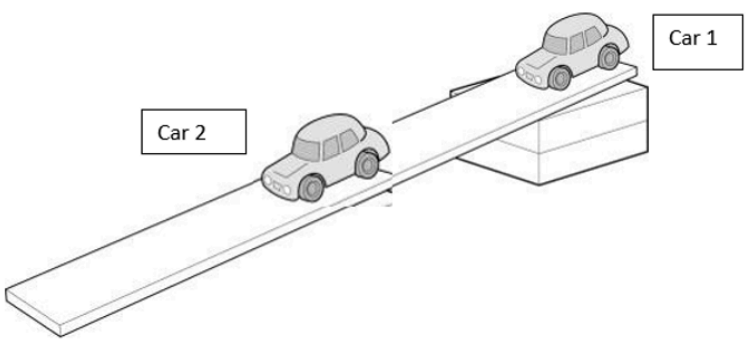
Form	BA - 1, Science, Grade 4, SY 24-25
Identifier	F-7ZWBC5_C17743

Item	BA-1_4_Toy Car_Q1
Identifier	I-SCI-F-227_C60372
Standards	SCI.4.4-PS3-1

Relationship between the Speed of a Rolling Toy Car and its Energy

In a science experiment, a group of students rolled two identical toy cars down a ramp. Car 1 started at the top of the ramp and rolled all the way to the bottom. The Car 2 started halfway down the ramp and reached a lower speed compared to the first car.



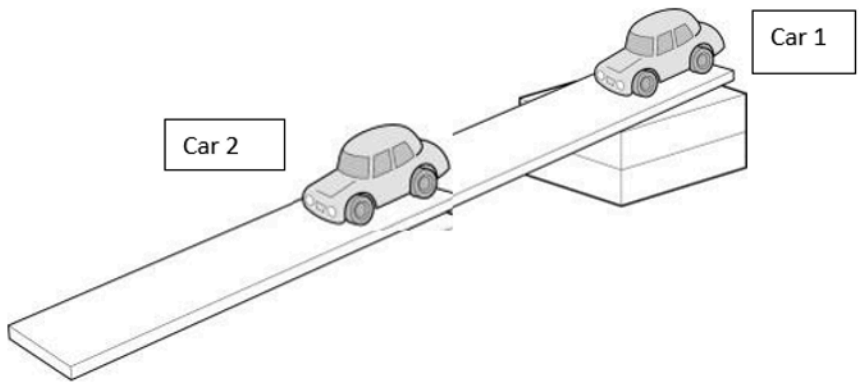
Which toy car has more energy when it reaches the bottom of the ramp?

- A Car 1 that started at the top of the ramp
- B Car 2 that started halfway down the ramp
- C Both cars have the same amount of energy
- D Neither car has any energy

Item	BA-1_4_Toy Car_Q2
Identifier	I-SCI-F-S000014
Standards	SCI.4.4-PS3-1

Relationship between the Speed of a Rolling Toy Car and its Energy

In a science experiment, a group of students rolled two identical toy cars down a ramp. Car 1 started at the top of the ramp and rolled all the way to the bottom. The Car 2 started halfway down the ramp and reached a lower speed compared to the first car.



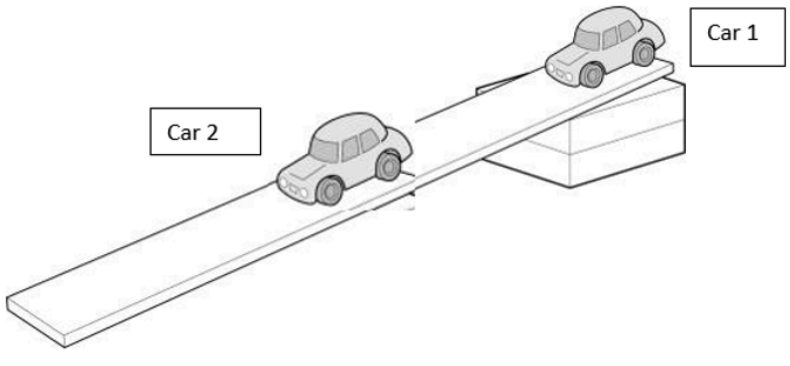
What evidence statement would best support the claim that one car had more energy than the other?

- A The cars were identical so their energy would be the same.
- B The car with the greatest speed would have more energy.
- C The slower car would have more energy because it is lighter.
- D The experimental set up doesn’t allow for energy to be determined.

