



## A G.A.T.E.WAYS JOURNEYS PROGRAM

for Year 3 and 4 gifted children with a love of science

### 'CURIOUS TOYS FOR CURIOUS BOYS

.....AND GIRLS!'

**G.A.T.E.WAYS** is an independent organization offering challenging and enriching activities and experiences to develop and extend highly able children. This *JOURNEY* for both girls and boys will run over four sessions. Toys are ancient. Most modern toys don't look like the toys used by children hundreds and thousands of years ago because we live in an era of mass production and electrical technology. We have overlooked the pleasures and challenges of hand-made things for the convenience of the shop bought. We are surprised to learn that the ancients liked to play with tops, dolls, balls, whistles and flying objects. It would be interesting to see the ancient toymakers reaction to our toy emporiums. In this program, we investigate the science and technology of the ancient toymakers and perhaps learn something about what they thought. We aim to have a lot of fun making toys and finding out how and why they work.

**Requirements:** Bring A blank exercise book, pencil , a small photo of yourself, a snack ( no nuts please) and a stamped, self-addressed DL envelope for your report. In addition, for Week 1: 2 or 3 scratched or ruined CDs, a cheap teaspoon or two (they will be destroyed); Week 2: a fork, a metal coat hanger and 2 small identical glass bottles eg Coke bottles(about 250ml- 375ml vol.); Week 3:an empty tin can (Milo / T2 sampler) with a metal lid (ideal size 10 cm diameter and 10/12 cm tall); you need to get your hand inside the can.

#### **Session One: Come in spinner**

The history of toys begins with some very simple objects. We get to hold some very old objects and try to guess what sort of toy it may be. What are the oldest toys we know, which were used by children long ago? Surprisingly the oldest toys are still recognisable although they tend to be made from wood, stone, fur, feathers, plants, clay and bone. We go on a journey to recreate some of the oldest toys we know but from modern materials and along the way we learn not just about the medium but also about some interesting science. In particular this week we look at different types of tops and discover the science of spin. We make tops from card, wood, plastic, rubber and metal. We try to find out which material works best and why. We try to discover why tops can seemingly go on spinning forever and how to reduce the effects of friction and gravity. Is there anything we know that has been spinning forever?

#### **Session Two Fun like sounds or sounds like fun, picking up on good vibrations**

This session we try to enjoy sound toys. We investigate vibrations. We investigate whether sound travels better through wood, string or air. We use our fingers to feel vibration and our ears to hear vibration. We look behind the eardrum to find out how our brain understands vibration. We try to trick our brain and enjoy some sound illusions. We try to do what a bat does and find something using our ears alone. We make a tuning fork, a quacking duck and different kinds of whistles.

#### **Session Three Stored energy**

This session we investigate toys that store energy. Some toys can sit as still as a spider in a web waiting for a chance to come alive. When the right moment arrives they can jump into action. The first toy we will make stores its energy in a rubber band and makes an excellent bookmark. This means the toy has stored potential energy but when it jumps out at you its energy is converted into kinetic energy or motion. We will do some simple experiments with balls to see how we can store energy and then convert energy. You will try to build your own toy which transforms potential energy into kinetic energy.

#### **Session Four To strike a balance**

This week we investigate how toys use balance to do some amazing things. We do some experiments in balance with our own body and try to work out what is happening. Then we find out how to find the centre of balance in a 2D object and next we make a simple balance toy, which uses weights to shift the balance point. We are now in a position to answer the question why some men and women prefer to carry or balance heavy weights on their head rather than on their backs. We make some simple balance toys and choose to make one that is not so simple.

**Homework:** You may be required to complete some homework between sessions.

#### **About the Presenter**

Tim Byrne worked at Melbourne museum and Scienceworks for 16 years but believes his interest in toys stems from when he was a little boy. He survived this danger filled period of life with abiding memories of playing with firecrackers, bows and arrows and football. He spends much of his present trying to recapture the raw fun of his childhood without hurting himself or anybody else. He wants to share the joy of making a toy and watching it work the way it is intended. The bonus will be understanding the underlying science!