Brainpop: Forces

Name _____ Class _____ Date _____

Question: If forces are invisible, how do we know they exist? And how do they work?

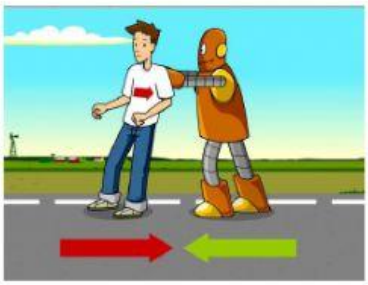
Forces are at work all the time, acting on everything around us. We _____ see them, but some of their effects are pretty _____. Like any time an object changes speed or direction.



A _____ is a push or a pull. And it always involves two or more objects. Something providing the push or pull, like Moby. And the thing it affects, like, um, me.



It's never really that simple. Objects _____ have lots of forces acting on them at the _____ time. Each one has a _____, the size of the force, and a direction.



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We are pushing equally hard, in opposite directions. Our forces are in balance, canceling each other out. That's why I'm not moving. The sum of the forces, or net force, is zero.



We measure force by _____.



Newtons is named _____ Isaac Newton, the physicist who figured a lot of this stuff out.



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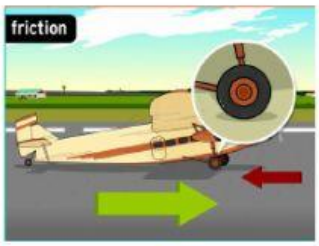
To get something in motion, you have to _____ an unbalanced force. That's any push or pull where the _____ force is *not* zero.



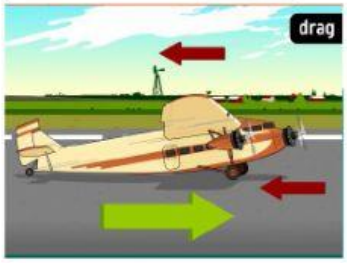
Right now, there are three main forces accounting for our movement. The engines are _____ the plane forward.



There's _____, the resistance a surface puts on anything sliding over it.



There is drag, which is basically the friction of _____ molecules.

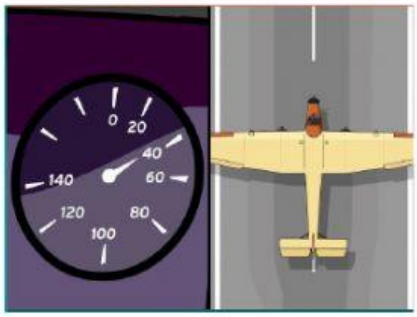


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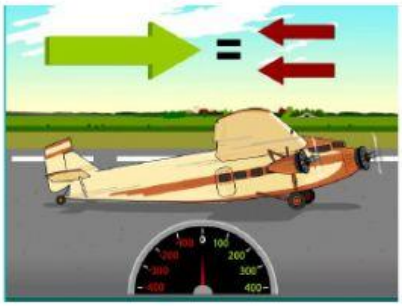
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You would think the force of the engines must be greater than friction and drag. After all, we're moving forward. But notice how still it feels in here? If the forces were out of balance, we'd feel the push. And we'd be able to observe its effects.

Well, we'd see a change in the plane's speed or direction. The combination of these two values is called _____. We're not _____ up or _____ down. And we're heading in a _____ line.



The net force on the plane is _____, same as if we weren't moving at all.



Acceleration isn't just speeding up. It's any change in velocity, including speedups, slowdowns, and _____.

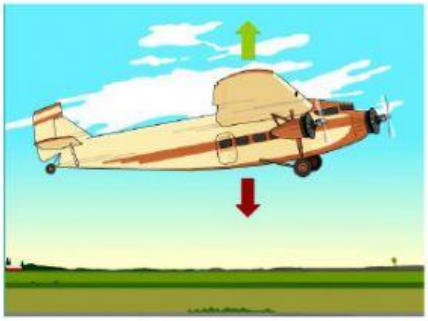


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There's a reason you can feel it when a car, or a plane, accelerates. It means there's an _____ force being applied to it, and to you.

