***Maadu*- a creative aid for school children**

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Introduction

Aim of the project

- To kindle and promote the natural ability of child to search, discover and experiment.
- To aid the child to realize, that one can change and manipulate his environment to create experiences, both new and known ones.
- To get hands on work experience by making things with various materials.
- To clarify and apply theoretical knowledge gained in school.
- To open up new avenues to utilize the time available in the school setup. (Work education and art classes).

The Project statement

Initiate a learning process where given parts are assembled to obtain known results with defined learning objectives.

The process thus triggering a creative process where given parts are assembled in an open ended way and assigned new meanings other than what they were meant to be.

The above process resulting in introducing new parts and open ended results.

Scope of the project:

'I hear and I forget. I see and I remember. I do and I understand'.
- Confucius

To design creative aids for school children of age 12 + years so that learning becomes a hands-on, enjoyable and self taught experience.

The aid is aimed as a means for kids to work with and manipulate various materials and components which they can relate to their day to day activities like play, games, hobbies and academics.

NCERT curriculum & the project

NCERT curriculum and the project

Objectives of school Education

Time structure for vii th standard

Work education

National Curriculum Framework

Child psychology

Child psychology:

Characteristics of the age group

Piaget's Stages of Cognitive Development

Developmental stages in art

Piaget's theory of learning

Vygotsky's theory of the zone of proximal development (ZPD)

Skemp's 'theory of learning'

Jerome Bruner's 'Theory of Instruction' and 'Constructivist theory'

Dienes 'theory of learning'

Interaction with children

Initial interaction with children

The interactions focused mainly on their interests, hobbies and other extracurricular activities in school and at home

Kendriya Vidyalaya, IIT Bombay

Campus school- IIT Bombay

Municipal School, Thana.

Summary of interactions :

Kids need a mix of assembling and making for any building activity to make it more participative and fun. The assembling activity can be the initiator and the making activity can follow once the kid is familiar with the device.

Teachers and academics play an important role in the type of activity the kids take up, the subjects kids like etc.

The peer group is one of the major influencer for kids to take up or wish to acquire a game/toy/device.

Study of existing products

Existing products available in the market were studied to find out the variety of creative aids available for the age group of 12+years

The search for the existing products was done by

- Visiting toy shops in Mumbai city
- Speaking with educationalists
- Searching the Internet.
- Attending Science exhibitions

Existing products searched were analyzed for the following criterion

The challenges offered
Learning objectives
Special characteristics
What the product doesn't do

Product brief

Product brief

Target users:
The target users for the product are school children of the age group of 12 + years or VII th standard upwards.

Objectives (essential):
•Help children understand working principles found in day-to-day products and situations by making and assembling models.
•To make children familiar with the basics of fabrication in different materials.
•To develop sensitivity towards handling tools and hand work.

Objectives (desirable):
•To develop and provide opportunities for team work including boys and girls
•To provide opportunities for the child to develop ones own aesthetic sensitivity.
•To develop sensitivity towards culture specific activities

Guidelines to fulfill the objectives:
•The aid has to initiate the kid into the learning process and go through the initiation process through ease and not put him off.
•Effort to be made so that both boys and girls should be able to use the aid.
•The design should throw challenges to the kid but avoid situations that may make him fail.
•The device should allow the kid to personalize so that the kid can show off.
•The kid should be able to relate the creative process or the end product to real life situations.

The product will be in the form of
- A set of pre-designed components.
- A set of specific components resulting in various end products.
- A set of materials/ information to prompt the kid to try out unknown, open-ended product configurations.

The product is to be put forward as a marketable proposition so as to fit within the existing system of the **CBSE** Curriculum.

Features to be considered:
- Proper storage facilities to be provided for storing the device when not in use.
- Care to be taken to design components to avoid accidental injury.
- Instructions to be provided for the proper use of tools and materials

Concept generation

Concept generation

Creative activity for the kid can be

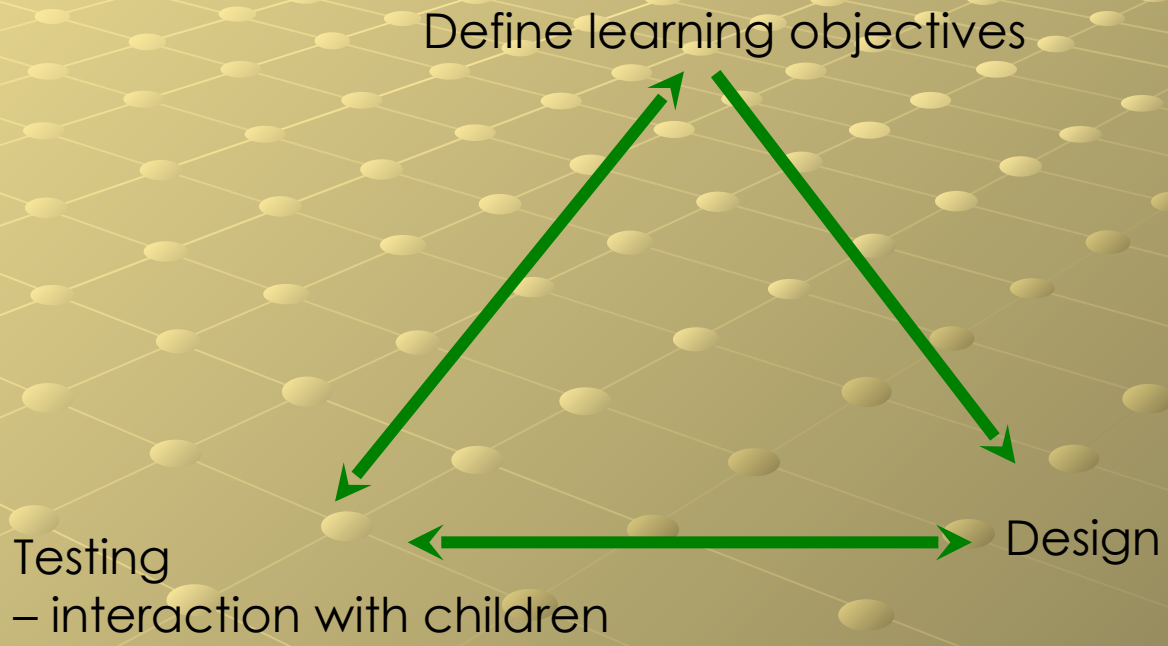
- To make things work
- To make something new