Item	BA-1_4_Toy Car_Q3
Identifier	I-SCI-F-S000017
Standards	SCI.4.4-PS3-1

Relationship between the Speed of a Rolling Toy Car and its Energy

In a science experiment, a group of students rolled two identical toy cars down a ramp. Car 1 started at the top of the ramp and rolled all the way to the bottom. The Car 2 started halfway down the ramp and reached a lower speed compared to the first car.



During a different science experiment, a student notices that a car traveling at a higher speed causes a more significant impact on a block it crashes into. What evidence from this observation supports the relationship between speed and energy?

- A The car’s energy decreases as it speeds up, causing a stronger impact.
- B The faster the car travels, the less energy it has, reducing the impact.
- C The car's greater speed results in more energy, which leads to a stronger impact.
- D The car’s speed does not influence the energy transferred during the impact.

Item	BA-1_4_Energy Transfer_Q4
Identifier	I-SCI-F-S000019
Standards	SCI.4.4-PS3-2

Transfer of Energy through Different Ways

During an experiment, a student placed three spoons in hot water. One of the spoons was plastic, one was metal, and one was wood. The students observes that the metal spoon in the hot water became warm.

Which of the following **BEST** explains how energy is transferred in this experiment?

A Energy is transferred from the spoon to the water through sound waves.

B Energy is transferred from the water to the spoon through heat energy moving.

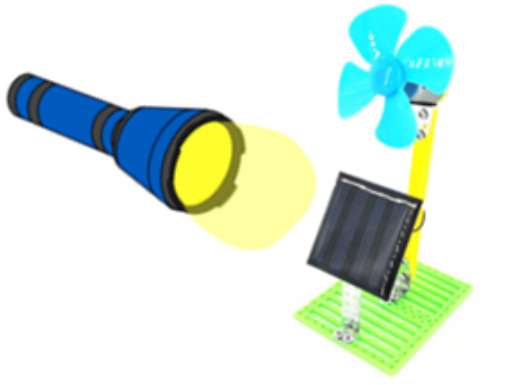
C Energy is transferred from the water to the spoon by electric currents.

D Energy is transferred from the air to the spoon through light.

Item	BA-1_4_Energy Transfer_Q5
Identifier	I-SCI-F-S000021
Standards	SCI.4.4-PS3-2

Transfer of Energy through Different Ways

A student shines a flashlight on a solar panel and observes that the panel produces electricity to power a small fan.



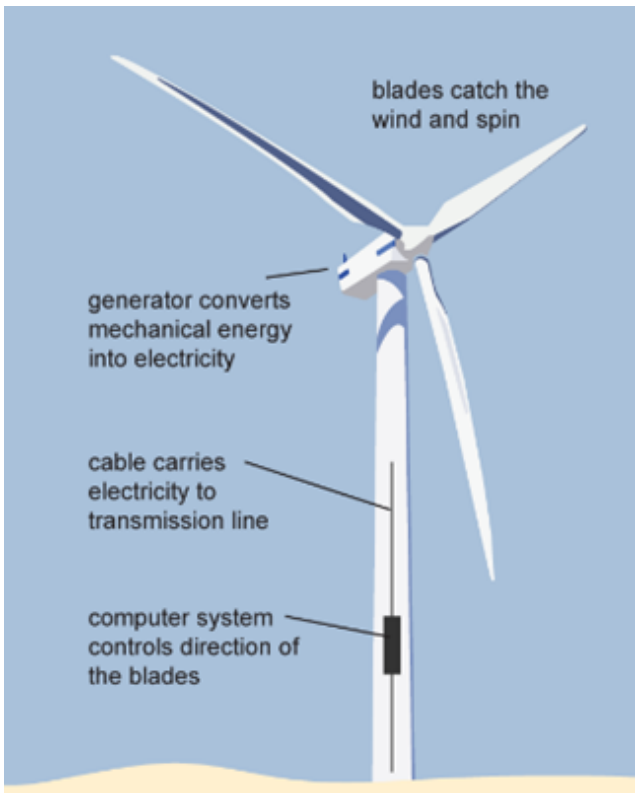
What does this observation suggest about how energy is transferred?

- A. Electric energy from the flashlight is transferred to the fan as mechanical energy.
- B. Light energy from the flashlight is absorbed by the solar panel and converted into electrical energy.
- C. Heat energy from the flashlight is transferred to the solar panel to create electricity.
- D. Sound energy from the flashlight is converted into electrical energy by the solar panel.