The plane has to generate enough _____ force to overcome gravity. It's a little different than the forces we've talked about so far.

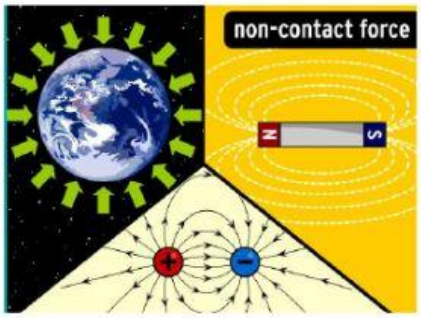


Friction, drag, you pushing me, those are all _____ forces. They're between objects that are touching.



Gravity is a _____ force: it can affect objects that are separated, like the earth and this plane.

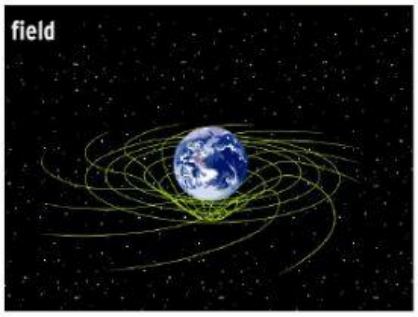
_____ and the electrical force are non-contact, too.



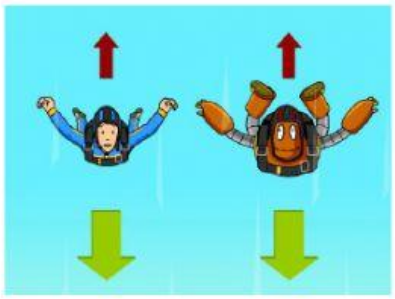
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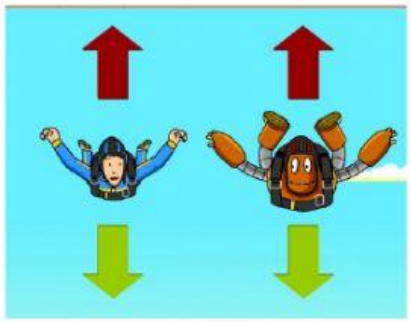
Like all non-contact forces, gravity acts through a field: an _____ area of influence. Fields get _____ the farther out you go from their source.



The gravitational force is pulling us down, hard. It's opposed by _____, which is resisting our downward motion.



The two forces are way unbalanced; that's why we're still accelerating. But the faster we go, the more drag increases. _____, those two forces will fall into balance.



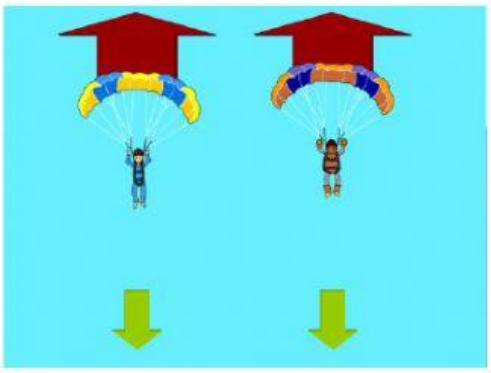
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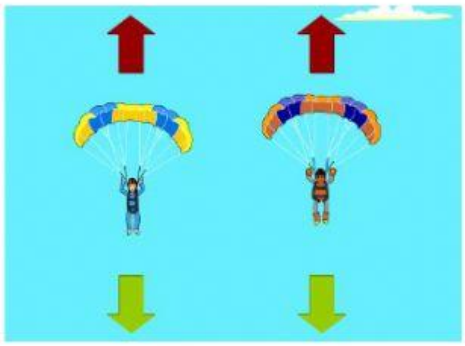
Our velocity is _____, which means we've stopped accelerating. So the net force on us is now _____. That's why it doesn't feel like we're falling anymore. More like floating.



When we pull our cords, our parachutes will _____ drag. So there will be a sudden _____ force upward.



But as we slow down, drag decreases. Eventually, drag and gravity _____ again, and our velocity levels off.



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