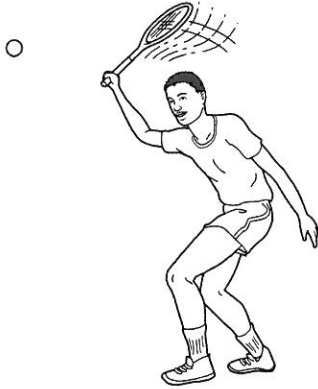


Laws of Motion

In some cases, an applied force is balanced by an opposite force, and there is no change in motion. In other cases, an applied force is not balanced by an opposite force, and the result is acceleration in the direction of the applied force. Look at the following illustrations, and identify the forces and motion in each one.

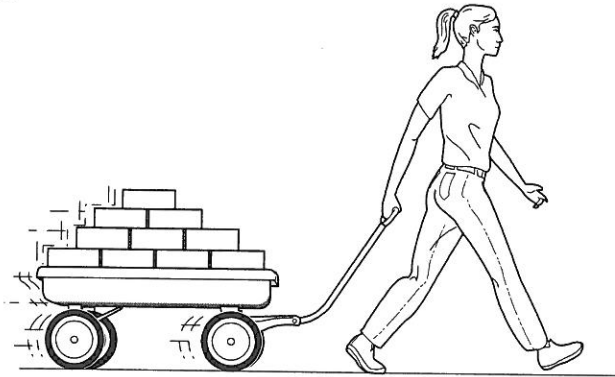
a.



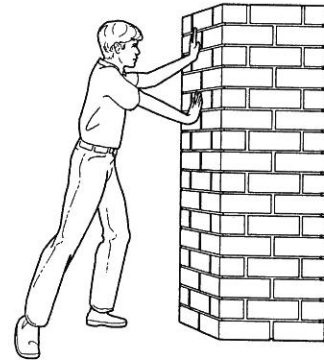
b.



c.



d.



1. In one drawing, no motion is likely to occur. Which drawing is it?

2. In which diagram are the forces clearly balanced? How does this relate to your answer to item 1? If more force is exerted by the person, does the opposite force increase to match the new force, stay the same or decrease?

3. Suppose there is enough friction in the wheels of the wagon in diagram c. to balance the force with which the wagon is pulled. How will this affect the motion of the wagon?

Cross-Disciplinary

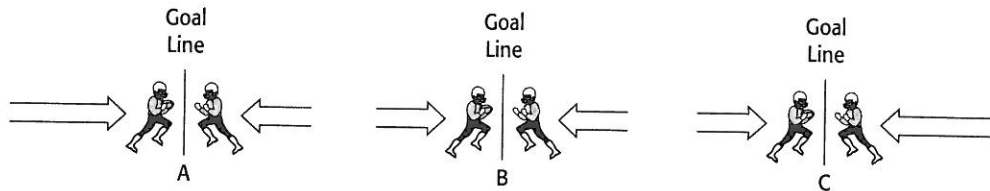
Using Force Diagrams

Read the following paragraphs, and complete the exercises below.

A running back in football drives toward the goal line. Will he cross it, be stopped dead in his tracks, or be pushed backwards? Force diagrams will help provide the answer.

Just before the play, the running back was motionless because the forces acting on his body were equal and opposite. The force of gravity pulling him toward the ground was opposite and equal to the force of the ground pushing up on him, so he didn't move up or down. This balance of forces can be represented by two arrows of the same size pointing in opposite directions. Balanced forces do not cause a change in motion.

Unbalanced forces always cause a change in motion. These forces are also represented by arrows. Only in this case the arrows are of different length. The greater force is represented by a longer arrow.



Exercises

1. Will the ball carrier cross the goal line in diagram "A"? Explain.

2. Will the ball carrier cross the goal line in diagram "B"? Explain.

3. Will the ball carrier cross the goal line in diagram "C"? Explain.

WORKSHEET

8.4 ENRICHMENT WORKSHEET



Car Seat Safety

Read the following paragraphs, and answer the questions below.

Air bags have saved the lives of many adults involved in automobile accidents. However, there has been much concern about their safety in accidents involving children. Because air bags were specifically designed for adults, children aged 12 and under are safest when properly restrained in the back seat of a car.

For infants and toddlers, being properly restrained means traveling in a car safety seat that has been correctly installed in the back seat. However, studies have revealed that up to 80 percent of car seats are installed or used incorrectly. In many instances, the safety belt is not holding the car seat in place securely. Other common problems involve incorrect use of the fasteners on the car seat's harness.

A law to regulate how safety seats are attached

On February 27, 1999, President Clinton announced that a new federal law requiring "a simple, universal system for attaching car safety seats" would go into effect by the year 2000. All safety seats will have attachments designed to fit three standard anchors in the back seat of every car.

Exercises

1. Why are children safer in the back seat of a car than in the front seat?

2. Explain how the law requiring a standard attachment system in car seats will improve child safety.

3. Which part of the back seat of a car—the left side, the right side, or the middle—do you think is the safest place for a child safety seat? Explain.

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