Item	BA-1_4_Energy Conversion_Q6
Identifier	I-SCI-F-S000026
Standards	SCI.4.4-PS3-4

Energy Conversion Devices

A team designs a wind turbine to generate electricity by converting wind energy into electrical energy. The initial design produces only a small amount of electricity.



Which modification would **MOST LIKELY** improve the turbine's energy conversion?

A Increase the number of blades on the turbine to capture more wind energy.

B Reduce the size of the blades to decrease air resistance.

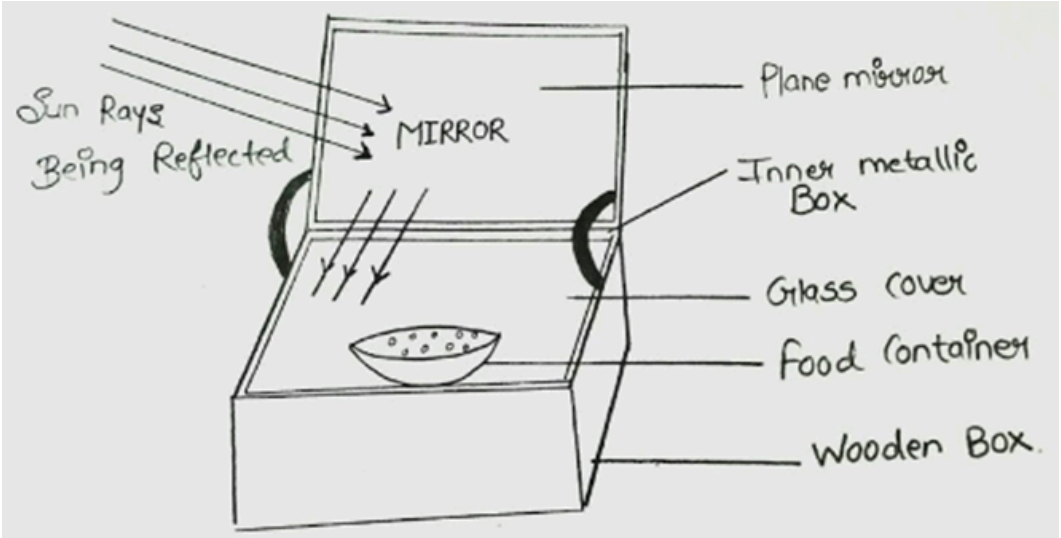
C Move the turbine to a location with less wind to prevent damage.

D Shorten the height of the turbine to make it easier to access.

Item	BA-1_4_Energy Conversion_Q7
Identifier	I-SCI-F-S000028
Standards	SCI.4.4-PS3-4

Energy Conversion Devices

Students are asked to design a solar-powered oven that converts sunlight into heat energy to cook food. During the first test, the oven does not reach a high enough temperature.



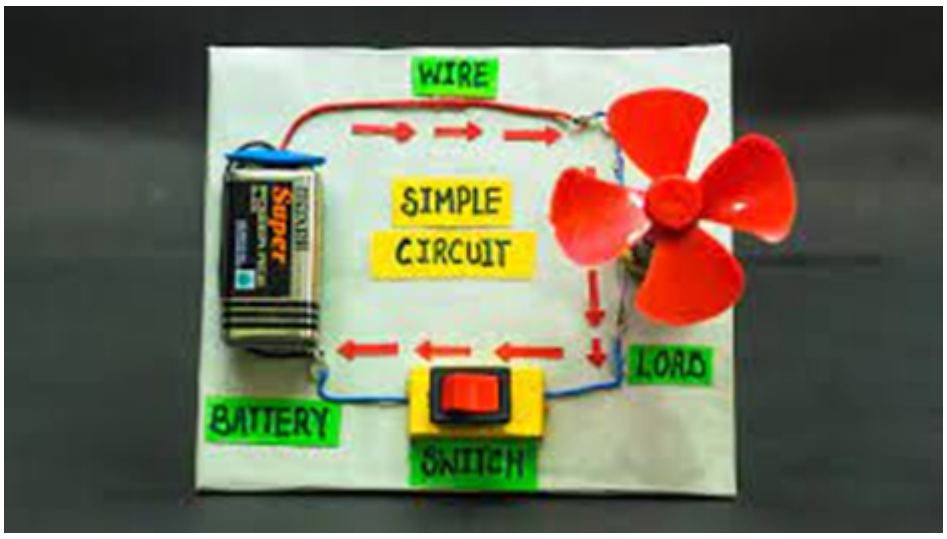
Which of the following changes would **MOST LIKELY** improve the efficiency of the oven?