Step-1 will be the initiation stage where the kid will create the object as shown in the image.

Step-2 is where the kid will apply the knowledge what he has learnt in step-1 and obtains an open ended product.

The proposed design intervention for a creative aid has to offer both steps 1 and 2 in the same order

Methodology



Concept generation

Objects kids can make

List of tools used by kids

Objects kids like to show off

Materials used by kids

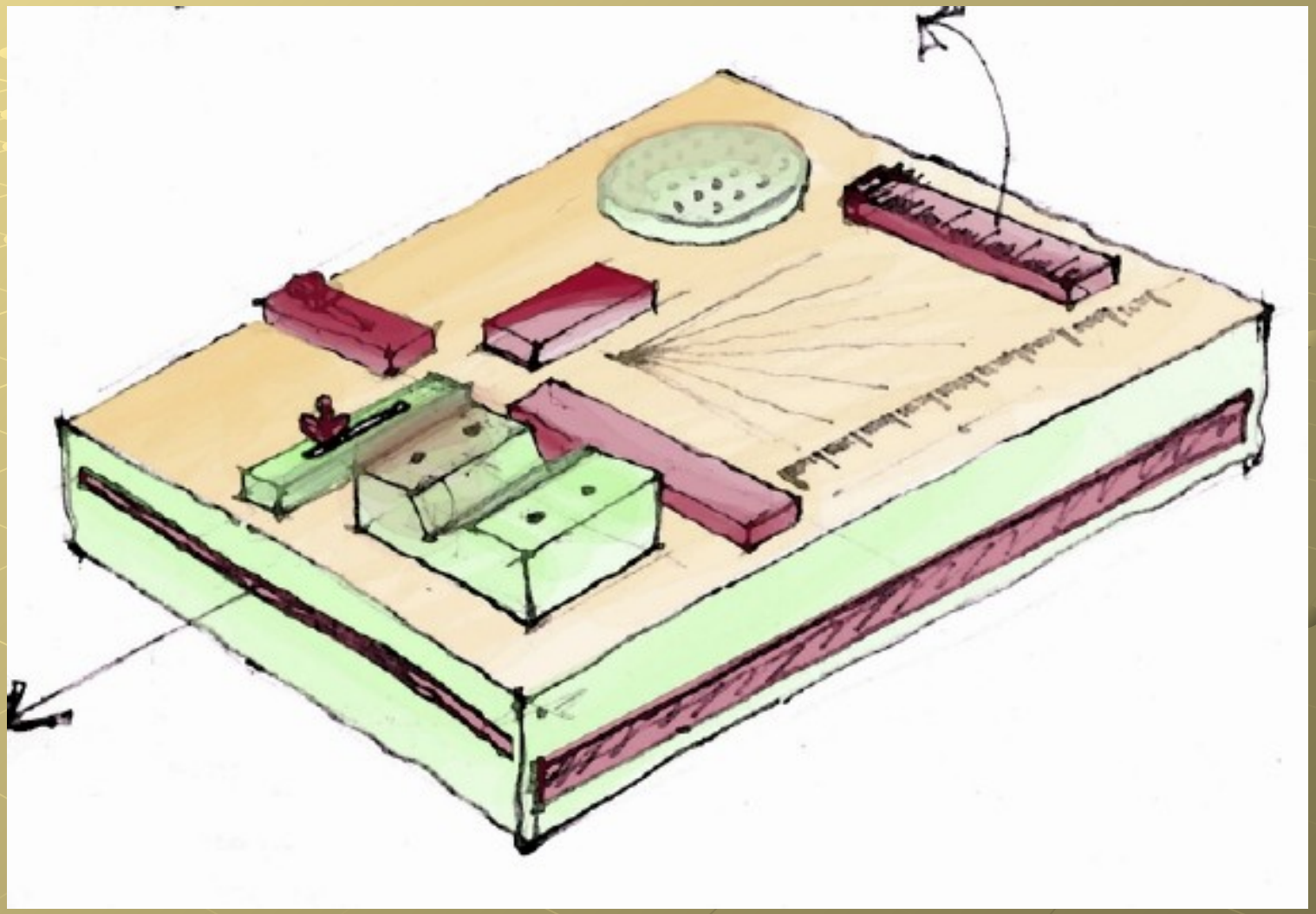
Products which throw challenges

Design strategy

The concepts were classified into 3 categories

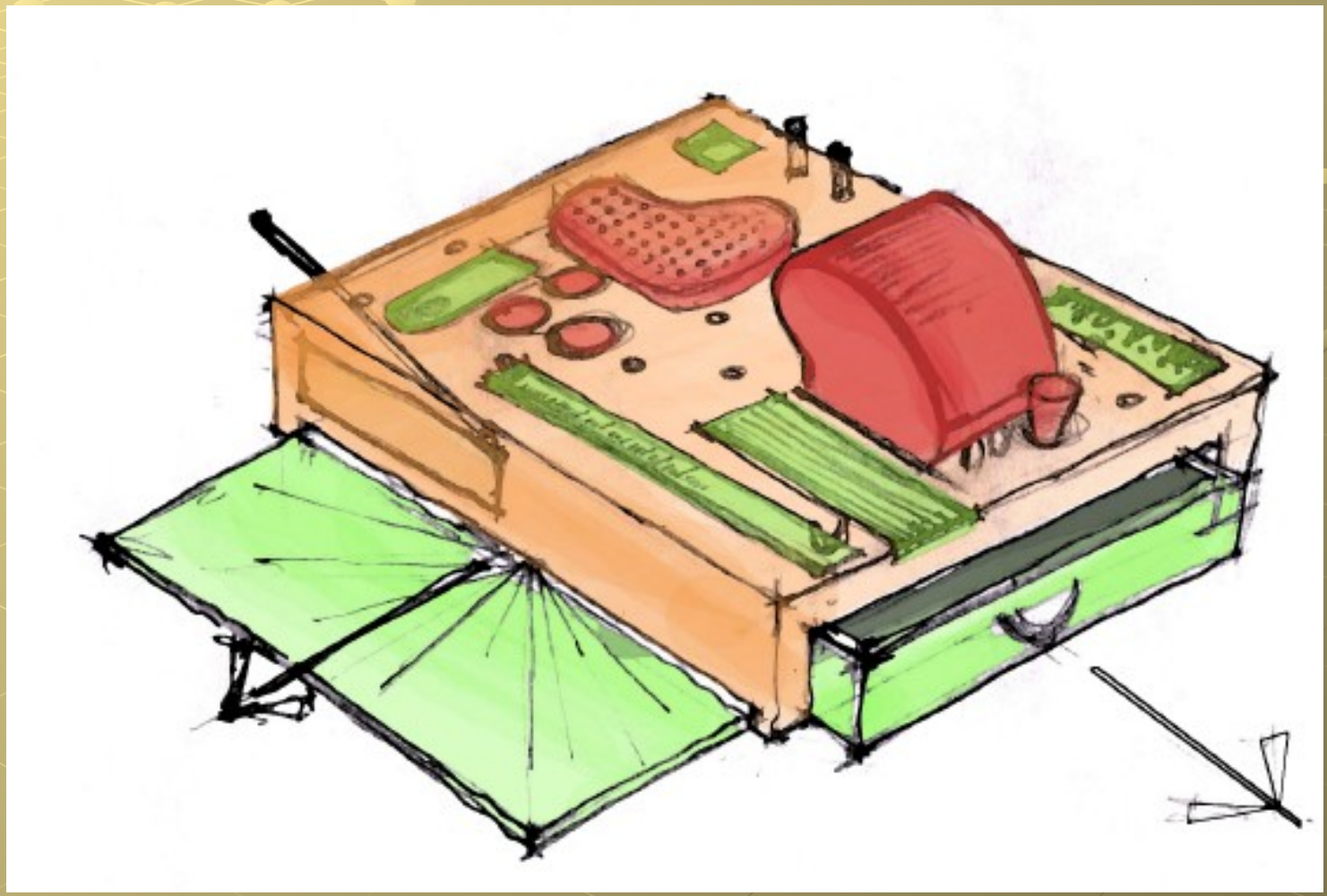
- Product ideas that were primarily tools.
- Products that involved mostly assembly.
- Products that involved assembly and making.

Product ideas that were primarily tools.

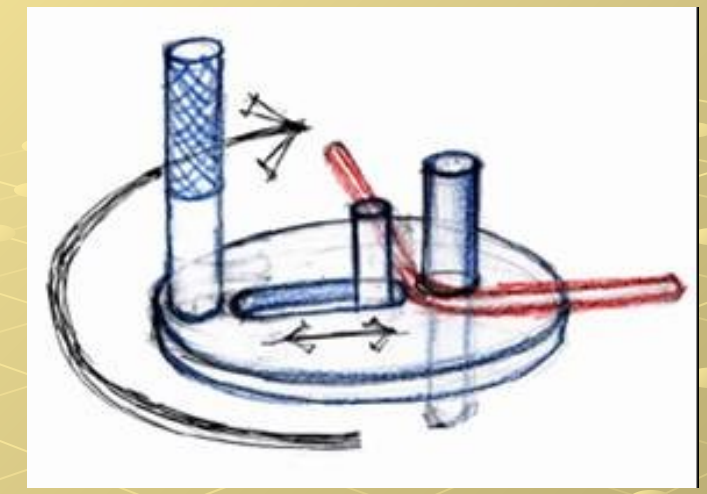


Product ideas that were primarily tools.

