

Activity – Back to School Physics

How strong are your Science and Math muscles after the summer break? Try these...

- 1.) Is pressure higher or lower than standard atmospheric pressure when you are flying *inside* an airplane? Explain.

- 2.) What is the volume of water in 100' of 5/8" diameter garden hose?

- 3.) Will water boil faster or slower while camping up in the mountains? Explain.

- 4.) Describe the means through which the *thermal energy* escapes from a cup of hot coffee. Will stirring the coffee cool it down?

- 5.) You have a sand box that is 15' by 18' and 6 in. tall. How many yards of sand do you need to order (a *yard* is 3' x 3' x 3')?

- 6.) At the circus, two trapeze artists, one large and one small, jump into a safety net at the same time. Does gravity *pull harder* on a large person than it will on the small one?

- 7.) The large Ferris Wheel at the Saline Fair goes once around every 46 seconds. Determine its *period* and *frequency*.

- 8.) Why does your bedroom door seem to stick more in the summer than in the winter when you try to open or close it?

9.) On a train to Chicago you travel for 10 minutes at 30 km/hr, two hours at 75 km/hr, and you stop for 22 minutes due to a breakdown. What is your *average speed* in mph?

10.) What is the *angle of ascent* and the *grade* of a section of highway over which a trucker notices the road rises 1000 ft over the course of a half mile?

11.) What type of energy do you have at the top of the first hill of the Mean Streak roller coaster? At the bottom? How do the two energies compare? How much energy would a 1200 kg train have when it is moving at 52 mph?

12.) From a physics point of view, why is a water slide at Rolling Hills park easier to slide down when it is wet?

13.) The distance that two cars travel can be represented by the equations:
 $4s = 12 - 3t$ and $s = 2t + 6$. At what time will they pass each other?

14.) Riding on the bus, you walk forward at 3 mph and see your friend on the street riding a bike in the same direction as yourself. If the bus is going 35 mph, and you observe your friend's speed to be 20 mph, how fast is your friend on the street riding w.r.t. the ground? How would the answer change if your friend were riding in the opposite direction (this is tricky!)?

15.) While driving out west you see a grain silo on the side of the road. You estimate it to be 60.0 ft tall and have a diameter of 25.0 ft. About how much grain could it hold (in ft^3) and how much paint would it take to cover it (in ft^2)?

16.) If you were able to take a vacation to the nearest star system (Alpha Centauri) via the space shuttle, how long would it take to get there if the shuttle had a maximum speed of 2.1×10^4 mph and the distance to Alpha Centauri is 4.12×10^{13} km?

