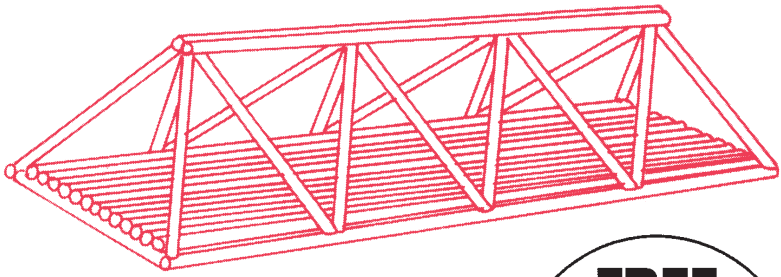
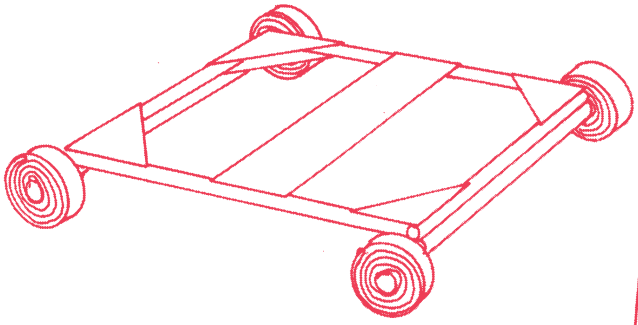
Artstraws

AN IDEAL D&T MATERIAL

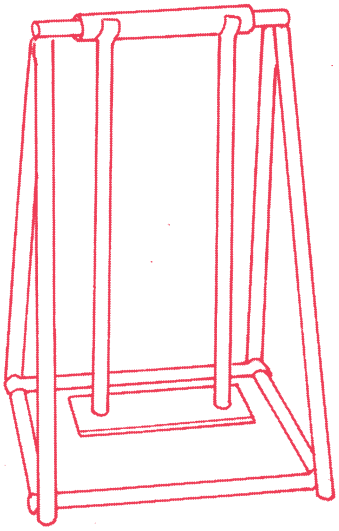




FREE

TEACHING ACTIVITY WORKSHEETS

using Artstraws to create storybooks, moving pictures, playgrounds, vehicles & photo frames



This introductory booklet shows teachers the many ways in which Artstraws can be used to develop D & T skills and deliver the National Curriculum for Design and Technology at KS1, KS2 & KS3. By using a 'weak' material such as paper straws, the pupil can learn how to investigate the properties of material and be able to change its characteristics.

The booklet starts with simple focused practical tasks designed to investigate the material and progresses through more complex focused practical tasks to design and make assignments exploring movement, vehicles and boat building.

BASIC JOINING TECHNIQUES

There are many ways to join Artstraws, most of which are detailed below.

This could be your first problem-solving exercise – How to join 2 pieces of Artstraw
a. using just straws
b. using other materials such as glue, pipecleaners, paperclips etc.

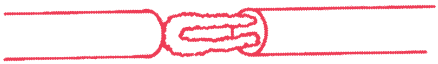
Straight Joining

1. The end of one straw is creased and inserted into the other straw. Glue if necessary.

2. Ends flattened and glued.

3. Sleeve made from straw. Glue if necessary.

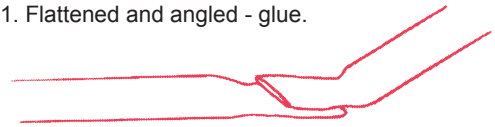
4. Pipecleaner insert.



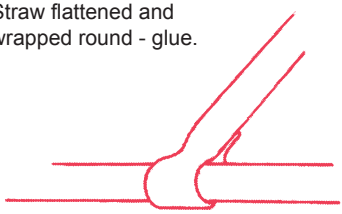
NOTE: It is possible to repair a buckled member of a structure by using method 3.

Angled Joins

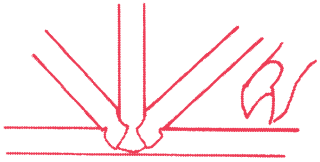
1. Flattened and angled - glue.



