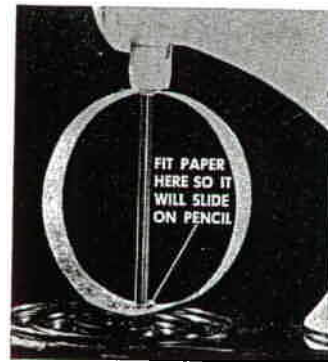




The earth bulges at the equator because of centrifugal (center-fleeing) force produced by its rotation. A loop of stiff paper, mounted on a pencil that fits the mixer chuck (below), represents the earth. The faster you spin the loop, the more its middle bulges outward (left). Centrifugal governors on steam engines work the same way.



Kitchen Mixer Answers \$64 Science Questions

It was meant to beat cakes, but it can also demonstrate some of physics' most curious facts.

By Kenneth M. Swezey

WHY does the earth have a pot belly—a bulge at the equator making its diameter there about 26 miles greater than from pole to pole?

How does a washer spin-dry clothes?
How does a cowboy spin his lariat?

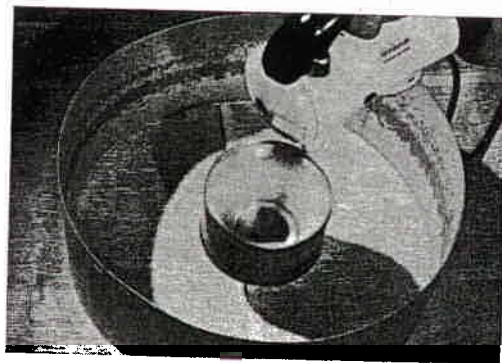
How does a cream separator work?

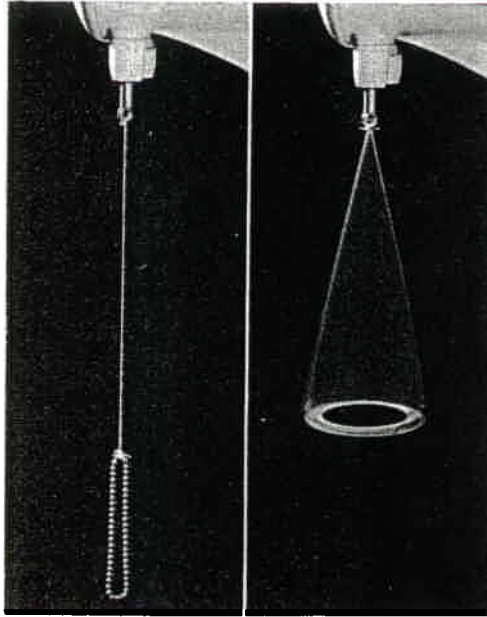
An electric kitchen mixer will answer such \$64 questions in an evening's science fun for the whole family. Use a mixer having a variable speed control. Most of the experiments here can be done with a 2½" dowel or pencil stub pressed into one chuck, with a small screw-eye turned into its end. Use the other chuck for reverse rotation.

And when you're through with the scientific tricks, you can put the mixer right back to work beating up a batch of waffles.

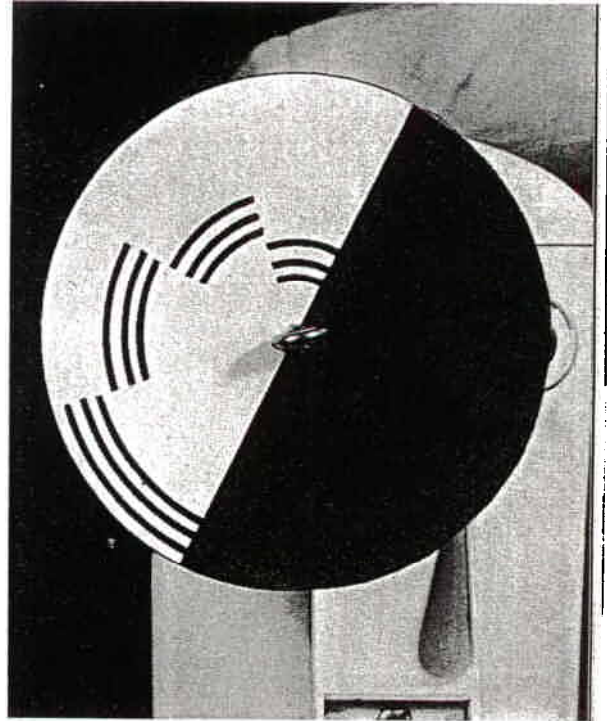


In a washer, wet clothes are whirled at high speed in a perforated cylinder. Centrifugal force throws out the water. A whirling coffee can punched full of holes (left) demonstrates this. Revolve it as at right. Centrifugal force is used commercially to dry sugar and salt.





