



Examples: Here are some examples of the ingenious toys made by young children using common household and natural materials.

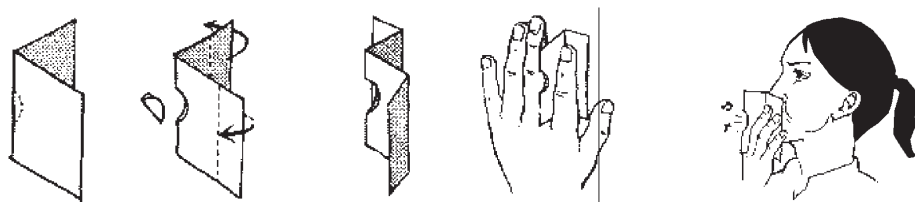
PAPER WHISTLE

You need

A paper about 12 cm x 6 cm.

How to make it

Fold the paper and make a cut as shown. Hold the paper and blow into it. You will hear a whistling sound. With practice you will be able to produce a variety of sounds by changing the intensity of blowing.



CAP-TAP

You need

Metal cap of a cold-drink bottle, rubber band, button, and a piece of thread.

How to make it

Cut the rubber band and pass one end through the hole in the button. Tie the two ends of the rubber band. The rubber band should neither be too tight nor too loose. Pass the rubber band over the bottle cap as shown. Take the string and pass one end through the other hole of the button and tie it up. Make knots about 3 cm apart. When you hold the bottle cap in one hand and run your fingers over the knots, the button produces a tic-tac sound when hitting against the bottle cap.



Try out: Use different caps, like the lid of a shoe polish tin.

Find out: Why is there little or no sound when you move your fingers slowly over the string? What happens if you make the knots too far apart or too close to each other?

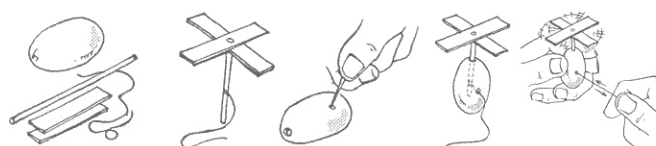
ANT AND THE FAN MACHINE

You need

A rubber plant seed, tiny pieces of palm leaf, a thin bamboo stick and a piece of string.

How to make it

Fix two pieces of the palm leaf on to the stick as shown. Pierce two small holes for the stick and the string. Hollow out the rubber plant seed by placing it near an ant hill (the ants eat the pulp inside the seed in a day or two). Tie the end of the string to the stick and place the stick inside the hollowed-out shell. Draw out the loose end of the string. Now turn the blades of the palm leaf to wind the string on the stick. Pull the string in jerks. With practice you can learn to keep the fan in continuous motion.



WINDMILL

You need

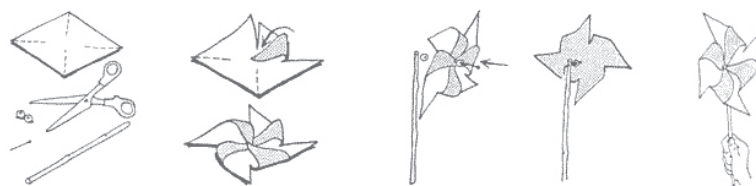
A thin, stiff piece of paper 15 cm x 15 cm, a pin, two beads and a reed.

How to make it

Mark the lines and make the cuts as shown. Place the blade ends at the centre but do not press the folded portion. Pass a bead through the pin and fix the four blades together as shown. Insert another bead through the pin to fix the blades to the stick. Hold the toy against the wind to make it rotate.

Try out

Make this toy with different types and sizes of paper.



Find out

Will the wheel rotate if one blade is shorter? Why does the wheel rotate only when placed against the wind direction? Why does it move when you run with it? Do you know of any appliance or machine based on this principle?

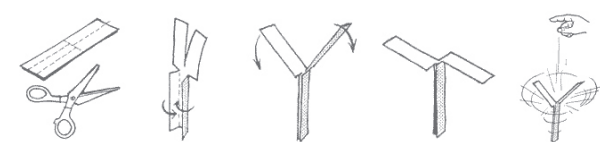
WHIRLING FAN

You need

A strip of thin paper 12 cm x 3 cm and a pair of scissors.

How to make it

Cut the strip vertically into two along less than half its length. Make two small cuts horizontally. Fold the two lower portions inside to overlap each other. Bend the upper portions horizontally. Drop the toy from a height and watch it rotate as it descends. If it does not rotate properly, change the length of the blade.



Note

Have you ever watched the large blades of a helicopter rotating at high speed? These blades push the air down with great force, causing the machine to rise up. In the whirling fan the opposite action takes place. Passing air causes the blades to rotate.

YO-YO

You need

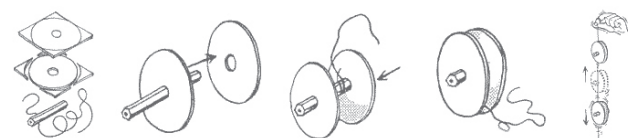
Two circular pieces of thick cardboard about 12 cm in diameter, a small pencil stub and a piece of thread 50 cm long.

