

Unit Project



Solve Problems Like a Scientist

Unit Project: Vehicle Safety

Car makers design vehicles for safety. But how do they know what happens to cars during different types of crashes? Is it possible to design cars that are safe in all types of crashes?

Common safety features on cars include seat belts, air bags, headrests, and ways to maintain safety. Carmakers are always looking for new ways to keep drivers and passengers safe. New technologies can help. Carmakers study the effects of crashes to design these new technologies.

When you travel in a car and it suddenly stops, the forward force of the car's motion continues to act on the passengers. A car crash using a mannequin where it looks as if the person is flying forward. Most of the time, a seatbelt is used to hold the person in place so that they do not hit the steering wheel, dashboard or front windshield of the car. Sometimes, however, a seatbelt is not enough to protect the passengers.

Airbags have been added to many cars in both the front of the vehicle as well as in the side doors to help protect people inside during a collision or a sudden stop. These airbags are folded up inside the framing of the car and are activated by a sudden change in direction or motion, or by the impact of a collision or crash. Airbags are designed to cushion the passengers so that they do not hit any of the hard objects inside the car or fly forward outside of the vehicle.



Car Crash



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Life Skills I can use information to solve a problem.

Unit Project

Car Crash Safety

You have learned about airbags and how they keep people safe. Now, conduct research online about the latest safety features carmakers are using to protect drivers and passengers. Choose one new safety feature other than airbags introduced in the last 10 years and create a plan to improve this device.

You will be creating a report or presentation to share with your teacher and your class. Your report should describe how the impact of a collision will trigger the device to activate and which riders in the car would benefit from its protection. You should include your design, the methods you plan to use to test your device, and any modifications you would make to improve your device using technology or other innovations.

Include in your report the types of crashes the device best protects against, the direction of the forces involved in these crashes, and the ways the feature counteracts them. Also, discuss at least one way this safety feature could be improved.

Notes

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Assess your learning

Choose the correct answer from the following:

1. In the opposite figure:

The body is under the effect of:

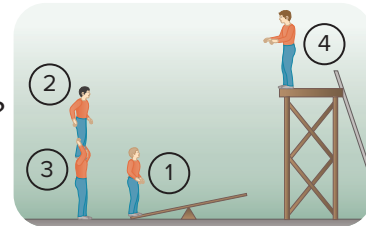
- A - Balanced forces and moving to the right.
- B - Balanced forces and moving to the left.
- C - Unbalanced forces and moving to the right.
- D - Unbalanced forces and moving to the left.



2. In the opposite figure:

In which one the player has the greatest potential energy?

- A- player (1)
- B- player (2).
- C - player (3).
- D- player (4).



3. The energy gained by a ball when it falls from above is:

- A - Potential energy.
- B - Kinetic energy.
- C – Light energy.
- D - Chemical energy.

4. If the angle of inclination of a surface increases, so the speed of the rolling body....

- A- decreases
- B- increases
- C- not affected
- D- equals zero

5. When a collision occurs, the sum of the energies before the collision is the sum of the energies after the collision:

- A - equal to.
- B – less than
- C - more than.
- D - not equal

6. When the moving car stops suddenly, the passenger's body moves to the direction.

- A - right
- B - left
- C – forward
- D – back.

7. The airbag helps to

- A- Reduce the speed of a person's movement forward.
- B- Increase the speed of a person's movement forward.
- C - Reduce the speed of a person's movement backwards.
- D - Increase the speed of the person's movement backwards.

Answer the following questions:

1. In the picture in front of you:

- (a) Are the forces on both sides balanced or unbalanced?.....
- (b) In which direction will the children move? (Right or left)



2. If the two cars moved at the same time for 20 seconds, car (A) covered a distance of 100 meters, while car (B) covered a distance of 300 meters.

Which of the two cars has a higher speed?

3. In the opposite figure:

When the compressed spring is released, a change in energy occurs. Fromenergy to Energy.



4. Look to the car in the picture in front of you, then complete:

- (a) The type of energy with which it operates.
- (b) This car is characterized by aweight.

Match column (B) with column (A):

(A)
1- Gravity
2- friction
3- speed
4- Potential Energy

(B)
a) the energy stored inside the body
b) the force that pulls things downwards
c) A force that arises between the surfaces of two contacted bodies.
d) Energy stored inside dry batteries
e) The distance covered per time unit.

Safety in the Science Classroom

Following common safety practices is the first rule of any laboratory or field scientific investigation.

Dress for Safety

One of the most important steps in conducting a safe investigation is dressing appropriately.

- Use gloves to protect your hands and safety goggles to protect your eyes when handling chemicals, liquids, or organisms.
- Wear proper clothing and clothing protection. Tie back long hair, roll up long sleeves, and if they are available, wear a lab coat or apron over your clothes. Always wear close-toed shoes. During field investigations, wear long pants and long sleeves.

Be Prepared for Accidents

Even if you are practicing safe behavior during an investigation, accidents can happen. Learn the emergency equipment location if available and how to use it.

Most importantly, when an accident occurs, immediately alert your teacher and classmates. Do not try to keep the accident a secret or respond to it by yourself. Your teacher and classmates can help you.

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Practice Safe Behavior

There are many ways to stay safe during a scientific investigation. You should always use safe and appropriate behavior before, during, and after your investigation.

- Read all of the steps of the procedure before beginning your investigation. Make sure you understand all the steps. Ask your teacher for help if you do not understand any part of the procedure.
- Gather all your materials and keep your workstation neat and organized. Label any chemicals you are using.
- During the investigation, be sure to follow the steps of the procedure exactly. Use only directions and materials that have been approved by your teacher.
- Eating and drinking are not allowed during an investigation. If asked to observe the odor of a substance, do so using the correct procedure known as wafting, in which you cup your hand over the container holding the substance and gently wave enough air toward your face to make sense of the smell.
- When performing investigations, stay focused on the steps of the procedure and your behavior during the investigation. During investigations, there are many materials and equipment that can cause injuries.
- Treat animals and plants with respect during an investigation.
- After the investigation is over, appropriately dispose of or store any materials that you have used. Ask your teacher if you are unsure of how to dispose of anything.
- Make sure that you have returned any extra materials and pieces of equipment to the correct storage space.
- Leave your workstation clean and neat. Wash your hands thoroughly.



Safety Goggles

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