

**Multiple Choice**

1. A ball is lying on the floor. When will the ball move?
  - A. It will never move.
  - B. When a force acts on it.
  - C. When gravity pulls on it.
  - D. When the lights are turned on.
  
2. What must be applied to push or pull an object?
  - A. a force
  - B. gravity
  - C. speed
  - D. distance
  
3. Why do people use simple machines?
  - A. They make things smaller.
  - B. They do the work for us.
  - C. They make work easier.
  - D. They are found everywhere.
  
4. How do you know how much force the wind has?
  - A. by the size of the objects it moves
  - B. by taking a deep breath and smelling it
  - C. by looking at a house
  - D. by seeing how much rain it brings
  
5. What will happen when a light-weight object and a heavy object run into each other?
  - A. They bounce away equally.
  - B. The small object bounces backwards.
  - C. The large object bounces backwards.
  - D. The small object becomes part of the large one.



6. Which force is this person using?

- A. motion
- B. gravity
- C. pull
- D. push



7. How will the batter change the force on the baseball?

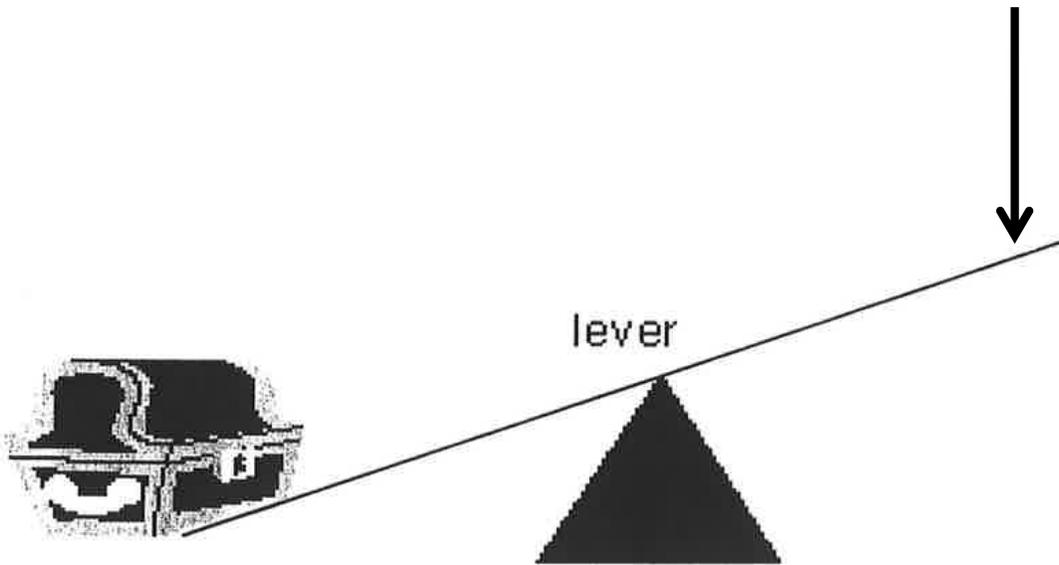
- A. He will change its direction
- B. He will change its weight
- C. He will change its shape
- D. He will change its color.

8. If you wish to kick a soccer ball to go as far as possible, what should you do?
- A. Kick it from the side
  - B. Kick it very hard
  - C. Kick it without shoes on
  - D. Kick it to a teammate.



9. What do you know about the force of the wind by looking at this flag?
- A. There is no wind this day.
  - B. The wind is blowing a little bit.
  - C. The wind is blowing from the north.
  - D. The wind is blowing strongly.
10. During a flood, a stream carries more water faster than normal. What will happen to rocks in the stream?
- A. They will not change.
  - B. They will get bigger.
  - C. They may move downstream.
  - D. They will freeze.

## Constructed Response



1. What does the arrow show?
2. How does the lever change the force needed to move the chest?
3. When would you use this simple machine?

## Answers for Grade 3 – Standard 3

### Multiple Choice

1. B
2. A
3. C
4. A
5. B
6. D
7. A
8. B
9. D
10. C

### Constructed Response

1. The arrow shows where you would have to push to lift the chest.
2. The lever makes it easier to lift the heavy chest because it requires less force.
3. A lever helps lift something you could not otherwise lift.

**Activity Description**

Students will investigate the results of collisions between objects of different sizes.

**Materials Needed**

- Balls of all weights and sizes (tennis balls, ping pong balls, bowling ball, baseball, etc.)
- Metersticks
- Two 8 ft. sections of 1” x 2” lumber (or other wood or cardboard to make a “track” from)
- Student Sheets (included)

**Prior to Assessment**

Students should be familiar with concepts of weight and force.

**Time needed for assessment**

45-60 minutes



**Procedure:**

1. Build the “track.” It should consist of two pieces of lumber or cardboard laid parallel. The balls will be rolled down the middle, so it should be adjustable to the width of different sized balls.
2. Students may be placed in groups and asked to design and perform a single test, or multiple tests can be done as a class. Students should predict how the balls will respond.
3. A student at each end of the track will roll his/her ball toward the student rolling a ball at the other end. There should be a signal to indicate when they should both roll the balls. Students should attempt to roll at the same speed each time.
4. A student should be assigned the job of watching and noting the location where the balls collide. The student should place a marker at that spot.
5. The balls should be allowed to collide and roll away from each other until they stop. Other students should measure the distance each ball recoils from the collision marker. All students should record the measurements on their student sheets.
6. Several tests should be performed and then a class discussion should take place to talk about the results. The weight of the balls should be estimated and related to the force each ball has when rolled. An extension of this activity would be to weigh the balls.
7. Students should answer the questions on the student sheet as a summary.

**Scoring Guide**

1. Students make prediction ..... 5 points
2. Students design tests ..... 5 points
3. Students record data ..... 5 points

What two balls would you like to see collide?

| <b>Test</b> | <b>Ball 1</b> | <b>Ball 2</b> | <b>Prediction</b> | <b>Distance for Ball 1</b> | <b>Distance for Ball 2</b> |
|-------------|---------------|---------------|-------------------|----------------------------|----------------------------|
| 1           |               |               |                   |                            |                            |
| 2           |               |               |                   |                            |                            |
| 3           |               |               |                   |                            |                            |
| 4           |               |               |                   |                            |                            |
| 5           |               |               |                   |                            |                            |

Questions:

1. Which ball bounced back the greatest distance?
2. Why do you think this happened?
3. Which ball bounced back the shortest distance?
4. Why do you think this happened?
5. Which two balls bounced back about the same distance?
6. Why do you think this happened?
7. Which two balls bounced back with the greatest difference in distances?
8. Why do you think this happened?