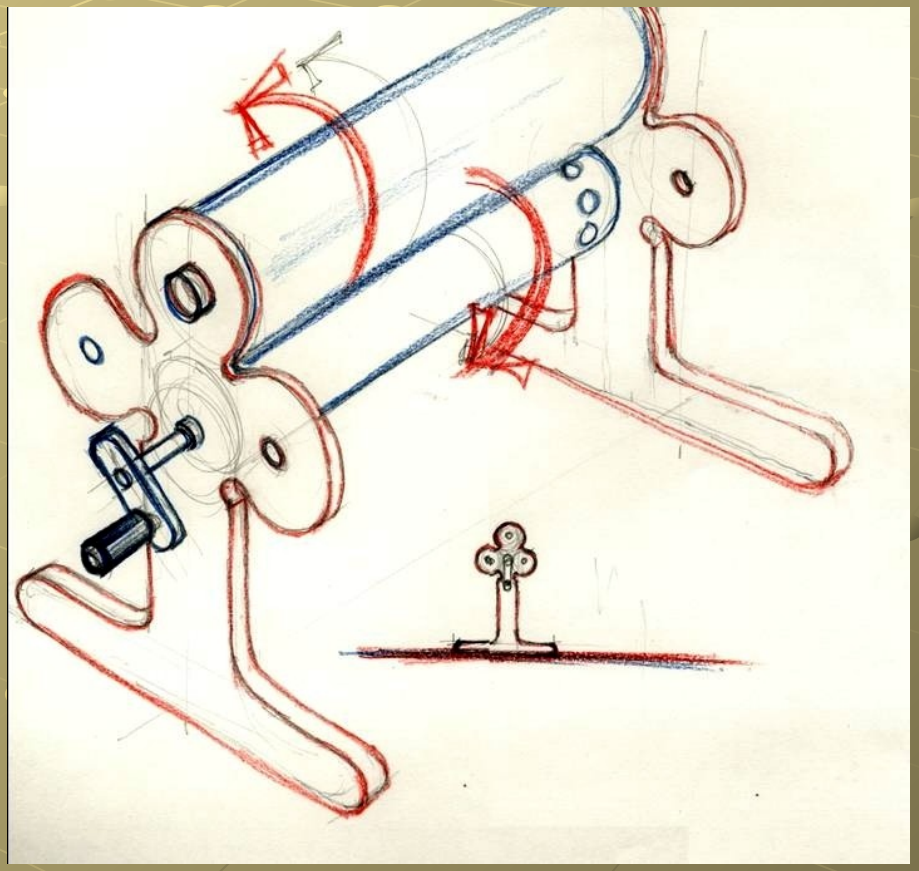
Thermacole bending

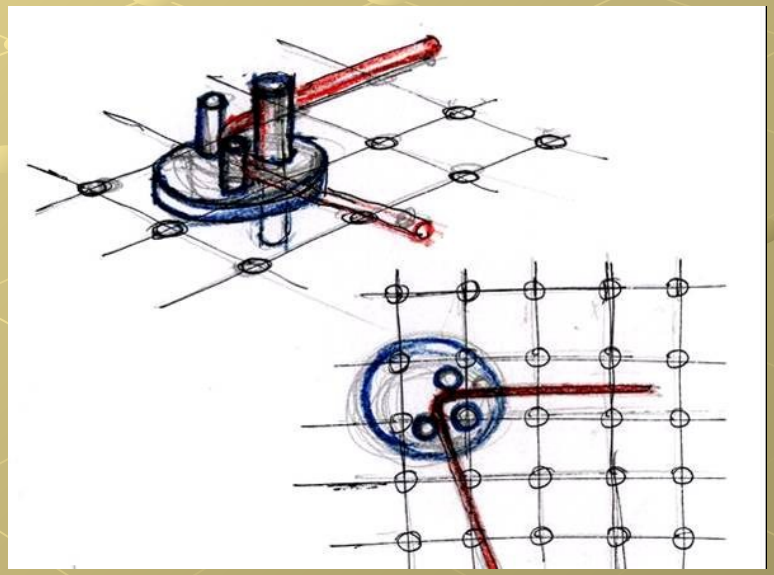


Product ideas that were primarily tools.