- A Increase the size of the oven to allow more sunlight to enter.
- B Paint the interior of the oven black to better absorb and retain heat.
- C Add more reflective materials inside the oven to reduce heat loss.
- D Use clear plastic for the oven’s cover to trap light energy.

Item	BA-1_4_Energy Conversion_Q8
Identifier	I-SCI-F-S000031
Standards	SCI.4.4-PS3-4

Energy Conversion Devices

A student designs a simple electric circuit that powers a small fan using a battery. After testing, the student notices that the fan does not spin as fast as expected.



Which of the following would be the **BEST** modification to improve the device's performance?

- A Replace the battery with one that has a higher voltage to increase the electrical energy available.
- B Decrease the number of wires in the circuit to reduce energy loss.
- C Replace the fan with a larger one to increase the motion energy.
- D Use thicker wires to decrease the resistance and slow down the fan.

Item	BA-1_4_Earth Human Activity_Q9
Identifier	I-SCI-F-S000034
Standards	SCI.4.4-ESS3-1

Earth and Human Activity

Students are studying the effects of renewable and non-renewable energy sources on the environment. Which of the following provides the **BEST** comparison between the environmental impacts of solar energy and coal energy?

A Solar energy produces more greenhouse gases than coal energy, leading to more air pollution.

B Coal energy is cleaner than solar energy because it requires less land use.

C Solar energy has minimal environmental impacts compared to coal, which contributes to air and water pollution.

D Both solar and coal energy have equal environmental impacts due to their energy production processes.

Item	BA-1_4_Earth Human Activity_Q10
Identifier	I-SCI-F-S000036
Standards	SCI.4.4-ESS3-1

Earth and Human Activity

A group of students is researching the use of wind turbines as a source of energy. They find that wind energy is renewable, but it can have some negative effects on local wildlife. Which of the following **BEST** describes one of these environmental impacts?

A Wind turbines can cause significant air pollution during energy production.

B The construction of wind turbines leads to the contamination of nearby water sources.

C Wind turbines can pose a threat to birds and bats, which may be injured or killed by the blades.

D Wind energy production depletes the local water supply, leading to habitat loss.

Item	BA-1_4_Engineering Design_Q11
Identifier	I-SCI-F-S000038
Standards	SCI.3-5.3-5-ETS1-1

Engineering Design – Defining Problems

A student needs to design a container that can keep an ice cube from melting for at least one hour. The available materials are aluminum foil, plastic wrap, and cotton fabric. Which of the following is the **MOST APPROPRIATE** way to define the problem?

- A Design a container that uses all available materials, without considering how long the ice cube lasts.
- B Create a container that looks nice and uses only aluminum foil and plastic wrap.
- C Define a container that keeps the ice cube frozen for one hour, using the available materials within a set time limit.
- D Build a container that uses as little material as possible, regardless of whether it keeps the ice cube from melting.

Item	BA-1_4_Engineering Design_Q12
Identifier	I-SCI-F-S000041
Standards	SCI.3-5.3-5-ETS1-1

Engineering Design – Defining Problems

A teacher asks students to design a device that can protect an egg from breaking when dropped from a height of 1 meter. The materials provided include straws, rubber bands, and cardboard.

What is the **MOST EFFECTIVE** way to **DEFINE** this design problem?

- A. Create a device that uses only straws, without worrying about whether the egg breaks.
- B. Design a device that looks creative, regardless of whether it protects the egg.
- C. Build a device that uses as much cardboard as possible, even if it doesn’t protect the egg.
- D. Define a device that successfully protects the egg from breaking when dropped from 1 meter, using the provided materials within the given time frame.

Item	BA-1_4_Engineering Design_Q13
Identifier	I-SCI-F-S000046
Standards	SCI.3-5.3-5-ETS1-2

Engineering Design – Generating and Comparing Design Solutions

A team needs to develop a method to filter dirty water for a camping trip. They have access to gravel, sand, and a coffee filter.

The water must be clean enough to drink, and the filter must be easy to transport. Which of the following options is the **BEST** solution based on the criteria and constraints?