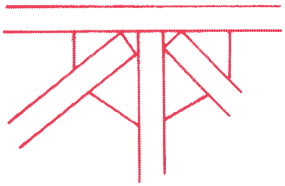
2. Straw flattened and wrapped round - glue.



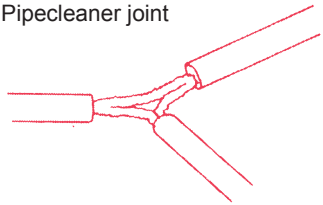
3. Straw split and fitted around - glue.



4. Paper or card joint - glue
(see also section on Constructor Corners).



5. Pipecleaner joint



6. Threaded and tied - use a tapestry needle

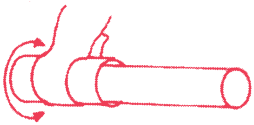
Moving Joints

1. Pivot joint using pin, wire or paper fastener.

2. A thin Artstraw can slide or rotate inside a thick straw

3. A thick Artstraw can slide or rotate around a thin straw

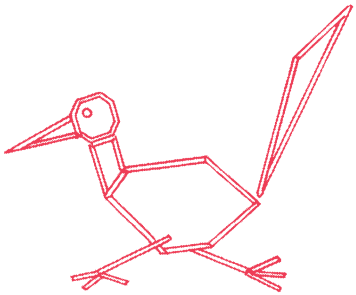
4. A combination of techniques can be used to enable movement at right angles.



SIMPLE FOCUSED PRACTICAL TASKS

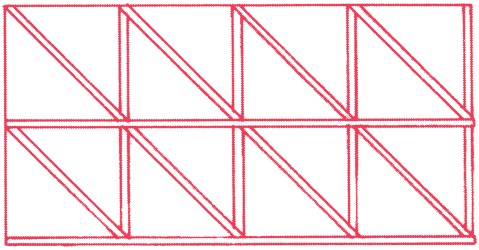
1. Plane Shapes

To the child's level in Maths - triangles, squares, rectangles, kites, trapeziums, pentagons, etc. Make geo pictures from shapes.



2. Patterns

a. free choice
b. plane shapes
c. tiling and tessellations
d. non-tessellating plane shapes



3. Symmetry

a. reflected picture
b. about a vertical axis
c. about a vertical and horizontal axis

4. Area and Perimeter

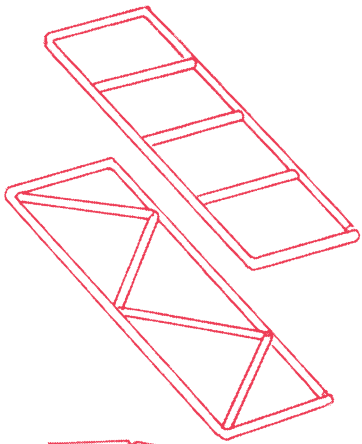
Flatten an Artstraw and join it end to end. It can be used to make a boundary to a shape.

a. Make a series of different rectangles using just one Artstraw for each rectangle. Mount them on cm squared card. What do you notice about their areas'?

b. Using one Artstraw, make the largest round shape you can. Mount it on the same cm squared card. Measure its area.

c. Again using one Artstraw, make a shape which will contain the least area.

d. Which of all these shapes has the greatest area?

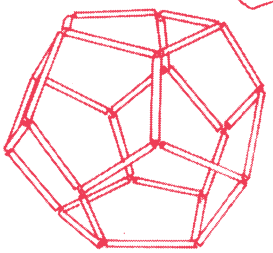


5. Frameworks

Make a long rectangle from one Artstraw (approx 15 x 5cm). Build in a series of cross pieces, diagonal etc. to make up a framework. You may see patterns you would like to try by studying girder bridges, electricity pylons, etc. Test its strength across a 10 cm gap by applying a load at mid span.

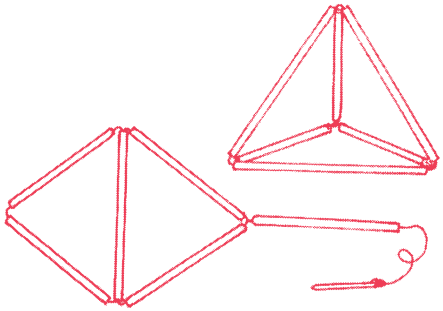
6. 3 Dimensional Shapes

Using equal edge lengths, try making as many different 3D shapes as you can.