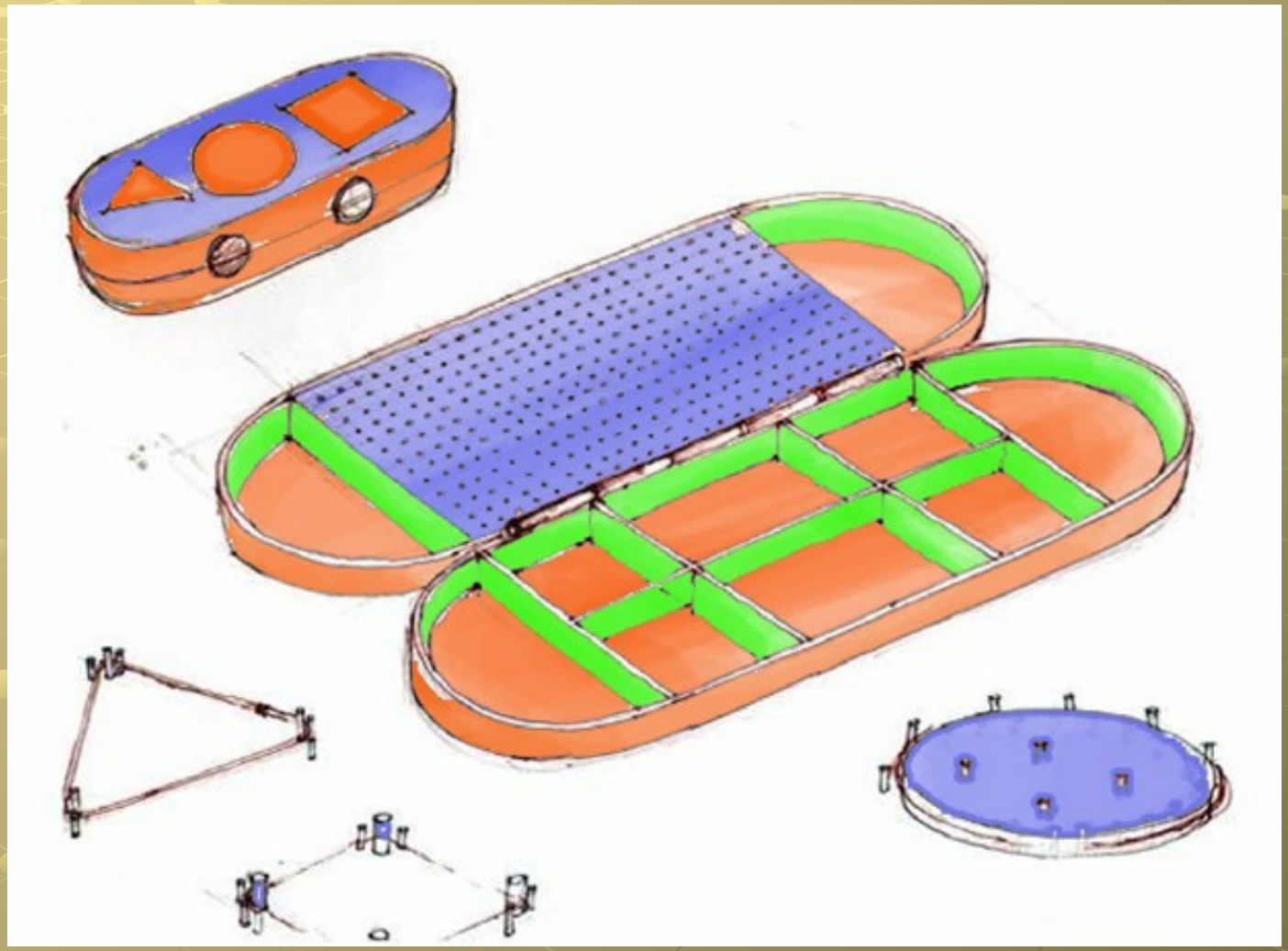
Roller printer





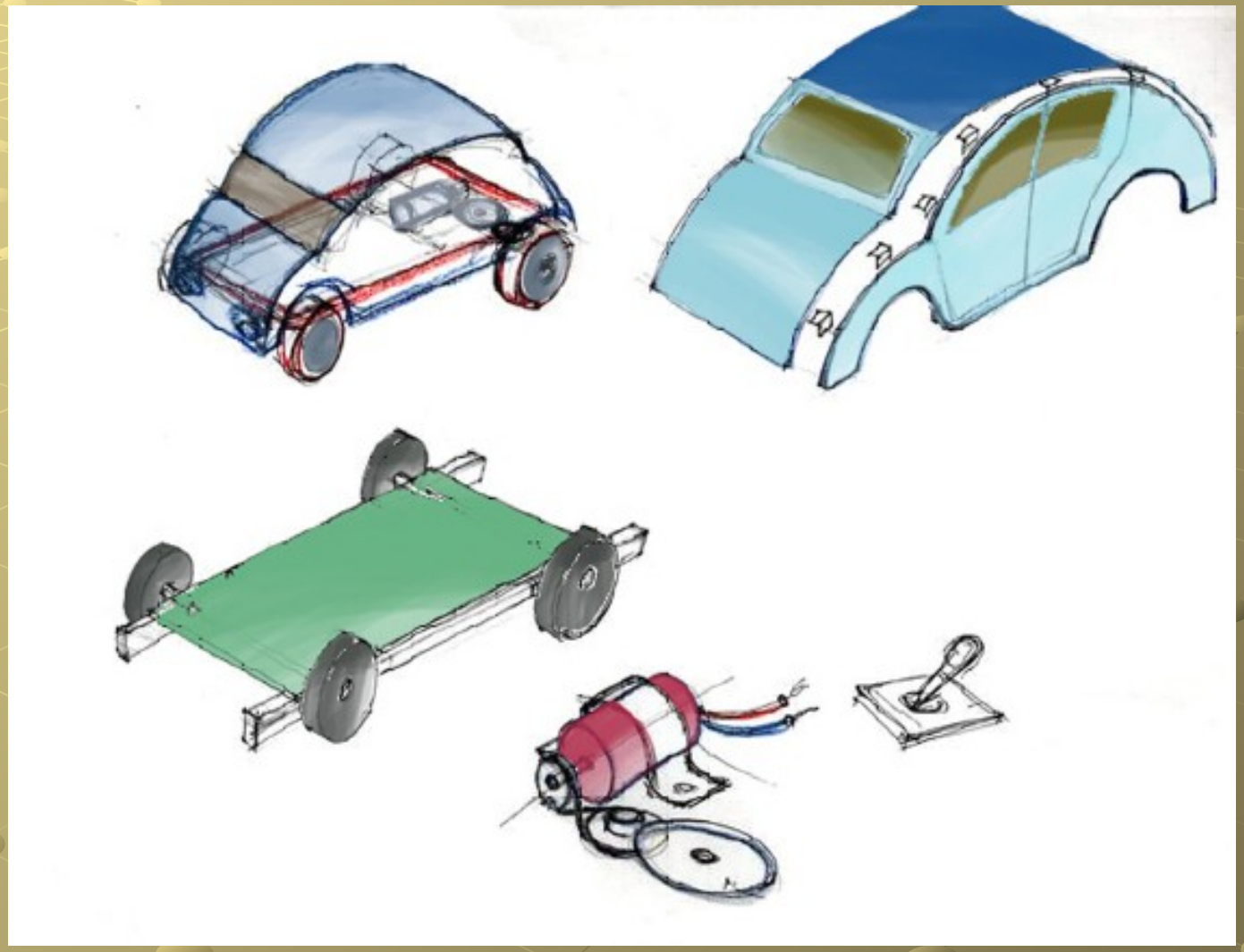
Product ideas that were primarily tools.

