

Springs 2

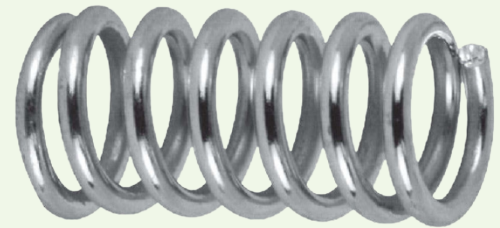


Springs 2

**Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.**

Springs allow cars to ride smoothly over rough roads. Take the following brief quiz to see how much you already know about springs. See the bottom of page 4 to check your answers.

- When was the first coiled spring invented?
 - 1493
 - 1566
 - 1682
 - 1763
- Who first placed a spring in a pistol to allow the gun to be operated using only one hand?
 - Isaac Newton
 - Leonardo da Vinci
 - Aristotle
 - Remington
- Egyptian chariots built over 3,600 years ago made use of all the following *except*:
 - anti-roll-over bars.
 - shock absorbers.
 - springs.
 - turn signals.
- An example of using a non-coiled spring is the bow and arrow.
 - True
 - False
- Some watch springs never need winding or a battery to operate properly.
 - True
 - False



How Much Stretch?

One very useful physical property of a rubber band is its ability to stretch. Because of this ability, rubber bands can be used to bundle items together. Are you ready to investigate the stretching ability of a rubber band? Get started now.

Materials

1 – metric ruler 40 – pennies 1 – plastic baggie
1 – large metal paperclip 1 – medium thickness rubber band

Procedure

1. Carefully bend open the large paperclip so both ends have a hook with a straight section between the ends.
2. Place the rubber band over a doorknob. Make sure the band is hanging freely.
3. Place 20 pennies in the plastic baggie.
4. Push one end of the paperclip through the top section of the plastic baggie.
5. Place the other end of the paperclip so it hangs on the rubber band as shown in Figure 1.
6. Use the ruler to measure the length of the rubber band. Record this value in Table 1.
7. Add the remaining pennies to the plastic baggie hanging on the doorknob.
8. Use the ruler to measure the length of the rubber band. Record this value in Table 1.

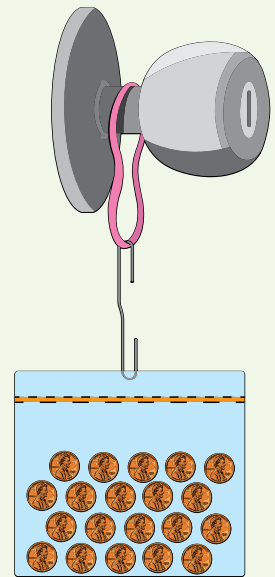


Figure 1

Table 1. Rubber Band Stretch

Number of Pennies in Baggie	Rubber Band Length (cm)
20	
40	

Questions

1. When you were adding more pennies to the plastic baggie, what quantity of the baggie were you changing by adding the additional pennies?
2. Describe the relationship between the number of pennies in the baggie and the amount of stretch of the rubber band.
3. Create a graph of the number of pennies in the baggie and the amount of stretch of the rubber band. Use your graph to estimate how much the rubber band would have stretched if a total of 30 pennies were added to the baggie.

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The Pogo Stick

One of the most popular toys of the 1920's was the pogo stick. The stick was created by George Hansburg and he patented the device in 1919. Gimble's Department store in New York City became the first retailer to sell the toys shortly after Hansburg received his patent. A resurgence in the popularity of pogo sticks occurred in the 1970's when a mass marketing campaign through television sold millions of sticks. Pogo sticks continue to be popular with a new sport called "Xpogo" or extreme pogo catching on with many people across the world. In fact, Xpogo now has an annual World Championship where athletes participate in several pogo skills categories.



The world records involving a pogo stick in several categories show how far people will go to make use of the potential energy device. The record for the most consecutive jumps on a pogo stick is currently 206,864 which James Roumeliotis did over a period of more than 20 hours straight. The



longest distance traveled while on a pogo stick, over 42 kilometers (more than 26 miles). The fastest mile on the stick, less than 10 minutes. In fact, Jack Sexty of Great Britain used a pogo stick to complete a marathon race in a little over 16 hours.

The highest jump on a stick is almost 3 meters (over 9 feet), with the highest backflip reaching a height of 2.8 meters (a little over 9 feet). The most consecutive front flips on the pogo stick is 5, while the most backflips on the pogo is an amazing 17.

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Answers: Page 2 Answers: 1) d, 2) b, 3) d, 4) a, 5) a; Page 3 Answers: How Much Stretch? 1) The mass inside the plastic baggie and the force of gravity pulling the baggie and pennies down. 2) The greater the mass of the pennies, the greater the amount of stretch. 3) Answers will vary. Might include the stretch distance halfway between 20 and 40 pennies in the baggie.

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