MORE COMPLEX FOCUSED PRACTICAL TASKS

It is suggested that teacher and pupils carry out the first task together. For example, the strength or stability tests.



STRENGTH TEST

Devise a test to see which is the strongest in supporting a load (weight) at mid span across a 15cm gap.

— Flattened Artstraws
— Tubular Artstraws

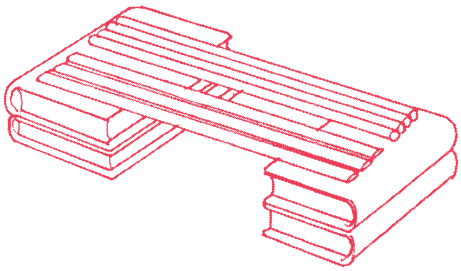
STABILITY TEST

Design the tallest structure that you can, that will support its own weight and be stable on a flat surface.

BRIDGES

Materials: Artstraws, glue, sellotape, paper clips

Bearing in mind what you have learnt from the strength tests, use 6 Artstraws to design and build a simple bridge that will support a 50 gram car at mid span.

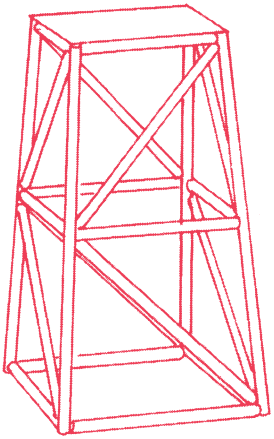


TOWERS

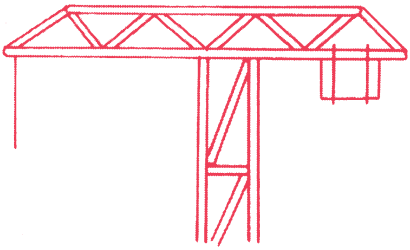
a. Using Unifix (or similar blocks), build a tower as high as you can. Compare its height and base area. Now build a higher tower with 5 Artstraws. Use any fixing material you like.

b. Using 5 Artstraws, based on the information learnt in *a*, build a new tower to support a marble on top.

c. Following on from *b,* build a tower with an arm out horizontally from the top of the tower which is at least 5 cm long and will support a marble at the end. Did the tower topple over? The illustration of the crane shows one way of solving this problem.



This can lead to discussions and further tasks on balance.



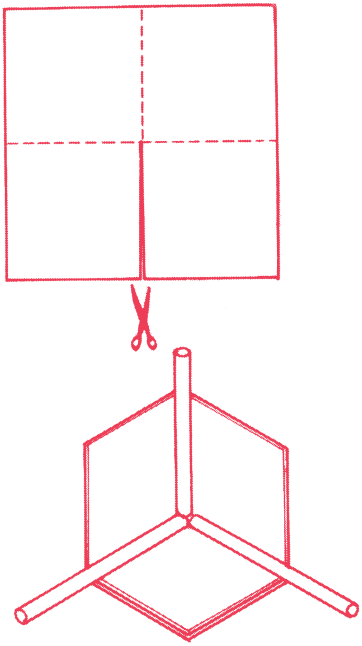
MAKING 3 DIMENSIONAL SHAPES

A framework can be made using only scissors, glue, paper and Artstraws.

Assembly Instructions

a. Using paper or card, cut out a square.
b. Fold inwards along the dotted lines.
c. Cut, to the centre, along one fold line.
d. Overlap the panels on either side of the cut and glue to make a finished 90° corner piece.
e. Make sufficient corners.
f. Cut lengths of Artstraws as required for the edges.
g. Using the corner pieces and Artstraws, make up one face of the structure.
   Always leave 'material width' space in the corners when fixing edges for final adjustment of structure shape.
h. Repeat 'g' until all the corners have been used.
i. Fix the faces together to make the final shape.