Wire shaper



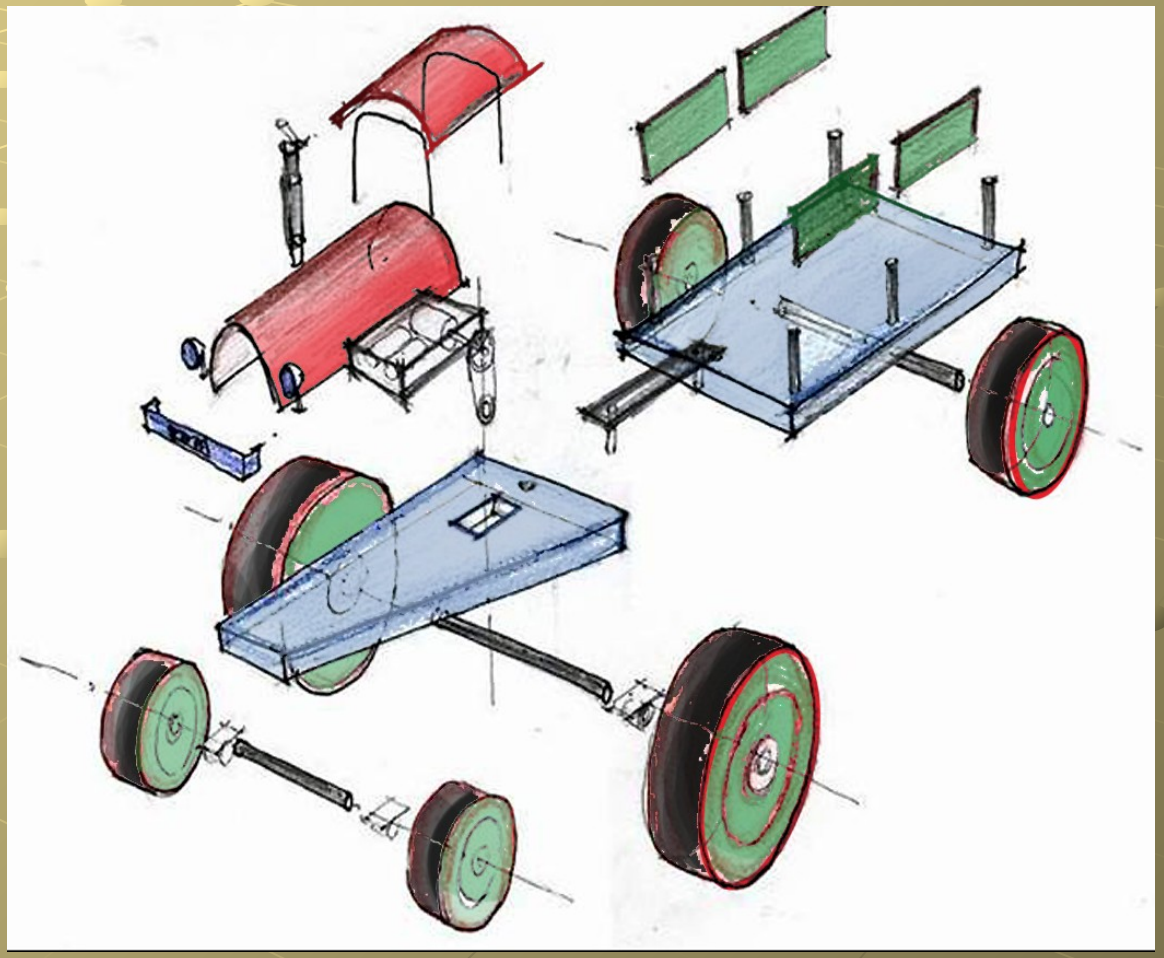
Product ideas that involved making and assembling.

Motor car assembly



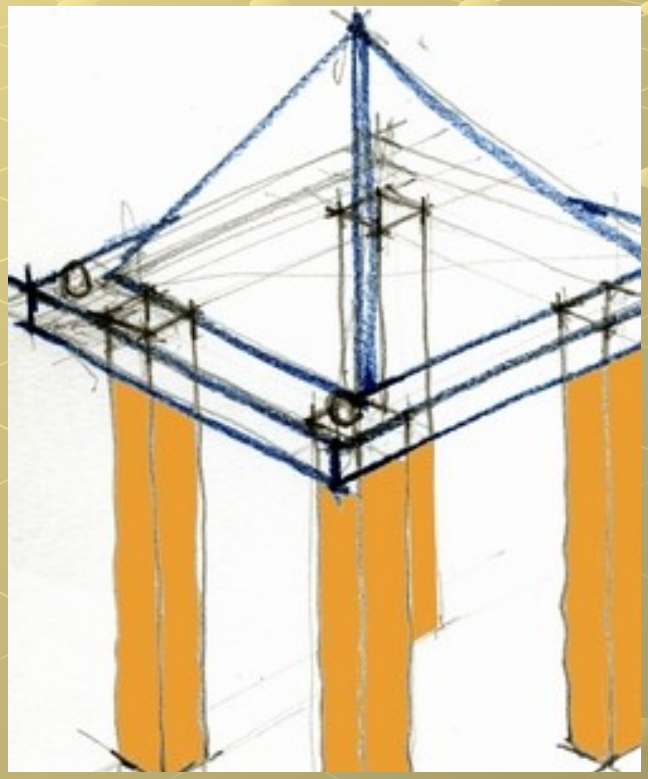
Product ideas that involved making and assembling.

