







## Why Does It Work?

How can several nails balance on top of one nail head without falling over? When something is in balance (like the nails), in science we say it is in equilibrium. Equilibrium happens when two opposite forces pull or push against each other with the exact same strength so that something remains motionless. For example, face a friend and push your hands against each other. If you both push against each other with the same amount of force, you will both stay in the same place. If you push with more strength than your friend, you will create an imbalance of forces and they will fall backwards. With the balancing nails, each side of the nails pulls against the other side equally, so that the nails balance and remain in a state of equilibrium. In order for an object to move, there must be an imbalance of forces, causing it to no longer be in equilibrium. Observe the place where all the nails are balancing on one nail (i.e. balance point). This balance point is called an object's center of gravity. The center of gravity is the place on an object where it can balance because all the forces are in equilibrium. The center of gravity isn't always in an object's exact middle, however. Try to balance a pencil or baseball bat on your finger to prove this. The center of gravity is closer to the heavier end.

## Career Connection:

**Civil engineer:** "Civil engineers design and supervise the creation of structures. Not just buildings – civil engineers work on everything from tunnels and dams, to highways and airports, to water and sewer systems. They use computer technologies and advanced materials to design structures that meet the needs of a growing population while protecting the environment, reducing the dangers from natural phenomenon like storms, and considering future needs of the community." - Engineergirl.org. Read more about civil engineers here: <http://www.engineergirl.org/cms/6069.aspx>.

## Resources:

- Seelascience.com: <http://seelascience.com/wp-content/uploads/2013/09/Puzzling-Nails-Tran-WW-pdf.pdf>

31 Days of STEM FUN!

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