

Elastic Force

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CHAPTER 1

Elastic Force

Lesson Objectives

- Define elasticity and elastic force.
- Describe uses of elastic force.

Lesson Vocabulary

- elastic force
- elasticity

Introduction

The boy in **Figure 1.1** has a newspaper route. Every morning, he rolls up newspapers for his customers and puts rubber bands around them. The rubber bands keep the newspapers tightly rolled up so it is easy to toss them onto porches and driveways as the boy rides by on his bike. Rubber bands are useful for this purpose because they are elastic.



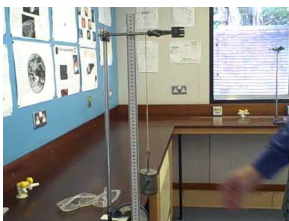
FIGURE 1.1

A stretchy rubber band holds this newspaper in a tight roll.

Elasticity and Elastic Force

Something that is elastic can return to its original shape after being stretched or compressed. This property is called **elasticity**. As you stretch or compress an elastic material, it resists the change in shape. It exerts a counter force

in the opposite direction. This force is called **elastic force**. Elastic force causes the material to spring back to its original shape as soon as the stretching or compressing force is released. You can watch a demonstration of elastic force at this URL: <http://www.youtube.com/watch?v=fFtM9JznLh8> (3:57).



MEDIA

Click image to the left for more content.

Using Elastic Force

Elastic force can be very useful. You probably use it yourself every day. A few common uses of elastic force are pictured in **Figure 1.2**. Did you ever use a resistance band like the one in the figure? When you pull on the band, it stretches but doesn't break. The resistance you feel when you pull on it is elastic force. The resistance of the band to stretching is what gives your muscles a workout. After you stop pulling on the band, it returns to its original shape, ready for the next workout.

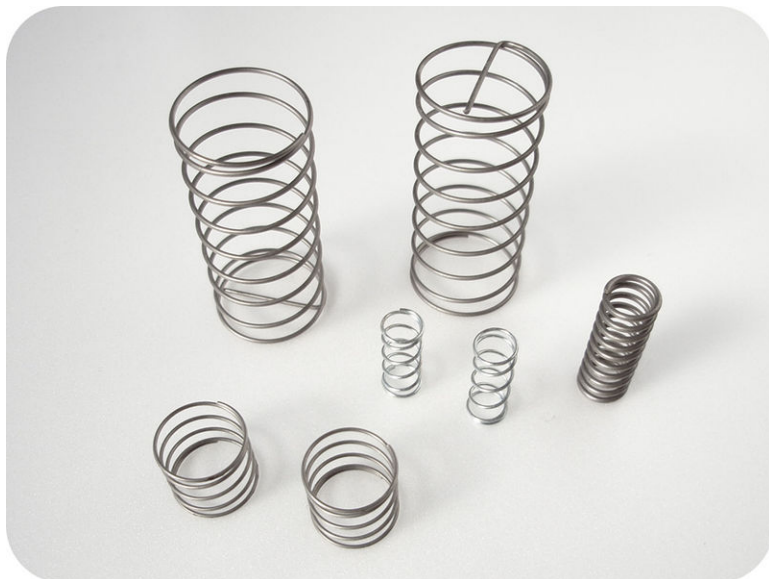


FIGURE 1.2

All these items are useful because they can be stretched and then return to their original shape.

Springs like the ones in **Figure 1.3** also have elastic force when they are stretched or compressed. And like stretchy materials, they return to their original shape when the stretching or compressing force is released. Because of these

properties, springs are used in scales to measure weight. They also cushion the ride in a car and provide springy support beneath a mattress. Can you think of other uses of springs?

**FIGURE 1.3**

Springs are useful because they return to their original shape after being stretched or compressed.

Lesson Summary

- Elasticity is the ability of a material to return to its original shape after being stretched or compressed. Elastic force is the counter force that resists the stretching or compressing of an elastic material.
- Elastic force is very useful. It is used in rubber bands, bungee cords, and bed springs, to name just a few uses.

Lesson Review Questions

Recall

1. What is elasticity?
2. Describe elastic force.
3. Identify uses of elastic force.

Apply Concepts

4. Think of a way you could demonstrate elastic force to a younger student. Describe the procedure you would follow and the materials you would use.

Think Critically

5. Explain how springs are used in scales to measure weight.

Points to Consider

In this chapter, you read about Newton's law of universal gravitation. Newton developed several other laws as well. In the next chapter, "Newton's Laws of Motion," you'll read about his three laws of motion. Recall what you already know about motion.

- What is motion? What are examples of motion?
- What causes changes in motion? What are changes in motion called?

References

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