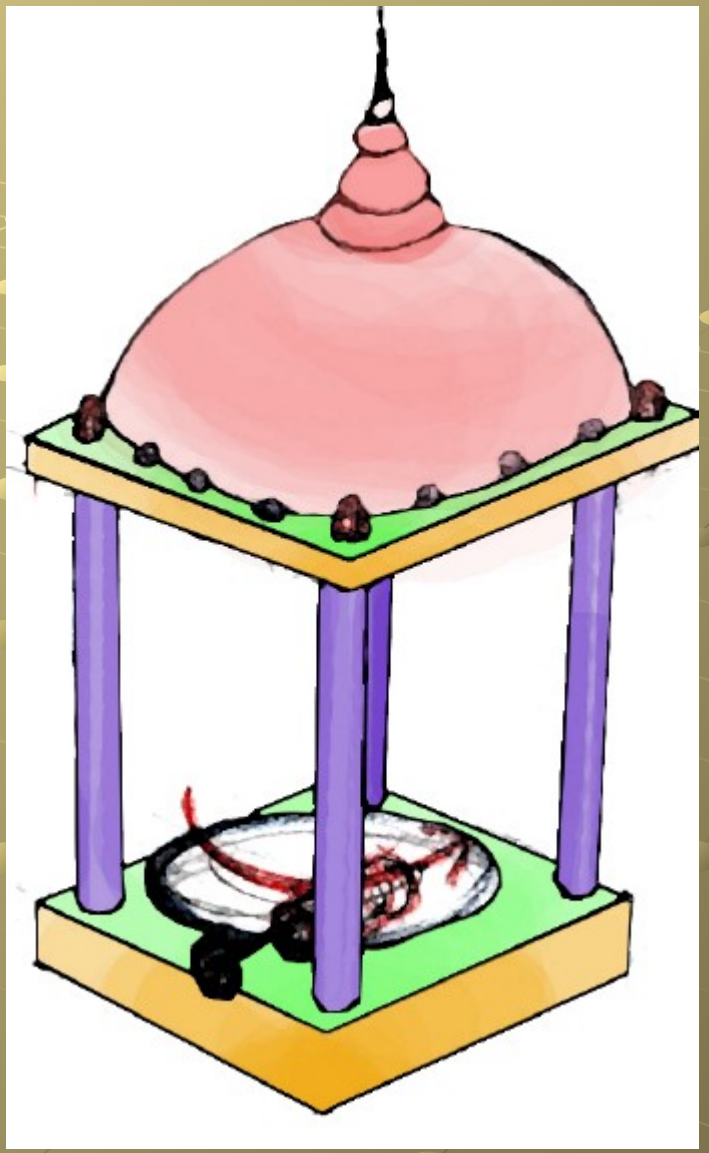
Unusual vehicle assembly



Product ideas that involved making and assembling.

