

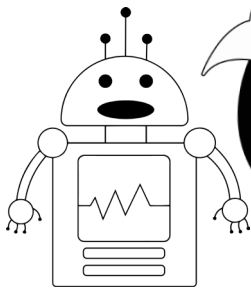
Debugging Force, Pressure and Area

This activity was created by Shannon.

Pressure is the relationship between force and area. Pressure and force are directly related, meaning that if force increases, pressure increases as well. However, pressure and area have an inverse relation, meaning as the area increases, pressure will decrease.

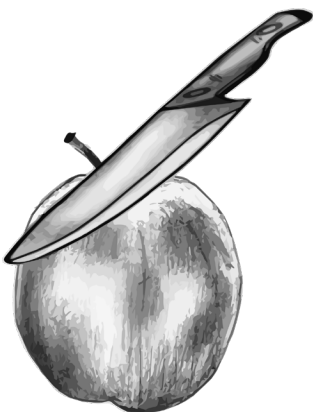
Let's compare getting poked in the arm by a finger to getting poked by a needle. When you're poked with a finger, it doesn't cause a great deal of pain. The force has little lasting effect since the surface of your finger is relatively large. However, if you were to apply the same force but use a needle instead, you will experience more pain since the area of the needle is significantly smaller. Since there's a decrease in area, the amount of pressure going into your arm increases.

Using your knowledge on the relation between force, pressure, and area, can you debug each scenario by determining what's wrong, and stating how to correct them? Make sure to discuss force, pressure, and/or area in your answers!



In computer science, a “**bug**” is an error in the code of a program that sometimes leads to unintentional outcomes. In each of the following scenarios, there is an intended outcome, but you will have to “debug” it to make sure the desired outcome is reached!

- 1 You want to cut an apple. You grab a knife and hold it so that the wide side of the knife is facing the fruit.



Will you be able to cut the fruit? Why or why not?

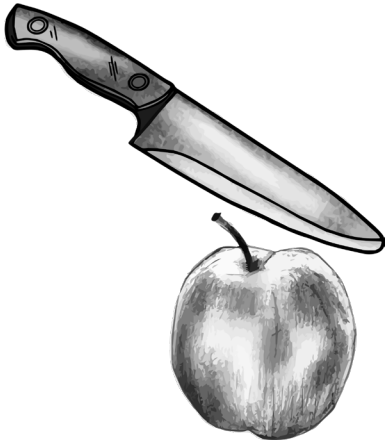
On the image, draw arrows to indicate the magnitude of the applied force (ie. Draw a big arrow for a large force, and little arrows for a little amount of force)

How would you correct this scenario?

Date: _____

Name: _____

- 2 Okay, you figured out how to hold the knife, but realized the knife is very dull.



Will you be able to cut the fruit? Why or why not?

On the image, draw arrows to indicate the magnitude of the applied force.

How would you correct this scenario?

- 3 Oh no! Your friend decides to go ice skating but didn't realize how thin the ice was and ended up falling through! You race to help but do so standing up.



Why would walking on the thin ice be dangerous?

On the image, draw arrows to indicate the magnitude of the applied force.

How should you approach your friend?

- 4 You see a friend walking home wearing high heels through the snow. They appear to be struggling.



What problems will this cause your friend when walking home?

On the image, draw arrows to indicate the magnitude of the applied force.

What would be a better option for your friend?