

## Turkey Bowl!

### What Is *IT!*

Want to be a stellar bowler? You might want to study up on Newton's three Laws of Motion. Bowling is all about friction, force, gravity, mass, momentum, inertia, and velocity. Knowing how all of these laws work together can help you to bowl like a pro!! You are sure to knock down all those pins!

Strikes are where the points are. In fact, did you know in the early 18th and 19th century if you bowled strikes in some places, you would be awarded food as prizes. If you bowled three strikes in a row you won a turkey. This is where the term "turkey" got its name! A "sizzling turkey" is when you bowl a strike in each of the first three frames of the game. Nowadays, most competitions just award trophies and cash prizes.

### Think About *IT!*

**How do you, a bowling ball, the bowling lane, and the pins work together to score a strike?**

Understanding Newton's Three Laws of Motion is pretty important in order to determine the best place to hit the pins. How hard you roll a bowling ball will determine how fast the ball moves down the lane. Keep in mind, the speed of the ball can be affected by the friction created by the wooden lane and the ball. The force of the ball hitting a bowling pin not only causes the ball to slow down, but also can knock down the other pins as well. The point where the ball hits the initial pin can also determine the direction in which that pin will fall and hit the other pins. Hitting the right pin, in the right place, and at the right speed will knock down all the pins resulting in a strike!



### Materials List:

- 10 Water Bottles (Empty or a little less than half full)
- 1 rubber ball/baseball/softball

Here is some basic information to understand why and how this happens.

- **Newton's First Law:** This is commonly called the Law of Inertia. An object must have an external force to initiate its motion. The object will continue to move unless another force interrupts or changes it.
- **Newton's Second Law:** This law determines how fast an object will go. Basically, the greater a force is applied to an object, the faster that object will move.
- **Newton's Third Law:** This law states that for every action there is an equal and opposite reaction.

Put these laws into action! Line up some water bottles like you would bowling pins. Pick a starting point about 60 inches from the pins and roll the ball toward the pins. Try it a few more times hitting a different pin. Increase and decrease the speed of the ball when rolling it.

- What happens to the "pins" (water bottles)?
- What happens to the ball?

### **Extend *IT!***

#### **Where is the best place to strike the bowling pins to achieve a strike?**

Using your knowledge of Newton's Three Laws of Motion, determine the best pin to strike with a bowling ball at the right amount of force to bowl a "turkey"! What happens if you add water to the bottles? How does changing the mass of the ball affect the way the "pins" fall?

### **Dare to Change *IT!***

How can you use your knowledge of Newton's Three Laws of Motion and knocking down bowling pins to help a local construction company demolish an old building?

**Scenario:** A local construction company has been hired to knock down a really old, unsafe, multi-story building in the center of town. The lead contractor is looking for an engineer to design a device that can knock down the building without spreading debris on the neighboring buildings. The engineer must also determine the best place to strike the building in order to collapse it to the ground without any injury or massive destruction.

**Challenge:** Design a device to successfully knock down your building model. Test different ways in which you could safely demolish it. Share your findings with your peers.

**Suggested Resources and Articles:**

YouTube: [Why is Bowling Three Strikes in a Row Called a Turkey?](#)

YouTube: [Newton's Laws of Motion—Video for Kids](#)

YouTube: [Drone Video—A Wrecking Ball Demolition](#)

International Bowling Museum and Hall of Fame: [History of Bowling](#)

The Homeschool Scientist: [Wrecking Ball Physics Experiment](#)

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