Grade 5

Science

Texas Assessment Review and Practice

Includes

- Review and Practice for Grades 3 and 4 Assessed TEKS
- TEKS practice items in 4 reporting categories
  - Matter and Energy
  - Forces, Motion and Energy
  - Earth and Space
  - Organisms and Environment
- TEKS Pre-Test and Post-Test

Available in English and Spanish

Contents

Name _____ Date _____

TEKS Review 3.6B

TEKS 3.6B demonstrate and observe how position and motion can be changed by pushing and pulling objects to show work being done such as swings, balls, pulleys, and wagons

Changes in Position and Motion of Objects

Changing Position

Where are you located right now? Are you *at* your desk? *Under* a light? *To the right* of a door, or *2 meters (6 feet) away from* the board? Words such as these describe your position. **Position** is the location of an object.

Every object has a position. The position of your nose is the center of your face. How would you describe the position of the doorway in the classroom below? These positions don't change.

Sometimes an object's position does change. When it does, the object is in motion. **Motion** is a change of position of an object.

There are many kinds of motion. You can walk forward or backward. An elevator goes up and down. A pendulum swings from side to side. Things may move quickly or slowly. They may follow a straight, curved, or circular path. There are many types of motion, but all types of motion involve a change in position.

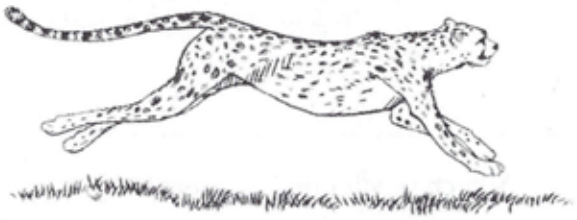
Speed and Velocity

How fast can you run? If you run faster than your friend, your speed is greater. Speed is a measure of how the position of an object changes during a certain amount of time.

You can use words such as fast and slow to describe speed. Fast-moving objects change their position quickly. Slow-moving objects change their position slowly. But you can be more exact if you use numbers such as 20 kilometers per hour or 5 meters per second.

To find an object's speed, you need to measure two things—distance and time. Distance is how far an object traveled. You also need to measure how long it takes the object to move that distance.

speed = distance ÷ time



A cheetah is the fastest land animal. It can reach speeds of 112 km/hr (70 mi/hr)!

When you tell both the speed and the direction of an object, you give its **velocity**. You can use compass directions or words such as *up, down, left,* and *right* to indicate direction. Two objects with the same speed have different velocities if they are moving in different directions.

Name _____ Date _____

TEKS Review 3.6B

Acceleration

Objects don't always move steadily in one direction at one speed. They stop, start, speed up, slow down, and turn. **Acceleration** is any change in the speed or the direction of an object's motion. So, acceleration is any change of velocity.

Forces

Push a door, and it moves. Pull the door, and it moves the other way. Pushes and pulls of all kinds are called **forces**. Forces are measured in newtons (N). Gravity and friction are two common forces affecting objects on Earth.

Forces can cause changes in motion. If a soccer ball is still, it stays still until a force moves it. If you kick a soccer ball, it keeps moving in the same direction until another force changes its motion. Any change of speed or direction requires a force. In other words, *forces cause acceleration.*

The direction in which an object moves depends on the direction of the force that is applied to the object. If there is more than one force, the forces work together. When two forces have the same size but work in opposite directions, they cancel each other out. They are called balanced forces.

Work

Forces are needed to do work. In science, **work** is using a force to move an object through a distance. You can use the following equation to calculate the amount of work you do when you move an object.

work = force × distance

Notice that work is a product of two things. The force applied to an object is multiplied by the distance it is moved.

A Closer Look—Pulleys and Work

Suppose you want to use a pulley to lift an object. A pulley is a simple machine in which a rope is draped over a wheel that spins. In a fixed pulley, like the one shown below, the wheel is attached to a surface. When you pull down on the rope, the other side of the rope goes up. It's easy to calculate the work you did.

Work Performed Lifting a Box			
Object Lifted	**Force Needed**	**Distance**	**Work Performed**
Empty box	5 N	3 m	15 J
Box of food	40 N	3 m	120 J
Box of nails	180 N	3 m	540 J

Name _____ Date _____

TEKS Review 3.6B

Hands-On Activity

Materials
- tape measure
- cardboard
- scissors
- spring scale
- string
- toy car or truck

Inclined Planes and Work

Like a pulley, and inclined plane is a simple machine. An inclined plane is a ramp that you can use to help lift an object. In this investigation, you will take measurements to find out how using an inclined plane helps you perform work.

Procedure:

1. Use some of the cardboard to make a ramp from the floor to a chair seat. Make a second ramp twice as long as the first. Using the tape measure, find and record the distance from the floor to the seat, both straight up and along each ramp.
2. Tie a loop of string to the toy car. Attach the spring scale to the string.
3. Hold on to the spring scale, and lift the car from the floor directly to the chair seat. Record the force shown.
4. Hold on to the spring scale, and pull the car up the short ramp from the floor to the chair seat. Record the force shown.
5. Repeat Step 4 for the long ramp.
6. Calculate the amount of work performed in each trial. Analyze your data and draw a conclusion.
7. Make a graph to display your data, and discuss your conclusion with your classmates.

