BALANCE

The plate balancing on the edge of the wall is displaying an example of potential energy. The plate has the potential to fall to the ground if even a very small amount of weight is added to the end hanging off of the wall. Once in motion, the plate would be undergoing kinetic energy, but once it hits the ground it's kinetic energy is converted to heat and sound.

BOOM

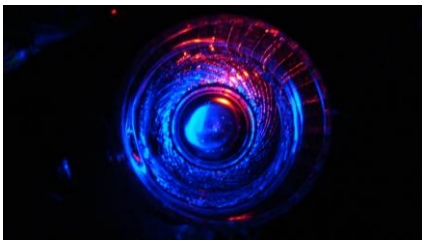
My picture is of me shooting a Winchester .22 magnum bolt action rifle at a aluminum pop can full of water. I was standing fifty yards from my target. The can is five inches tall. While holding the gun, it was approximately at a height of five and a half feet. The rounds firing speed is 2,200 f/s. At that speed it would take sixty eight thousandths of a second for the bullet to reach the can. This can be calculated with the formula dx=vx*t. The angle at which the gun was fired at was at a three degree angle below the horizontal. This was found with the tangent function. The spread of the water is due partially to the transfer of energy from the bullet. That is why some of the water shoots out the back of the can. Most of the water is shot out in many different directions though. This is because the sound wave that follows the bullet causes the water to expand and burst through the can.

BALL DEFECTS

Here is a picture of a ball bouncing off of the ground. First of all there are multiple forces on the ball. There is the ball on the floor, the floor on the ball, and gravity. The ball compresses on the ground because it's filled with air. The less amount of air inside the ball causes the deformation to be greater. If the pressure inside the ball is very small then the deformation of the ball will be very noticeable. Basketball players want the ball to be filled with a lot of air that way the momentum in the ball isn't lost in the compression therefore it bounces back up.

Bridge Reflection

Members of our FCCLA chapter went to a national cluster meeting in Louisville, Kentucky. This was the view from my hotel room. Water acts like a flat mirror. Light reflected from a smooth shiny surface, such as water, is reflected in only one direction. This type of reflection, called specular reflection, can be described using the law of reflection. It states that when an object bounces off a flat surface, the angle at which it hits the surface will be equal to the angle at which it bounces away. The angle of incidence equals the angle of reflection.



Bending of Artificial Light

This is a picture of a glass that I was holding that refracted two sources of light. One source is to the left and is beaming blue light. The other light is behind the cup and is beaming a red laser projection. The two colors of light refract as they hit the bottom of the cup because the cup is denser than the air. As the lights hit the glass they bend towards the normal and continuously change direction as the curvature changes.

Diffraction of Light Waves

Diffraction is a term that refers to the various results of a wave encountering an obstacle. The waves bend around small obstacles and spread out of waves through small openings. The level of diffraction varies by color, following the pattern of ROY G BIV. That is, red, with the longest wavelength, diffracts most. Violet, with the shortest wavelength, diffracts least.

This photograph is one taken as the sun was shining through the window behind my Christmas tree. At first we considered the red dots to have appeared due to internal reflections of the camera lens. However, the dots appeared before the picture was taken, so that hypothesis was ruled out. Instead, we concluded that the sunlight is being diffracted through a very small space in the branches. Since red has been proven to have the longest wavelength, it is the most prominent color shown. Upon closer inspection, though, the remaining colors of the rainbow can be found in a ring around the light coming through the branches.

Dye Collisions

In this picture we have a single drop of green dye and a single drop of red dye being dropped into a glass. The dyes are at a temperature of 10°C when they were dropped in a glass of hot water at 85°C. The water in the glass is warmer, its molecules are moving more quickly, and it has a lower density. The colder dye's molecules are moving slower and have a higher density, which causes it to sink. The red dye was dropped a partial second before the green dye and this picture was taken 2 seconds after the red dye was dropped. However, as the molecules of dye travel downward, they are colliding with water and transferring some of their energy - as can be seen in the dye dispersing sideways throughout the glass.

The Gravity of My Situation

Sir Isaac Newton developed the law of Universal Gravitation which says that objects are attracted to one another based on their masses and the distance between them.

$d=v_it + at^2+h_i$…You're probably wondering how in the world this involves snowmobiling. One of the problems I have with my 1996 Polaris Indy snowmobile is that the speedometer doesn't work. I wasn't sure how to figure out how fast I was going until I encountered this formula. I measured the height of the snow ramp to be 3 ½ feet taller than the surrounding powder. I also

Faucet Free Flow

This photo was taken in a hotel bathroom in Charlotte, North Carolina. Within this picture are many examples of physics, one being the flow of the water from the faucet. As the water flows, the water interacts with air causing turbulence in the water, so those molecules will fall just a bit slower. In addition, the polarity of the water molecules causes cohesion and the stream to narrow as it falls. Also, as the water moves down closer to the sink, gravity and surface tension act on the water. The gravity causes the stream to accelerate and the surface tension eventually causes some of the water molecules to form droplets.

Also in the picture you can see the reflection of the faucet handle on the faucet. This is a virtual image produced from the convex faucet.

Moreover, there is a reflection of my face in the middle part of the faucet, where the concave curvature of the smaller mirror like surface caused my reflection to be real, inverted, and smaller than normal.

Lastly, in the image you can see the flash from the camera reflected from the mirror (above the sink) to the sink. Since the sink vanity is another smooth surface, another reflection occurs; a specular reflection. As in any reflection, the angle of incidence equals the angle of reflection, causing me to see two images.

