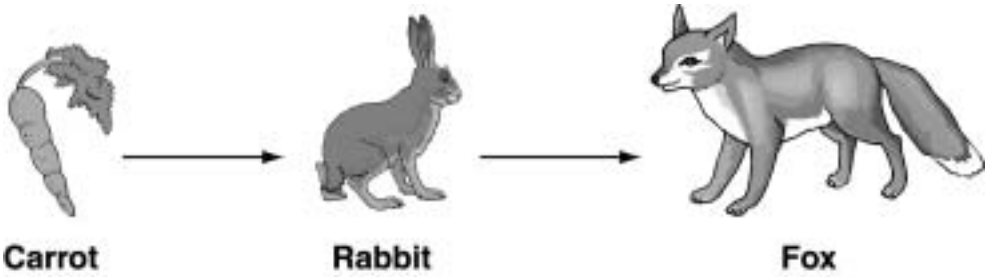
BENCHMARK SC.B.1.2.1

Strand	**B**	Energy
Standard	**1**	The student recognizes that energy may be changed in form with varying efficiency.
Benchmark	**SC.B.1.2.1**	The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).
Item Type(s)		MC, SR
Benchmark Clarification		The student identifies energy transfers in biotic or abiotic systems.
Content Limits		Items may address the student's understanding of energy flow in ecosystems, mechanical, and electrical systems. Items may assess the student's ability to place elements of a portion of a system in the correct order showing the appropriate energy flow. Items may address potential energy, heat transfer, and release of energy from fossil fuels.
Stimulus Attributes		Items will use simple, clear graphics in place of lengthy descriptions to describe systems. Items will describe a real-world context. Items will NOT use more than four parts of a system.
Response Attributes		None specified.

Sample MC Item

Each living thing in a food chain plays a role in the flow of energy in an ecosystem. Below is a picture of a simple food chain. The rabbit eats carrots and the fox eats the rabbit.

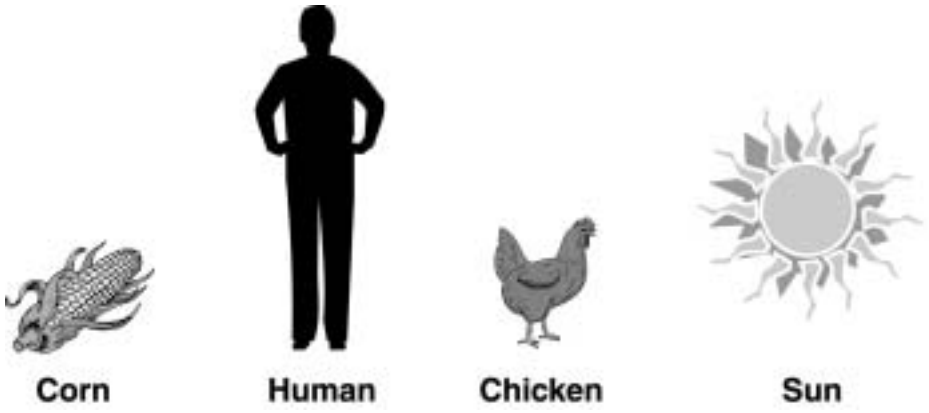


What is the **primary** role of the rabbit in this food chain?

A. to form a habitat
B. to find a space to live
C. to be a source of water
* D. to be a source of energy

Sample SR Item

Safara cuts out these pictures from a magazine. She must use all four of them to make an example of a food chain.



Part A Using words, show a food chain using all of Safara's pictures.

Part B Explain the transfer of energy between all four of the organisms in your food chain.

Correct and Complete Response

Part A Sun → Corn → Chicken → Human

Part B The energy from the Sun is converted to food by the corn. When the chicken eats the corn the energy is transferred to the chicken. The energy in the chicken is then transferred to the human when he eats the chicken.

BENCHMARK SC.B.1.2.2

Strand	**B**	Energy
Standard	**1**	The student recognizes that energy may be changed in form with varying efficiency.
Benchmark	**SC.B.1.2.2**	The student recognizes various forms of energy (e.g., heat, light, and electricity). This benchmark also assesses SC.B.1.2.4.[1]
Item Type(s)		MC
Benchmark Clarification		The student identifies types of energy by their source and properties.
Content Limits		Items will NOT address chemical energy. Items will NOT require memorization or quantification of energy quantities. Items may address both renewable and nonrenewable forms of energy. Items may assess the student's knowledge of potential and kinetic energy.
Stimulus Attributes		Items may provide the student's data in drawing or picture form.
Response Attribute		Items may require responses in the form of clearly labeled graphics.

[1] The complete text of SC.B.1.2.4 is "The student knows the many ways in which energy can be transformed from one type to another."

Sample MC Item

For a special dinner, Catherine's mom lit some candles in the living room for decoration.

Which two forms of energy does the fire from a burning candle release?