Discussion Questions:

1. How did using the ramps affect the amount of force needed to move the car to the chair seat?
2. After examining your data, what conclusion did you draw?
3. What effect do you think repeating the experiment using ramps that are additional lengths would have on your conclusion?
4. In what circumstances is an inclined plane helpful?

Name _____ Date _____

TEKS Review 3.6B

Changes in Position and Motion of Objects

Match each term in Column B with its meaning in Column A.

	Column A	Column B
_____	❶ Measure of how fast or slow an object is moving	Ⓐ position
_____	❷ The location of an object	Ⓑ motion
_____	❸ A push or a pull	Ⓒ speed
_____	❹ A change in an object's position	Ⓓ acceleration
_____	❺ Use of a force to move an object a certain distance	Ⓔ force
_____	❻ A change in an object's speed or direction	Ⓕ work

❼ Explain why a tennis ball travels from one side of a tennis court to the other during a tennis match.

_____

_____

_____

❽ **Think About It** Is reading a book work, as a scientist defines it? Explain.

_____

_____

❾ List two ways you could change the position of a wagon.

_____

_____

Name _____ Date _____

TEKS Review 3.6B

TEKS Assessment 3.6B

Fill in the letter of the best choice.

1. In which of the following situations is the **most** work performed?

   (A) A heavy object is moved 1 m to the left.
   (B) A light object is moved 1 km to the right.
   (C) A heavy object is moved 1 km to the left.
   (D) A light object is moved 1 m to the right.

2. Which of the following describes both an object's speed and its direction?

   (A) force
   (B) motion
   (C) velocity
   (D) acceleration

3. Which of the following is **true**?

   (A) Gravity acts only through air, not through water or land.
   (B) Gravity does not act on airplanes flying in the sky.
   (C) Gravity always acts toward the center of Earth.
   (D) Gravity does not act on objects falling through space.

4. A mother and her daughter are loading identical boxes into the back of a car.

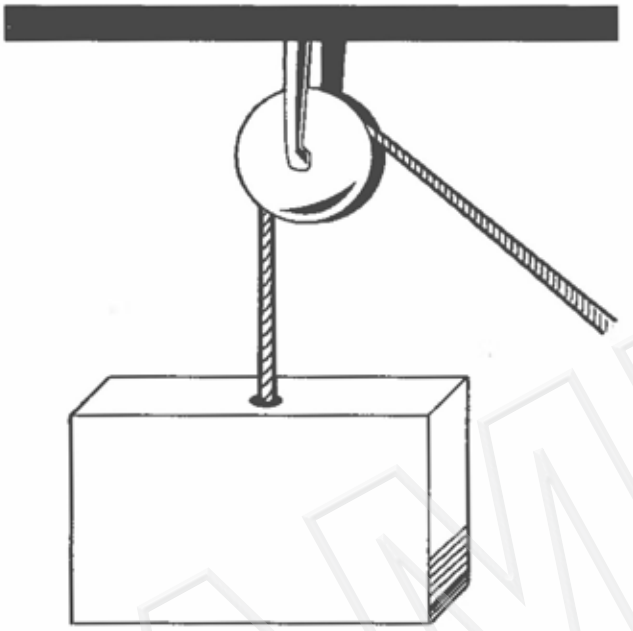
   Suppose friction is not a factor. Which statement is correct?

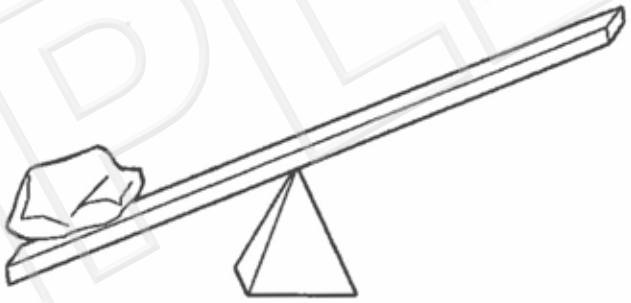
   (A) You do more work when you use a ramp.
   (B) You do less work when you use a ramp.
   (C) You do the same amount of work whether you use a ramp or lift the box without using a ramp.
   (D) You must use more force when you push the box up the ramp.

5. Stanley kicks a ball. It travels 10 meters in 2 seconds. What was the average speed of the ball?

   (A) 20 meters per second
   (B) 10 meters per second
   (C) 2 meters per second
   (D) 5 meters per second

Use the drawings below to answer questions 40, 41, and 42.





40 What is the device on the left called?

- **F** a lever
- **G** a pulley
- **H** a wheel-and-axle
- **J** an overhead crane

41 What do both of these devices have in common?

- **A** They help you do the same amount of work while using less force.
- **B** They change the direction of the force that you apply.
- **C** They utilize alternative energy sources.
- **D** They can be used in the same way a pan balance is used.

42 Which type of energy must be used in order for these devices to cause motion?

- **F** light energy
- **G** sound energy
- **H** electrical energy
- **J** mechanical energy