators find them more difficult to detect against the snowy background, leading to their increased survival and reproduction.