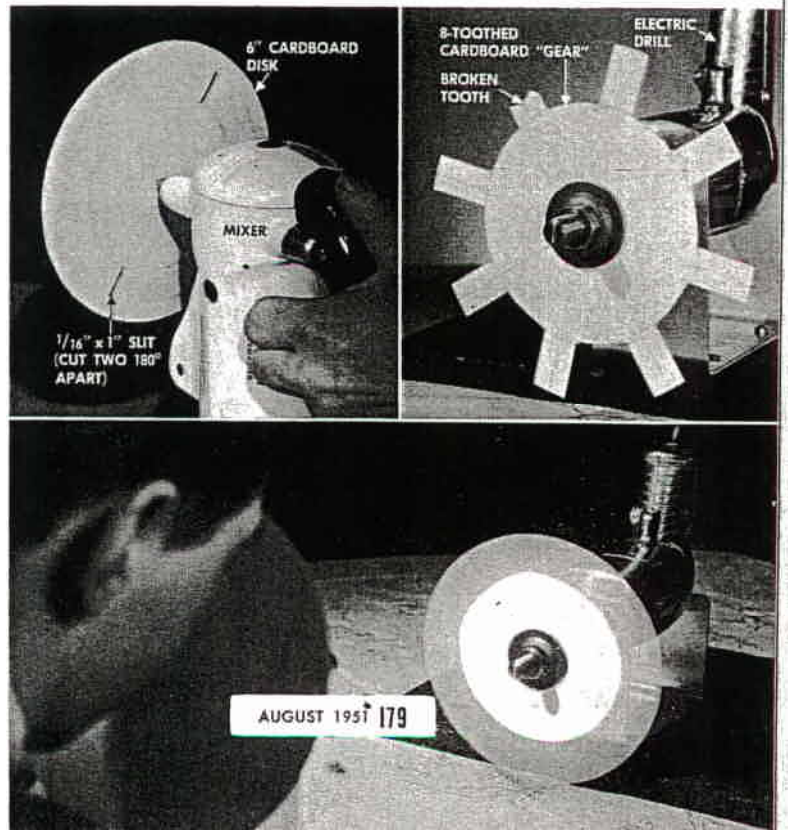
Spinning a lariat. You can see the science involved by fastening a 3" loop of electric-light chain to a 7" string tied to the mixer spindle. Start mixer slowly and gradually build up speed. As speed increases, loop will open and its bottom rise. Finally loop will spin on its side in a circle. Centrifugal force raises it until greatest amount of its weight is as far as it can get from the axis. Lariat loops spin in an open circle for the same reason.

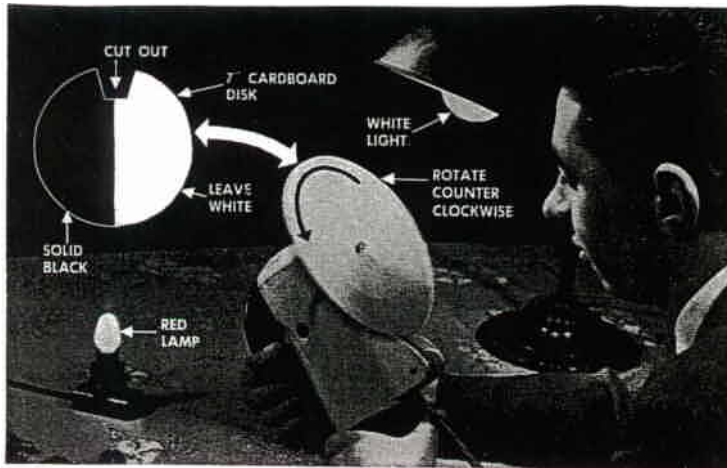


Here's a real puzzler. Blacken half of a 4" disk and draw sections of circles with black ink on other half as shown. Rotate this disk slowly under strong white light, and arcs of black ink seem to change to circles of four different colors. Reverse the rotation, and colors appear in reverse sequence. Scientists say illusion is related to rate of growth and decay of color sensations in eye and mind—but the principle is still imperfectly understood.