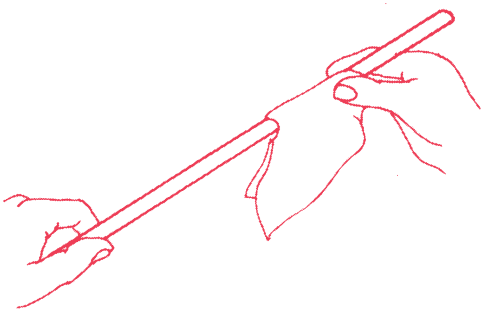
Make a cube, measure and cut a diagonal for each face. Then glue the diagonals in place so that they meet at the same corners on adjacent faces. What is the new 3D shape inside the cube?



CHANGING THE WORKING CHARACTERISTICS OF MATERIALS

BUNDLES

It is often necessary to use a number of Artstraws alongside each other. Apart from gluing, we can use 'banding' (elastic bands, thread, paper wrapped round and glued, flattened straws wrapped round and glued).



REINFORCING STRAWS

If an Artstraw is needed as an axle or spindle, it is often desirable to strengthen it. This is best done by inserting a length of creased straw. A thick Artstraw can be strengthened by simply inserting a thin straw.

Filling Artstraws with fine sand will add weight and stability where required, e.g. suspension bridge, crane, roundabout base, etc.

COLOURING & FINISHING

(Red, Green, Yellow & Blue Artstraws are now available)

It is best to colour straws before use except for large models which can be painted or sprayed afterwards.

Use large felt pens, paints or food colouring. To apply paints or colouring, dip a piece of damp J cloth into the paint, wrap round straw and slide along.

Leave straws to dry before using.

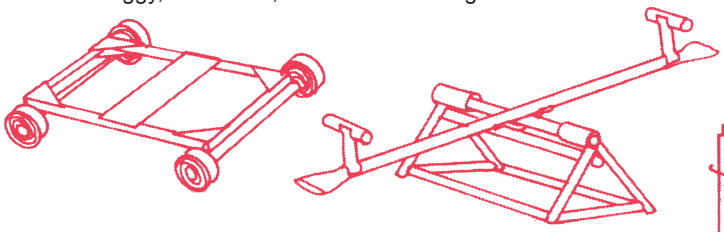
A special finish may be used to strengthen or waterproof a model. However, this is an area best left to separate investigations or problem solving.

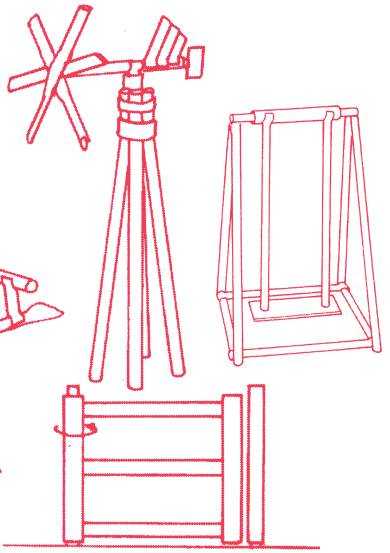
DESIGN & MAKE ASSIGNMENTS:
JOINTS THAT ALLOW MOVEMENT

The two sizes of Artstraws can be made to slide or rotate in conjunction with each other.

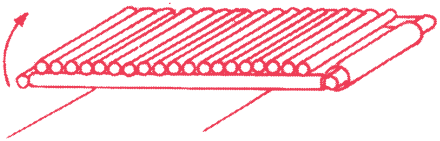
Here are some illustrations of models which have a moving element, such as:

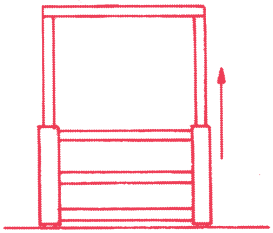
– the buggy, wind vane, see-saw and swing.





1. Design and make a model of a swing gate, drawbridge or sliding door.
2. Design and make your own opening and closing or raising and lowering device.
3. Develop your idea so that it becomes a 'self closing mechanism'.
   As in –
   a. a farmer's gate to keep sheep in, but allow walkers through
   b. a drawbridge, with fast lowering capacity
   c. a vertically sliding sluice gate
      clues – gravity, weight, springs, etc.

