

2nd Place Contrived



Let Me Pour You Some Rainbow,
Alyson Michele Vallario
Tamalpais High School, Mill Valley, CA
Teacher: David Lapp

This photo was contrived by holding a crystal vase upside down at the perfect angle in the sunlight to produce the illusion of a rainbow being poured out of the vase. The sunlight flowing in through the window enters the crystal as white light, yet exits with the many colors of the spectrum, including red, yellow, and blue. This is because the white light that enters is really just a sum of all the colors of the spectrum, and each of these colors has a slightly different index of refraction. So when the crystal is placed at a certain angle, the colored light will bend in different directions, creating this rainbow effect.

3rd Place Contrived



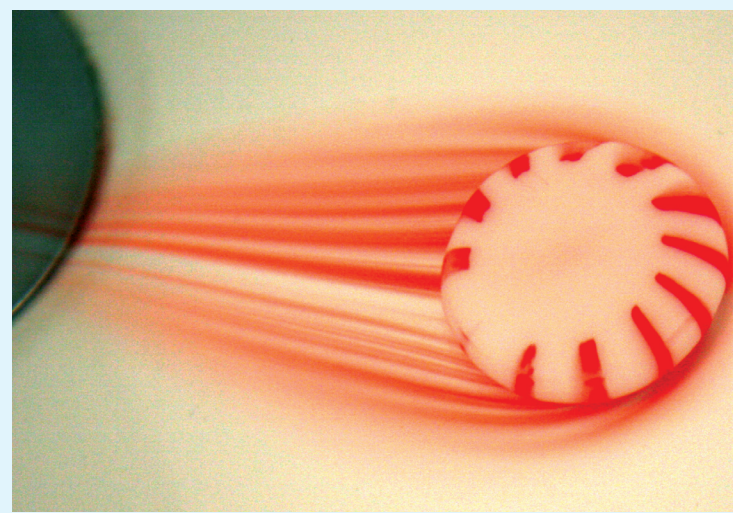
Happy Hour, Natalie Colette Hummel
Columbus School for Girls, Columbus, OH
Teacher: Kevin Sweeney

The smiley face depicted in the picture is created by a reflection of two sequins and a pencil in a martini shaker. The outer surface of the martini shaker forms a convex cylindrical mirror. Thus, the shaker's surface creates an image that is upright and smaller than the original object. This curvature and the angle of incidence distorts the straight pencil into an upward curve forming a smiley face.



Balloon Bust, Patricia Mooney
Mission College Preparatory High School, San Luis Obispo, CA
Teacher: Vickie Backman

This picture of a bursting water balloon demonstrates effects of elastic forces and the law of inertia. The balloon, stretched by the water inside it, is under tension. When it is popped, it tears and quickly returns to its original size. The water it contained is initially at rest, but then begins to fall due to the force of gravity.



Laminar Flow, Alex Ryan Mallison
Highland High School, Gilbert, AZ
Teacher: Stephanie Sapakie

This photo was taken a few seconds after the candy fell into the sink. As water flowed around the candy and into the drain, the red streaks clearly show the laminar flow. The density of the dissolved candy solution is greater than that of the water. Had the two densities been the same, the red lines would not appear.



Blurry Spokes, Archan Baldev Luhar
Medfield High School, Medfield, MA
Teacher: Richard Shapiro

As I rode across the lawn, a camera with a set timer captured the wheel of my bicycle. The spokes near the top of the wheel are more blurred than those near the bottom of the wheel because they are moving faster. Because the very bottom of the rolling wheel has a zero net velocity, the camera captures it sharply. At the top of the wheel, the pure rotation and the pure translation of the wheel yield a net velocity that is twice the translational velocity of the bike. This higher net velocity results in the spokes near the top being blurred because the camera captures them at multiple positions in the 1/160 of a second its shutter is open.

About the Contest

Each year, AAPT organizes a High School Physics Photo Contest. Physics students around the world are challenged to submit a photo illustrating a physics concept. The students are required to take an original photo and include a written summary of the physics occurring in the photo. The photos shown here were judged at the 2010 AAPT Summer Meeting in Portland, Oregon. See the top 100 and check for upcoming information about next year's contest online at aapt.org/Programs/contests/photocontest.cfm.

AAPT thanks Vernier Software & Technology, Inc. for their generous support of the photo contest.