How to make it

Make a hole in the centre of each disc and fix the pencil as an axle. The distance between the discs should be 1 to 2 cm. Tie the thread to the pencil and wind it as shown. Hold the free end of the thread and let the spool go down. Give it a slight jerk when it almost reaches the end of the thread. The spool winds and unwinds itself.

Try out

Make a small and big sized toy.



Find out

Why is it easier to operate a bigger sized yo-yo? Why is the toy difficult to operate? Terms like 'torque' and 'momentum' are used to describe how this toy works. Request senior students to explain these terms.



Every society has a great deal of practical and useful knowledge, which is often expressed most creatively and effectively through its tales and toys. Some 30 years ago, I realized the value of toys as learning aids while guiding design students on learning about materials playfully and creatively. I observed that many ingenious toys made from everyday materials are extraordinary examples of intelligent and innovative design. These included toys developed and produced by local toymakers as well as toys made by children themselves. This motivated me to document examples of interesting and educative toys and to design resource books.

The best thing a child can do with a toy is to break it. The next best he can do is to make it. The fact that many toys made by children cost nothing and are made of the simplest materials, often recycled, does not mean that they are inferior to the high priced, factory made and easily available on-the-shelf toys. These handmade toys often have an edge over commercially produced playthings.

Learning from each other

Children learn either from their peers during play activity or from older children. Toy making and playing become part of the free interactive learning laboratory, providing opportunities to learn skills in using materials and understanding their properties. The process of making also introduces children to ways of integrating an idea or a theme with the design and development process.

Learning by experimentation and creative activity

One of the unique features of these toys is that they introduce children to a scientific method of working. In the process of making and playing with the toys, faults and shortcomings in them become obvious. This is because unless the toys are made according to certain specifications, they will either not work at all or work improperly. Children can make changes and remove the shortcomings, if any, on their own. For instance, when a paper whistle is made and no sound emanates, children become curious and wonder, 'Is the construction right? Is the way of blowing correct? Is the selection of paper appropriate?' This way, children are introduced to the basic ideas of experimentation and creativity in a subtle yet effective manner.

These innovative toys introduce the child to the fundamentals of technology besides showing how to plan and construct step by step; to work with common basic tools such as a knife, pair of scissors, hammer, etc; to use a variety of materials and thus get familiar with their properties; to understand the basic concepts of measurements and the need for accuracy; to appreciate the 'part and assembly' concept, i.e. how an object having more than one part is made by assembling parts which have been made separately; and to evaluate the work done and judge the scope for improvement.

Introduction to design

Take the case of the windmill toy. The aim is to make a playing device, which can rotate by wind energy. This toy is developed by selecting the right materials and through appropriate structural construction. Let us suppose that the paper used for this windmill is too thin or too thick or the paper blades are not in balance or do not have the correct type of folds. Will this toy work? Likewise, how does a new user know that this toy should rotate against the wind current? Very often children paint colourful rings on the blades to perhaps indicate rotary action and to enhance the visual appeal.

Are these toys safe?

These toys are relatively safe considering the home environment. Children usually make them from discarded materials by using tools such as knives, scissors, needles, etc. At what age should the child be allowed to handle these tools? Are these tools risky? On the contrary, toy making provides an opportunity to handle materials and tools by taking adequate precautions when working. This is an important aspect of growing up. However, in the making of certain toys there is always an element of risk. Here teachers and guardians need to guide the children against accidents, yet encourage them to handle tools with proper care.

Developments ahead

The most important aspect of these toys is the experience of joy and the element of creativity. Handmade toys can be the early indicators of future scientists, engineers and designers. This is a tribute to the genius of those 'ordinary' people who thought of and gave shape to 'extraordinary' playthings that can be prepared with commonly available materials and tools.

Concluding remarks

What is so unique about toys and games as media for education and entertainment? How can they be widely used as teaching/learning resource materials? Toys are products that have these key aspects:

Learning from each other: The child who knows makes and plays. Other children observe, play together and get to learn how to play and make the toy.

The educational value: Children can repeatedly play and interact with these products and learn many things by the experience of play and making toys. These can be an excellent part of the early education activities in schools.

3H in Harmony: Toys use 3Hs (Hands, Heart and Head), while a story book or a TV programme uses mainly 2Hs (Heart and Head). Cooking and eating food also involves the 3H principle, but there is little context of free play.

Interaction and first-hand experience: A toy is more of an experience and is based on an idea, a basic socio-cultural concept for the age group; it is designed and made using required materials as per design. Children are quick to like or reject a toy even after first interaction. A good toy provides great interactive experience to a child and needs no earlier learning or training. The toy must provide fun, play, a sense of freedom and challenge; it must make no expectation and no judgment on a child's abilities. It should motivate sharing with others and help relate to similar experience in the environment and surroundings. Every good toy has a lot to teach in a silent, sensitive and discreet manner. Learning to play and to make toys from other children is a profound and desirable experience. This is also a very valuable group activity in schools.