- A. Build a large, heavy filter using all the materials, which is effective but difficult to transport.
- B. Create a small, portable filter using only the coffee filter and sand, which may not fully clean the water.
- C. Design a filter using a combination of sand, gravel, and the coffee filter, balancing effectiveness and portability.
- D. Use only the gravel to make a lightweight filter, even if it doesn't fully clean the water.

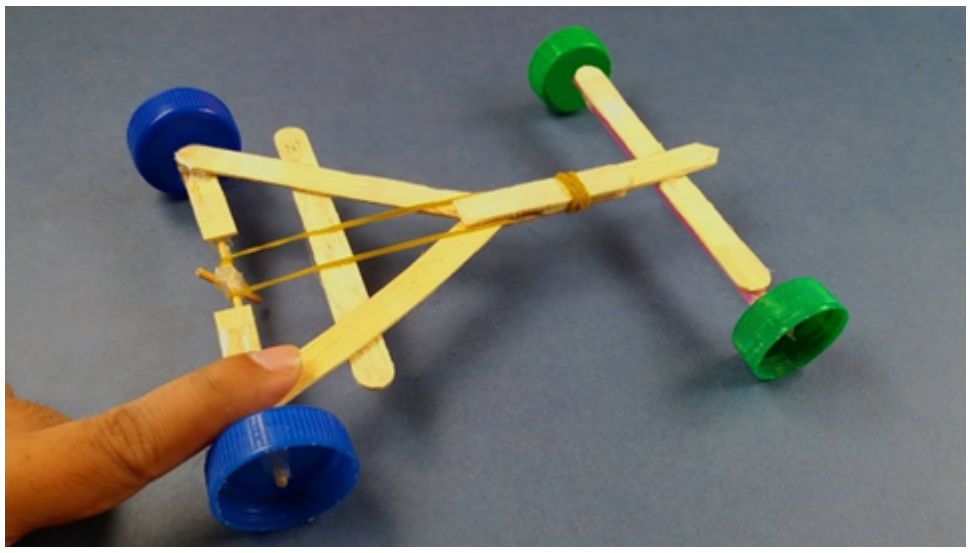
Item	BA-1_4_Engineering Design_Q14
Identifier	I-SCI-F-S000048
Standards	SCI.3-5.3-5-ETS1-2

3-5-ETS1-2

Engineering Design – Generating and Comparing Design Solutions

Question 14:

Students are asked to create a model vehicle powered by a rubber band that can travel at least 5 meters (about 15 feet). The vehicle must be lightweight and easy to build with basic classroom materials. Which solution best satisfies the criteria and constraints?



- A. Build a heavy vehicle with multiple rubber bands for extra power, even if it's harder to build.
- B. Design a simple lightweight car with one rubber band that can be built quickly and travels the required distance.
- C. Create a complex vehicle with gears and multiple rubber bands, prioritizing complexity over simplicity.
- D. Use a large rubber band to propel a large, heavy vehicle, ensuring it travels far but requiring more time to build.

Item	BA-1_4_Engineering Design_Q15
Identifier	I-SCI-F-S000050
Standards	SCI.3-5.3-5-ETS1-3

Engineering Design – Planning and Carrying Out Tests

A group of students builds a prototype of a paper airplane designed to fly the farthest distance. They decide to test different wing shapes. Which of the following is the best way to plan a fair test to identify which wing shape works **BEST**?

A. Test all wing shapes on different days to account for changing wind conditions.

B. Change the wing shape and the paper type in each test to see how both factors affect the distance.

C. Have different students throw the airplane to see how different throwing styles affect the distance.

D. Test each wing shape by throwing the airplane with the same force in a controlled environment, keeping all other variables constant.

Item	BA-1_4_Engineering Design_Q16
Identifier	I-SCI-F-S000052
Standards	SCI.3-5.3-5-ETS1-3

3-5-ETS1-3

Engineering Design – Planning and Carrying Out Tests

A class is testing different parachute designs to see which one allows a toy soldier to land most slowly. They are considering factors like parachute size, material, and string length. How can they design a fair test to identify the **BEST** parachute?

- A. Change the parachute size, material, and string length all at once to find the best combination.
- B. Keep the toy soldier and drop height the same, and test one variable at a time, like parachute size, while keeping other variables constant.
- C. Drop the parachute from different heights to see how altitude affects the descent.
- D. Test the parachutes on different days and under varying weather conditions to simulate real-life scenarios.