AAPT
PHYSICS EDUCATION

high school physics
photo contest

2010 Winners

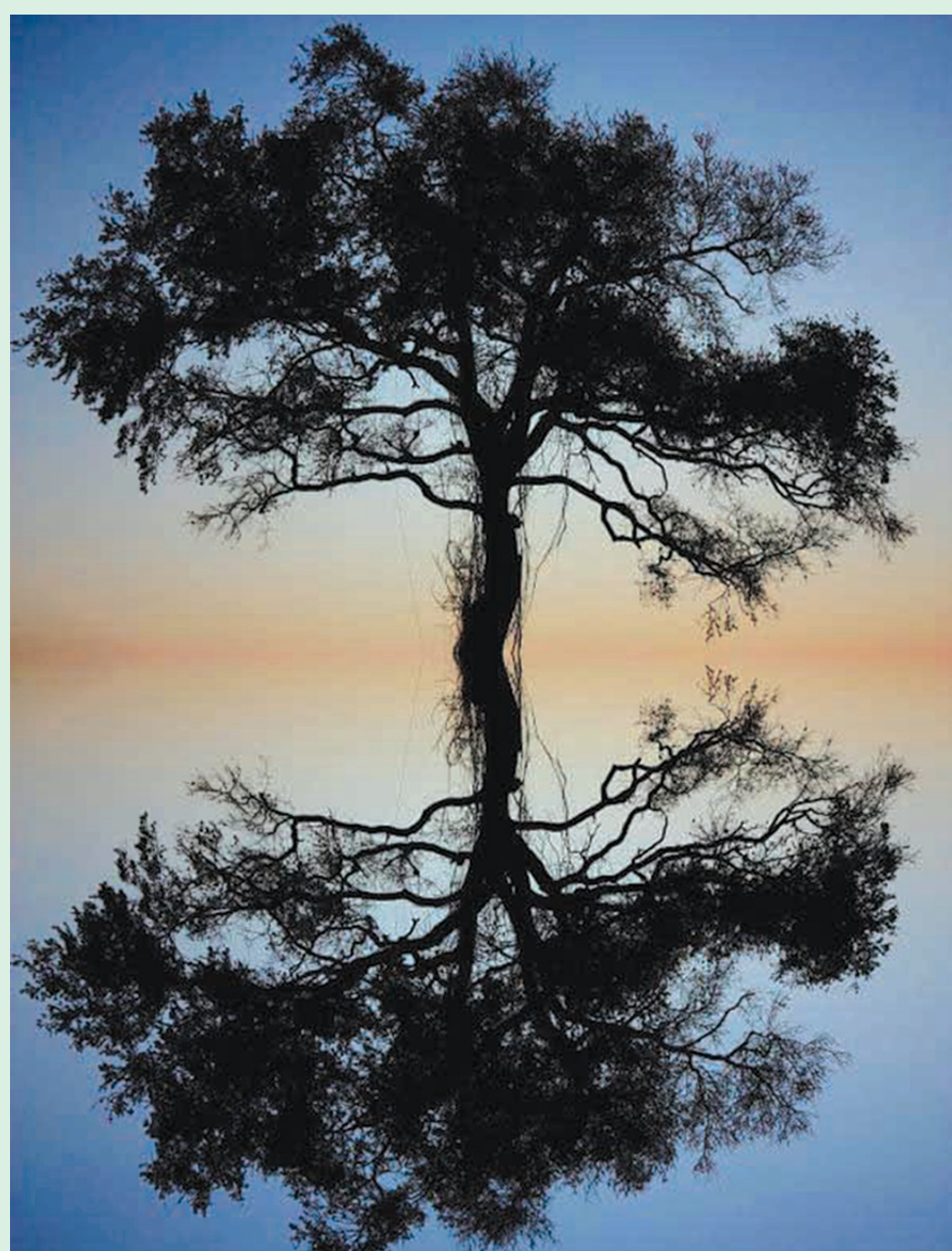
1st Place Contrived



Slap Shot, Joshua John Garcia
Kuna High School, Kuna, ID
Teacher: DaNel Huggins

Using a high-speed camera, the instant of a hand slapping a stomach was captured. This activity caused a shockwave that originated as the hand moved into the stomach. This shock wave is in the shape of the hand. It was created by the transfer of energy from the hand to the stomach and moved across the torso of the body.

1st Place Natural



Connecting Branches, Brittany Illana Fader
West Boca Raton Community High School
Boca Raton, FL
Teacher: Maria Aparicio

I took this photo near sunset, while standing at the side of a lake in Florida. I zoomed in on the tree and its reflection so that no other objects were in the picture. The lake acts as a plane mirror and a virtual image is created that has the same size as the tree.

Honorable Mentions Contrived



Magical Maypole, Abby Kelso
The Archer School for Girls, Los Angeles, CA
Teacher: Helen Reese

This picture was taken at the front of our school on a bright spring day. The sunlight streamed through the double convex lens, inverting the image. As rays of light hit the lens, they are refracted, causing what we see as the top of the maypole to appear as the bottom, thus creating this fun illusion.