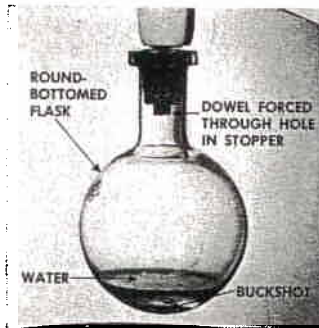
How a stroboscope shows up flaws in rapidly moving machinery is another experiment you can perform. (A stroboscope makes revolving or vibrating parts seem to slow down or stand still.) Cut a sheet of cardboard to represent a broken "gear." Spin gear in an electric drill and view it through the revolving slits of a stroboscope improvised as shown. Carefully adjust the speed of the mixer motor and you will find one point at which the gear seems to stand still, revealing broken tooth. When this happens, the stroboscope slits are passing your eye at same rate gear is revolving. You see gear for fraction of a second in same position each time it revolves. Persistence of vision blends these images into one. You can also "stop" electric-fan blades, the hammer of a vibrating bell, or alternating-current fluctuations.

[Continued on next page]

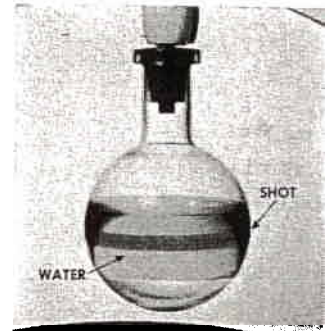




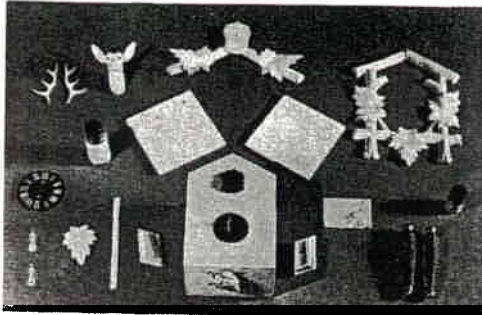
Red lamp turns green if you view it through slot of this disk, revolving slowly counterclockwise. Scientists say that this illusion is caused by retinal fatigue. The eye tires of the color it sees every time the opening in the disk passes, and so creates an image of complementary color on white section of disk. Speed up disk, or reverse direction, and illusion vanishes.



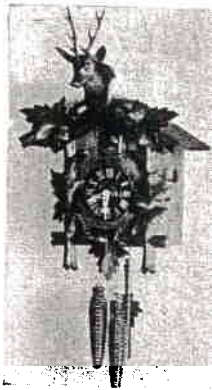
Cream separator. If two bodies of different weight are rotated at same velocity, the heavier one pushes out with greater force than the lighter. Start up mixer after assembling the setup at left, making sure fittings are tight and flask exactly centered. The shot will form a ring around widest part of flask with water in rings above and below. Cream is separated from milk by same principle, since the cream is lighter. Laboratory centrifuges separate chemicals in same way.



Cuckoo Clocks Assembled from Kits

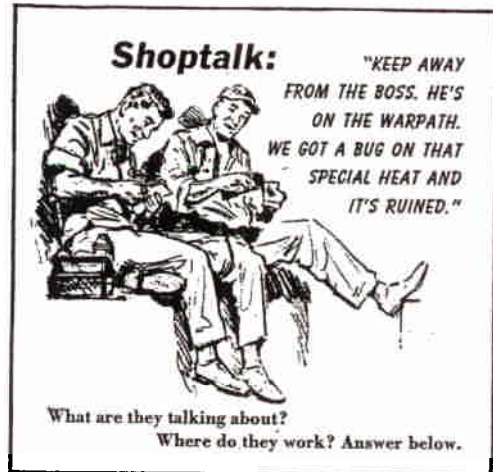


CARVINGS, works, and all parts are included in these cuckoo-clock kits. The works come mounted in place and ready to run. You assemble the other parts and stain the case. The kits, priced from about \$13 to \$30, are imported from Germany. According to the importer, J. F. Reich, of Quivira Lake, Kansas City, Kan., assembling a clock from a kit is a one-evening job.



Modeling Clay Identifies Cut Film

WHEN film holders have been loaded for weeks and you don't trust your touch to identify the notches, unload in the dark and press the notched edge into modeling clay. Then look at the clay in the light.



They're steel workers. A bug is a small particle of steel that solidifies on the nozzle of a ladle for molten metal and interferes with pouring. The bug causes spraying during pouring. This in turn causes the ingots to have a poor surface that might require scrapping or expensive surface conditioning.



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