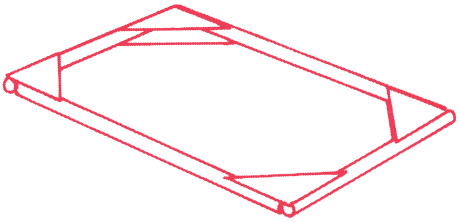




VEHICLES WITH WHEELS AND AXLES

Strong Artstraw frames can be built by using triangles of card.

a. Make a buggy as shown on the cover. You may need to reinforce the axle.
b. Make a box shape using triangles of card and Artstraws. Cover the outside so it becomes the body of a vehicle. You can make it the right size to fit on the buggy.



BUILDINGS

a. Make a frame using triangles of card and Artstraws.
b. Cover the outside of the card and add details.

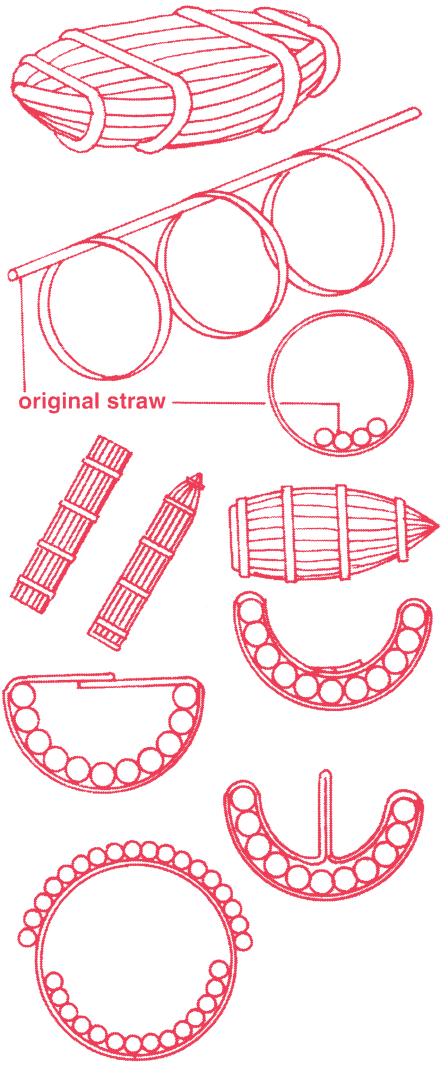
BOAT BUILDING using the 'hoop technique'.

The 'hoop technique' is a very simple method of using Artstraws to make all kinds of boats which can be used in projects on Normans, Vikings, canals, fishing etc. The basic construction work can then be extended into a problem-solving exercise if required.

The easiest format is called 'The Closed Hull', suitable for long, narrow craft:

1. Flatten at least 3 thin Artstraws; cut and glue to make several hoops of the same diameter (5-6cm); lay one Artstraw through the equi-spaced hoops and glue into position; allow the glue to set with the Artstraw supported at each end.
2. By gluing, start to build up a series of straws on both sides of the original straw until you have achieved the hull shape you want.
3. Artstraws are flexible, so you can pinch them to make a pointed bow, bend them for a square stern, overlap them, or confine the straw ends in small hoops at the bow or stern.
4. You now have a variety of ways to use the hoops:
   a. for hull strength you can cut the hoop and glue into the hull shape.
   b. to support a deck, cut the hoop, trim as required and glue the cut ends across the top of the hull.
   c. for a mast support, fold in a hoop, uncut, so that the folded piece extends vertically - this will fit inside a thick Artstraw.
   d. for roofing supports leave two adjacent hoops free to fix extra straw lengths on top to provide a cabin roof.

Any combination of the above will add to the individuality of the vessel so that decking, masts, booms, etc., can be built up.



EXTENSION ACTIVITIES

a. How can you make your craft waterproof?
b. Test and improve its stability.
c. How could it be simply propelled?
d. How could it be steered?

Artstraws Limited
Swansea SA6 8RB
Tel: 01792 796151
Fax: 01792 700540
Email: info@artstraws.com
www.artstraws.com

Distributed exclusively in the USA by:
Dixon Ticonderoga Company (Pacon Corporation)
2525 N. Casaloma Drive
Appleton, WI 54913-8865
1-800-333-2545