PENCIL POWER

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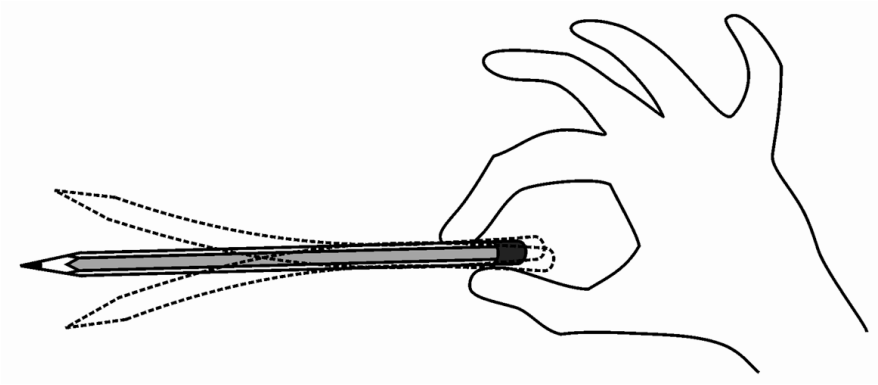
Pencils are found everywhere…except a sharpened one when you need it! Who invented them and how many creative ways can they be used? Modern pencils are made by mixing finely ground graphite and clay powders, adding water, forming long spaghetti like strings, and firing them in a kiln. The strings are dipped in molten wax, which seeps into the tiny holes of the material, resulting in smoother writing. This thin inner core of the pencil is protected by an outer wooden casing which prevents the core from breaking and also from smudging the user's hand.

Pencils create marks via physical abrasion, leaving behind a trail of solid core material that adheres to a sheet of paper. One pencil can write an average of 45,000 words and can be sharpened 17 times. On 30 March 1858, Hymen Lipman added an eraser to the end of a pencil for which he received a patent.

Writers have had a strange relationship with pencils. Thomas Edison had his pencils specially made by Eagle Pencil. Each pencil was three inches long and was thicker than standard pencils. John Steinbeck was an obsessive pencil user and is said to have used as many as 60 in a single day. His novel *East of Eden* took more than 300 pencils to write. Roald Dahl only used pencils with yellow casing to write his books. He had 6 sharpened pencils ready at the beginning of each day and only when all 6 pencils became unusable did he sharpen them again.

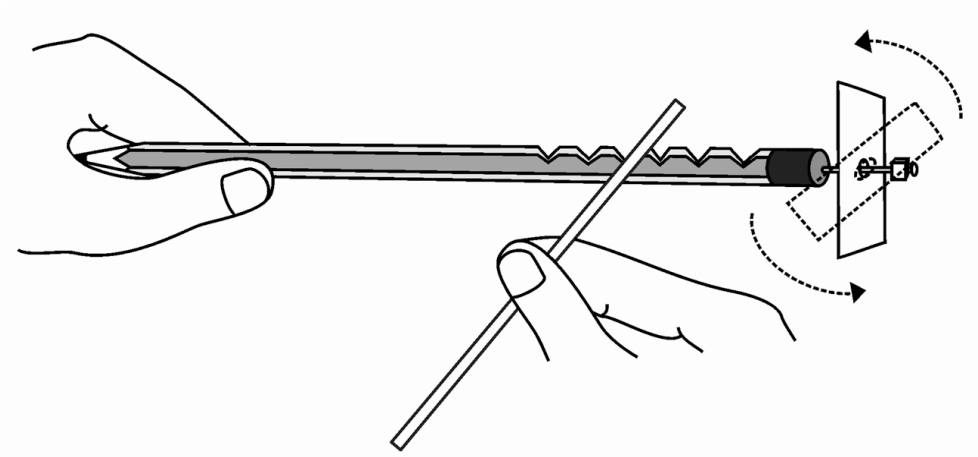
Pencils are certainly objects of everyday use and they can be used to perform a number of experiments and tricks.

BENDABLE PENCIL



Hold a pencil end loosely with your thumb and index finger. Then give it an up-down shake holding the end loosely all the time. You will be surprised – the stiff pencil will suddenly become "rubbery" as if it was made of some elastic material. When you hold the pencil and shake it up-down it moves in two planes and it results in this wonderful illusion.