. . . **Gravity continued . . .**

measured the angle of the jump which ended up being 41° I had my dad time how long it took before I landed. That was 1.11 seconds. I then used the formula above to find that my V_i (in the vertical direction) was 14.61 ft/sec. This then got plugged into the sine function. I figured it out that the hypotenuse, which is equal to my actual velocity, to be 22.27 ft/sec – which is equivalent to 15.18 mph.

Floating Ping-Pong Ball

The photo shows a ping-pong ball floating in mid air. How is this possible? Bernoulli's Principle. Since the ball is round, the air that flows around it has to be traveling at a greater velocity to cover the greater distance around the curved ball than the rest of the air. This high velocity creates a low pressure area around the ball. The higher pressure created from the slower moving air away from the ball keeps the ball in the air current.

JUMP

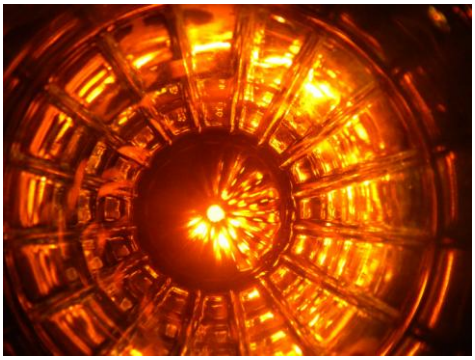
This is a picture of my sister jumping off the roof of a calf shed. I wanted to examine her fall from the top of the calf shed to the ground. The variables to look at would be my sister's mass, the distance from the top of the calf shed to the Earth, and the acceleration due to gravity. My sister weighs 135 pounds. But seeing as mass is preferred in kilograms, I had to convert her weight. So the mass I ended up with was 61.23 kilograms. Measuring with a tape measure, the distance from the roof of the calf shed to the ground is 1.31 meters. And of course, the acceleration due to gravity is 9.8 meters per second squared. The formula v^2=2ad gives my sister's final velocity of 5.07 meters per second towards the ground. T=v/a gives my sister .52 seconds to reach the ground.

MUSIC Takes ENERGY

This music box works by using many elements of physics. The first that is put into use is a force, that being someone's fingers turning the dial at the bottom of the device, which converts potential energy in a spring of the box into kinetic energy to make the spring spin. The more force applied, the more tension there is in the spring which transfers the kinetic energy to a spinning dial connected to the spring. This energy then transfers to a series of gears that cause different things to happen

ROTATION

By applying a net force on a basketball, the ball gains angular momentum about its axis of rotation. Because of the law of conservation of momentum, it takes a large torque or rotational force to cause the ball to change the angular momentum (falling off the finger). The faster the ball spins, the greater the angular momentum and the easier it is to balance the ball on the tip of the finger. If there were no spin on the ball, there would be no momentum to maintain balance and the ball would fall over.



REFLECTION

This picture is of a cup made of mirrors. Shining a light into the glass made many reflections of light off of the other panes of glass. Reflection is the bouncing back of a ray of light from a surface. When a ray of light reflects from one mirror its angle of reflection is equal to the angle of incidence. With a rough surface the light it reflected in many different directions. Like the glass with multiple mirrors. It reflects the light in multiple directions. With the mirrors being plane mirrors when the light hitting it comes off the same way that it went. With the light in the picture being brighter on the one side you can tell which side the light was pointing. With it pointing to the left and knowing that when the light reflects with the same angle that it approached. The light reflects off and it keeps reflecting throughout the whole glass with the mirrors and never stops until the light is no longer present.

SNOW BANK

The reason the snow forms like a cave is because when the wind blows it carries the snow up to the tree line, then falls because the trees slows down the wind current. This causes the snow to fall, thus making a snow bank.

From a previous snowfall the snow beneath the cavern was a major factor as to why the snow formed the way it appears. A possible reason for the hole in drift is that it may have been formed later due to solar heating.

Reserving Energy Through Buoyancy

Fish need to be able to float at a certain depth otherwise they waste energy swimming. As the waters' depth increases, temperature decreases causing the water to be denser. Therefore fish need to change their density to float at different depths. An internal gas-filled organ, called a swim bladder, allows fish to do just that; they are able to remain at a certain depth of water without having to swim. Inflating or deflating this organ with gas from gulping air at the water's surface or secreting gas from the gas gland allows a fish to change its average density, which ultimately alters their buoyancy. When the swim bladder in inflated, the fish's average density decreases causing the fish to float at a higher water level. The opposite occurs when it is deflated; the average density of the fish increases, which results in a weaker buoyant force thus allowing the fish to float at a lower water depth.

SNOW SHADOW

In my picture you can clearly see one of nature's most basic phenomenons. The warmth of the sunrays has melted the snow in the garden, but in the shadow, where it's colder, the snow still remains. The shadow with the snow is on the north side of the house; the sun is shining from the south.

VORTICES

Vortices are the motion of a fluid rotationally flowing around a central point. Two common types of vortices are free vortices and forced vortices. The vortex shown in this photo is an example of a free vortex. In as free vortex, the fluid near the bottom of the vortex rotates at a greater velocity than the fluid near the top. This is because the molecules at the bottom have less distance to travel to make a complete circle than the molecules at the top. Therefore, the speed is held constant in one area but still decreases as you move upward in the vortex.

The vortex in this picture is due to the rotational inertia of the water. As the water flows down into the drain, it begins to rotate. It rotates faster and faster until a clear vortex is seen.

WATER MAGNIFIER

In this picture, the beaker full of water acts as a lens magnifying the object outside. This is an example of a convex lens. The light from the cup bends inward when it goes through the water. Your eyes would trace on a straight line to the big image which is the magnified image. In the picture, I have a Coca-Cola cup behind a glass beaker filled with water. The actual size cup is on the left side and as you can see the cup to the right appears bigger.