The Kaye Effect, Ellen Alice Eichelberger
Kuna High School, Kuna, ID
Teacher: DaNel Huggins

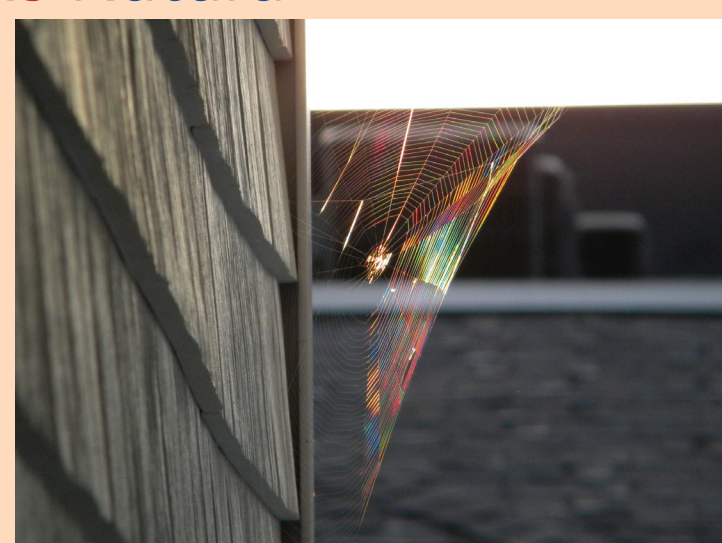
The Kaye effect, first described by Alan Kaye in 1963, is an example of the physics of complex liquids. The Kaye effect occurs when a viscous-elastic fluid, like shampoo or soap, is poured onto a surface. A heap of the poured fluid builds up on the surface. After the fluid heaps, the continuous stream of falling fluid causes the heap of fluid to dimple. The stream of fluid falls into the dimple and shoots out in continuous arcs. The dimple acts much as a ski jump does.

Honorable Mentions Natural



Center of Mass, Allison Leigh Pixler
Glenbard West High School, Glen Ellyn, IL
Teacher: Bruce Medic

In this photograph, the white ibis stands with its mass centered over one leg. Its other leg remains tucked in its feathers. For any object to balance, its center of mass must be over its base. This is why, when you lift up one of your feet, you can't help but shift your weight to prevent yourself from falling over. This photo is an example of how physics can be found anywhere, such as the forest preserve on Sanibel Island, FL, called Ding Darling.



The Web of Refraction, Inkisar S. Anwar
Fox Chapel Area High School, Pittsburgh, PA
Teacher: Dan Malone

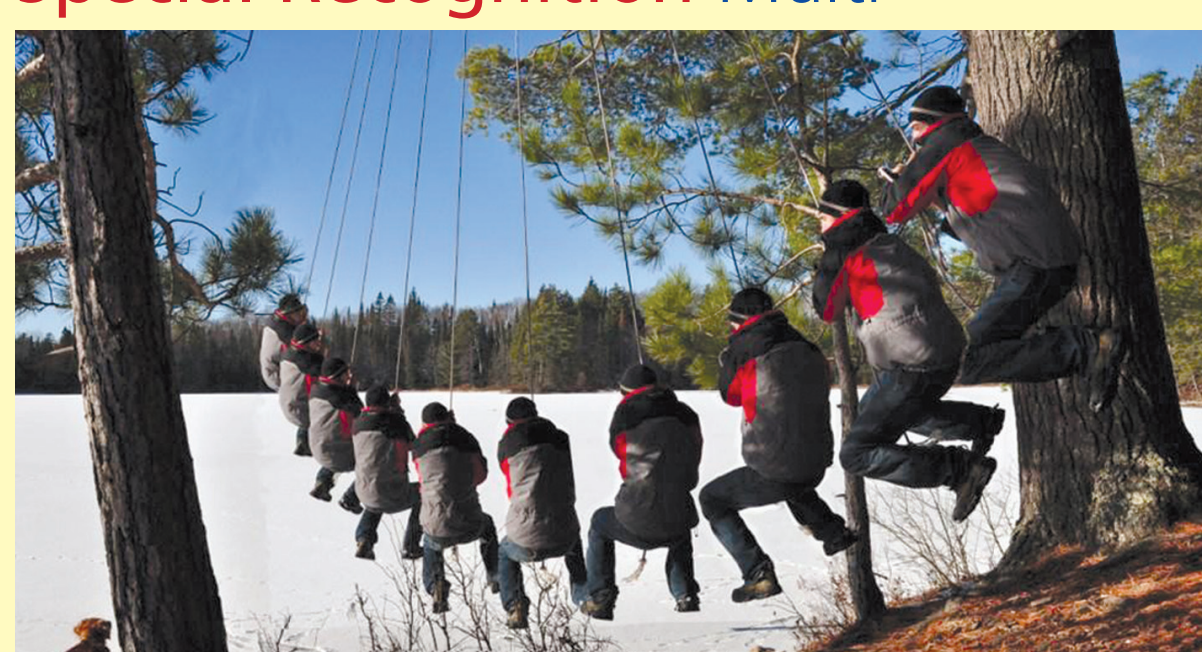
Rainbows are an amazing sight to behold, yet one may not realize that the laws that apply to them also apply to so many other things around us. We can see the laws play out in some of the most unusual places—in this case, a spider web. This picture was taken at sunrise when the web had a layer of dew covering it. Each wavelength is refracted at a slightly different angle when passing through the water-covered web. Since the sunlight we see is made up of waves of all colors, they are all projected into different angles. This in turn causes us to see the rainbow of colors on the cobweb.