PENCIL SPINNER

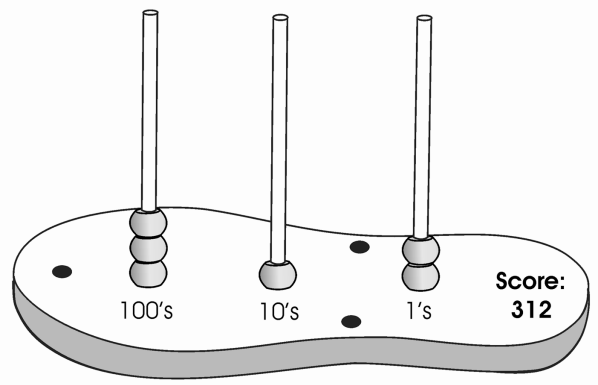


Take a pencil with an eraser on one end. With the help of a pen knife make six "V" notches near the rubber end. The notches should be deep. Then take a 1.5-cm x 3.5-cm rectangle from an old greeting card to make the fan. Mark the two diagonals to locate the centre and make a 3-mm diameter hole with a pencil point. Place the card-fan in a pin and poke the pin in the eraser rubber. The fan should rotate freely on the pin. Fix a small rubber stopper to prevent the fan from flying away.

Hold the pencil with one hand. Hold a ball pen refill near its end and rub it to-and-fro on the notches with your other hand. You will be surprised to see the card fan spinning! This toy has intrigued scientists for over a century. Half a dozen scholarly scientific papers have been written to explain its working. When you rub the notches "vibrations" are produced which rotate the fan. You can also hold the pencil from its free end and tap it repeatedly with a scissors. This will also produce vibrations and make the fan spin too.

Watch this video http://www.youtube.com/watch?v=i5h3bHM9vPA

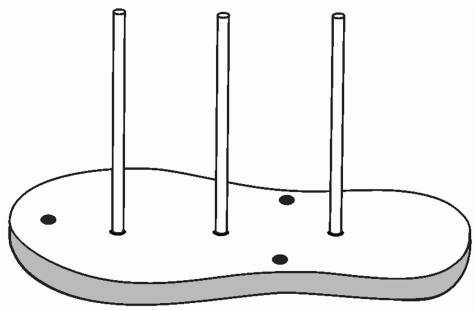
SIMPLE ABACUS



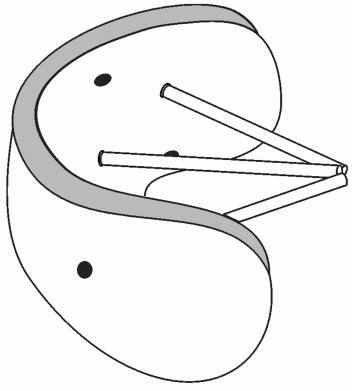
A simple abacus can be made from a used rubber slipper. Make three equidistant circular holes in a slipper with a shoemaker's punch. They should be just big enough so that a pencil can fit tightly in them. Stand three pencils in the slipper. Cut the pencils so that only nine beads can be fitted in one pencil. The pencils represent place value – the right one "units" the middle one "tens" and the left one "hundreds". The score on the abacus is 312.

Watch this video of the Simple Abacus http://www.youtube.com/watch?v=3mdxVrnbhc4

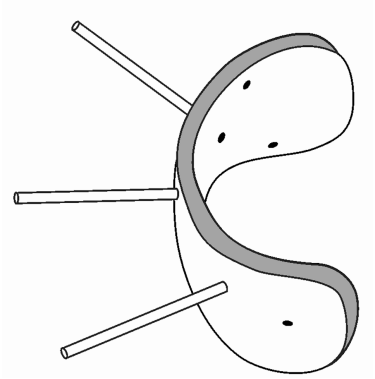
LIGHT RAY MODELS



Plane Mirror



Concave Mirror



Convex Mirror

The conventional "ray diagrams" are often confusing. Here is a good way of getting a "feel" of what happens to light when it strikes a plane mirror – it just returns back the same way. What happens when light falls on a concave mirror? The rays converge to one point called the "focus" (fireplace in Latin). When light rays strike a convex mirror the rays "diverge". All this can be clearly seen in this simple model.