* A. light and heat
B. sound and chemical
C. magnetic and nuclear
D. electrical and mechanical

BENCHMARK SC.B.1.2.3

Strand	**B**	Energy
Standard	**1**	The student recognizes that energy may be changed in form with varying efficiency.
Benchmark	**SC.B.1.2.3**	The student knows that most things that emit light also emit heat.
Item Type(s)		MC
Benchmark Clarification		The student identifies radiation in the form of light and heat.
Content Limits		Items will NOT require unit conversions to compare data.
Stimulus Attributes		Data in chart, diagram, or picture form may clearly and simply demonstrate to the student that most things that emit light also emit heat.
Response Attributes		None specified.
Sample MC Item		Lamps and flashlights produce light. When they are turned on, they also produce another type of energy. What other type of energy do these objects emit? A. chemical B. nuclear C. solar * D. thermal

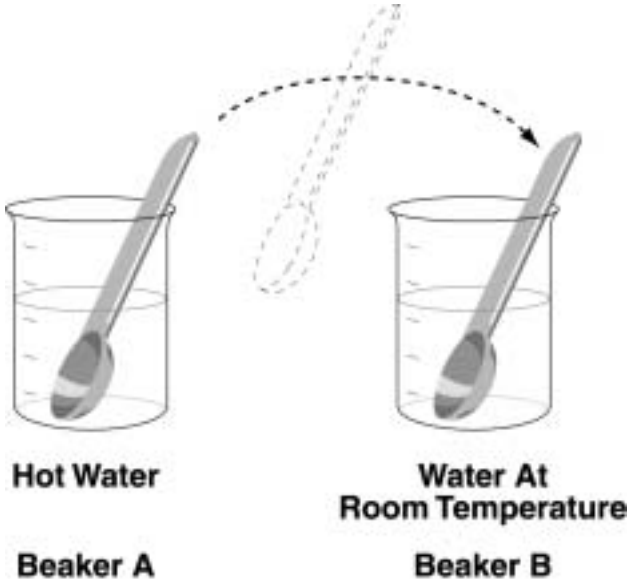
BENCHMARK SC.B.1.2.5

Strand	**B**	Energy
Standard	**1**	The student recognizes that energy may be changed in form with varying efficiency.
Benchmark	**SC.B.1.2.5**	The student knows that various forms of energy (e.g., mechanical, chemical, electrical, magnetic, nuclear, and radiant) can be measured in ways that make it possible to determine the amount of energy that is transformed. This benchmark also assesses SC.B.1.2.6.[2]
Item Type(s)		MC
Benchmark Clarification		The student identifies energy transformations by changes that occur and knows ways to measure energy changes.
Content Limits		Items will NOT require the student to quantify energy transfers. Items will NOT require unit conversions to compare data. Items may ask students to identify the various forms of energy.
Stimulus Attributes		None specified.
Response Attributes		None specified.

[2] The complete text for SC.B.1.2.6 is "The student knows ways that heat can move from one object to another."

Sample MC Item

A spoon is put into Beaker A containing hot water for five minutes. Then the spoon is moved to Beaker B containing water at room temperature.



Which is the **best** way to measure the energy transfer that causes the change in the water temperature in Beaker B after the spoon is added?

A. Use a graduated cylinder to measure the new water levels.

*B. Use a thermometer to determine the change in Beaker B.

C. Use a balance to determine how much heat has been added to Beaker B.

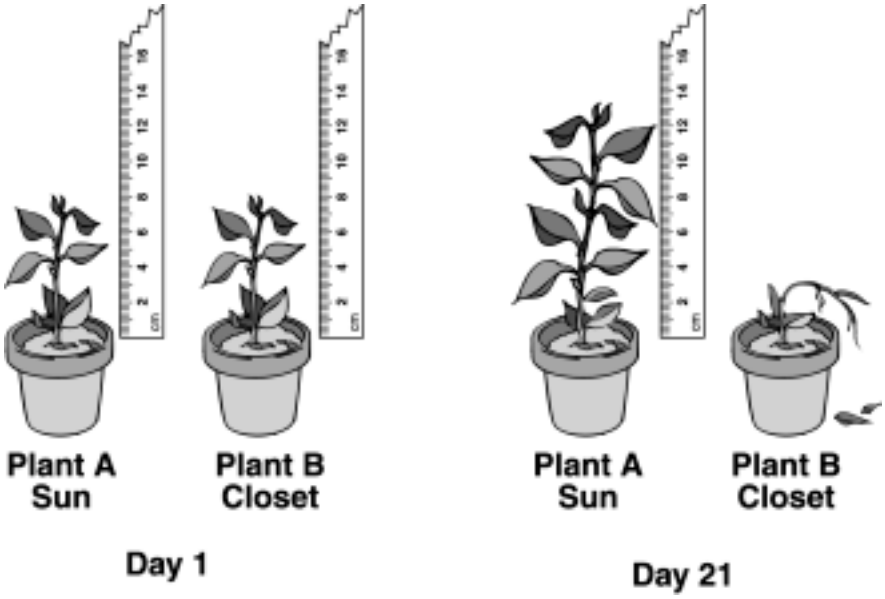
D. Use a ruler to measure how much water has evaporated from Beaker B.

BENCHMARK SC.B.2.2.1

Strand	**B**	Energy
Standard	**2**	The student understands the interaction of matter and energy.
Benchmark	**SC.B.2.2.1**	The student knows that some source of energy is needed for organisms to stay alive and grow.
Item Type(s)		MC
Benchmark Clarification		The student recognizes that all organisms, including plants and animals, need energy to maintain life and to grow.
Content Limits		Items will NOT require knowledge of chemical formulas.
Stimulus Attributes		Items may provide the student with data in the form of simple, clearly labeled pictures.
Response Attributes		None specified.

Sample MC Item

Plant A was placed on a sunny windowsill, and another just like it, Plant B, was placed in a dark closet. Each plant was given the same amount of soil and water. At the end of three weeks, Plant A in the sunny window had grown about six more centimeters (cm), but Plant B in the closet had started to wither and die. This activity was repeated many more times with other plants and similar results were recorded.



Why did Plant A grow more than Plant B?

* A. There was no sunlight in the closet.
B. Plant B had no oxygen (O_2) in the closet.
C. There was no air movement in the closet.
D. Plant B had no carbon dioxide (CO_2) in the closet.