The Life of a Snowflake, Amanda Boone
Viewpoint School, Calabasas, CA
Teacher: Nancy Argano-Rush

Snowflakes form when water vapor becomes deposited on dust particles or other condensation nuclei. The water vapor must be converted directly into ice, which is what happens in snow clouds. When the water is deposited it forms hexagonal prisms of ice. Along uneven surfaces or edges more water vapor is deposited, causing branches to form around the hexagonal prism. These bumps then become even better places for water vapor to deposit, causing the branches to grow and diverge off, resulting in snowflakes having many possible shapes.

Special Recognition Multi



Human Pendulum, Brian W. Jacobel
Northfield High School, Northfield, MN
Teacher: Rebecca Messer

This image is a composite of 10 photos shot at four frames per second by a tripod-mounted remote-activated camera at a lake near my cabin in Wisconsin. The image shows the photographer riding a rope swing from its maximum displacement on the right to the left. In this way, the photographer and the rope swing demonstrate the motion of a simple pendulum.



Natural Mirrors and Lenses, McKenna Lee Botts
Cherry Creek High School, Greenwood Village, CO
Teacher: Jessica Olsen

This is a photo of light reflecting off the surface of a lake in Utah. In the wake of the boat the water surface is irregular, so the incident light reflects in many different directions and no clear image is formed. The surface of the relatively calm water just outside the wake is also slightly distorted by the passage of the boat. Light reflecting off that curved surface forms distorted mirror images of the rocks above the lake.



Icicles From Down Under, Paul Doell Manning
Niskayuna High School, Niskayuna, NY
Teacher: James Samascott

An ice storm in December 2008 left everything outside coated in a layer of ice. The deposition of ice began slowly enough for small icicles to form on the bottom of our clothes line. Soon, however, the ice formation started to pick up speed; when the buildup of ice on top of the line caused it to become top heavy, it flipped over. Still, one defiant icicle formed in the new orientation.



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Special Recognition Multi



The Essence of Dance, Samantha Lynn Birk
Oceanside High School, Oceanside, NY
Teacher: Matt Sheinkopf

Balance is a key component to dancing. The forces acting on a balanced dancer include that of gravity pulling down and the force of the floor pushing back up on the dancer's feet. The forces cancel each other out and allow for the dancer to maintain her balance. In this photo, I am spinning in a circle; the forces (along with the associated torques) of gravity and the grass pushing up are balanced in order to allow me to stay straight up.

2nd Place Natural



Light on Water, Erika Lynn Laman
West Boca Raton Community High School
Boca Raton, FL
Teacher: Maria Aparicio

When light travels from one medium into another, of different refractive index, it bends. This is called refraction and can cause an object that is underwater to appear larger and closer than it does when it is in air.

3rd Place Natural



Shrouded Flyer, Peter XinmanTang
Lynbrook High School, San Jose, CA
Teacher: David Taylor

This photo was taken during the U.S. Navy's annual Blue Angels Air Show in San Francisco in 2009. The weather was cloudy and the humidity was likely high. The increased amount of water in the air allowed the condensation cloud to form at speeds lower than normal, allowing a picture of this rare event to be taken. Due to the high velocity of the air flow in the immediate vicinity of the aircraft, a region of lower pressure and temperature is created. This results in the condensation of atmospheric water vapor, similar to that in cloud formation. As the jet passes the tail of the plane, the flow velocity drops and the condensation ceases. Therefore, the visible cloud appears to move along with the airplane.