The mandap



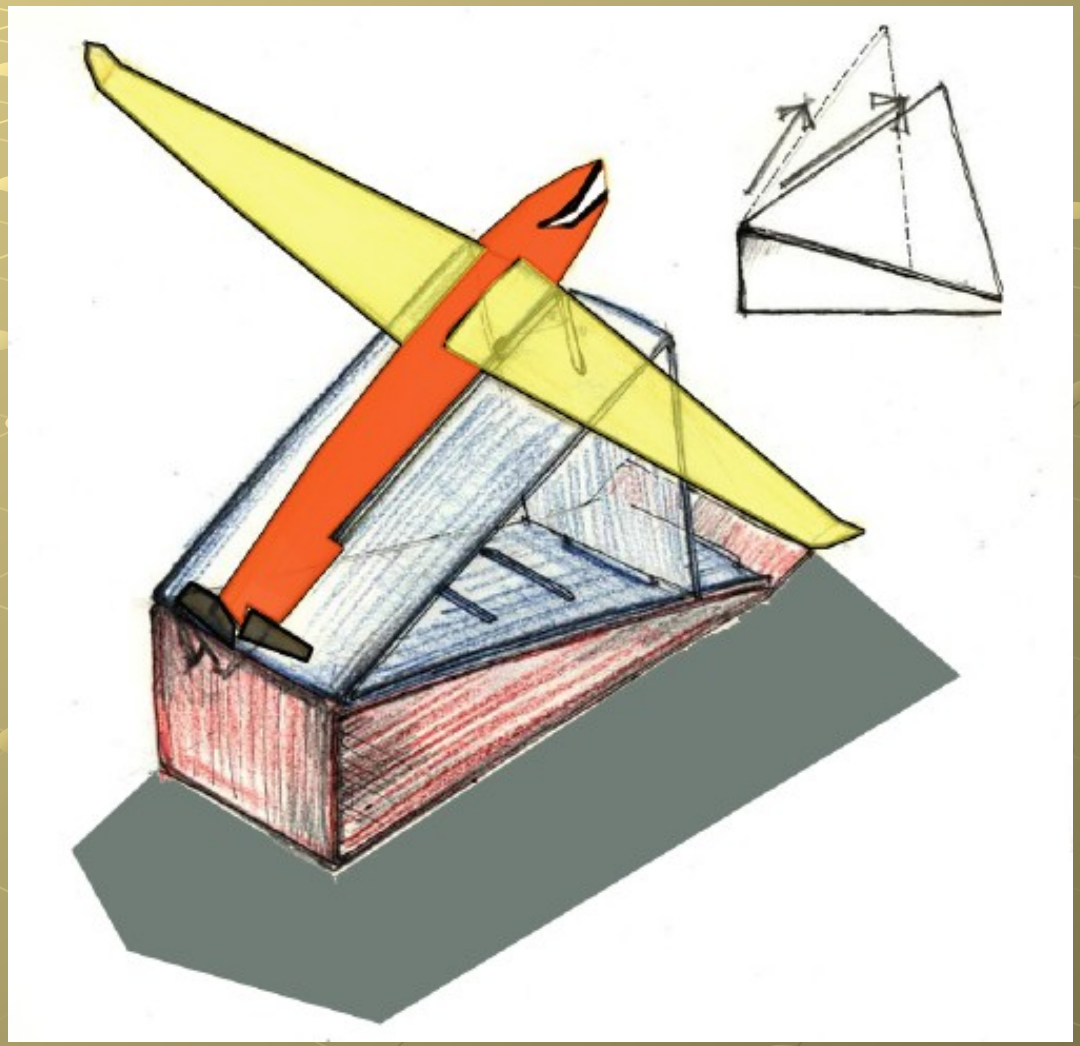


Product ideas that involved making and assembling.

Shoe-box puppet theatre

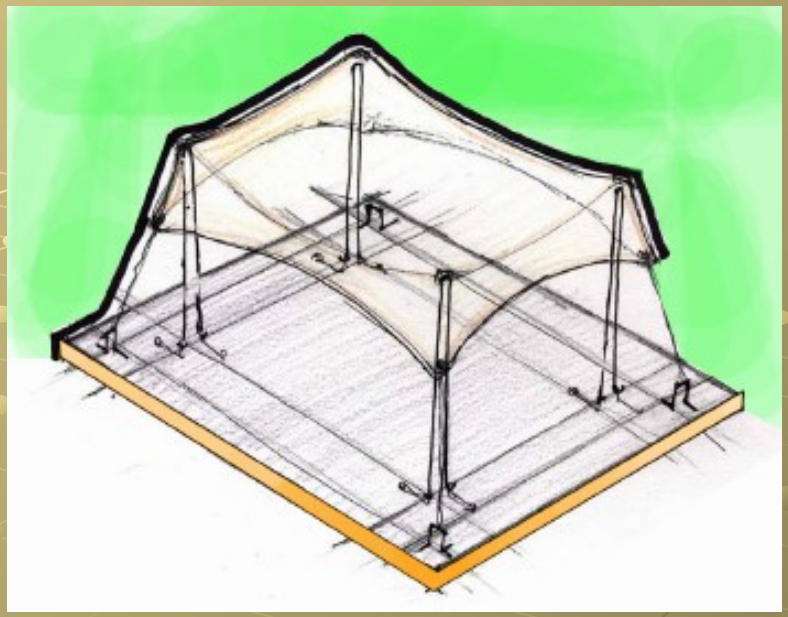
Product ideas that involved making and assembling.

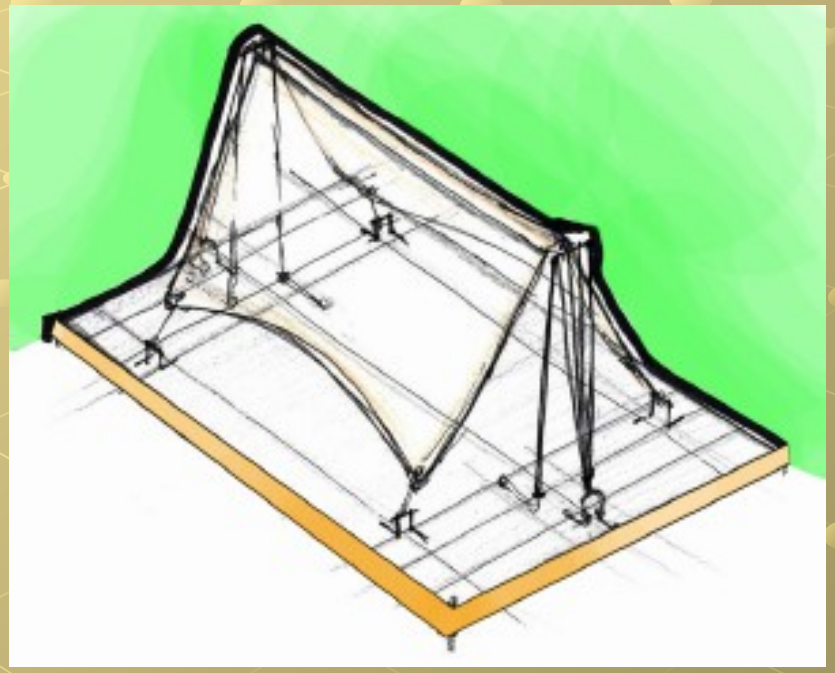
Aero launcher

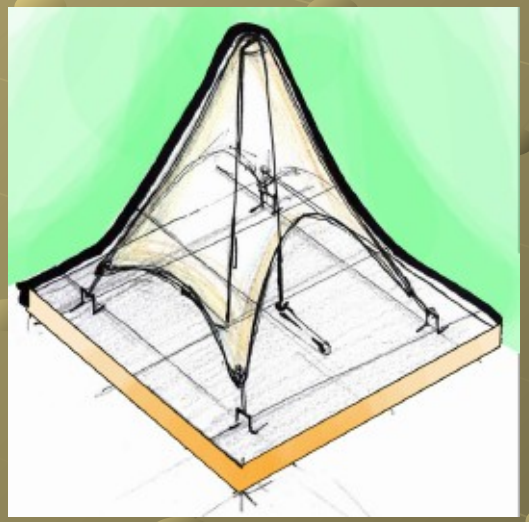


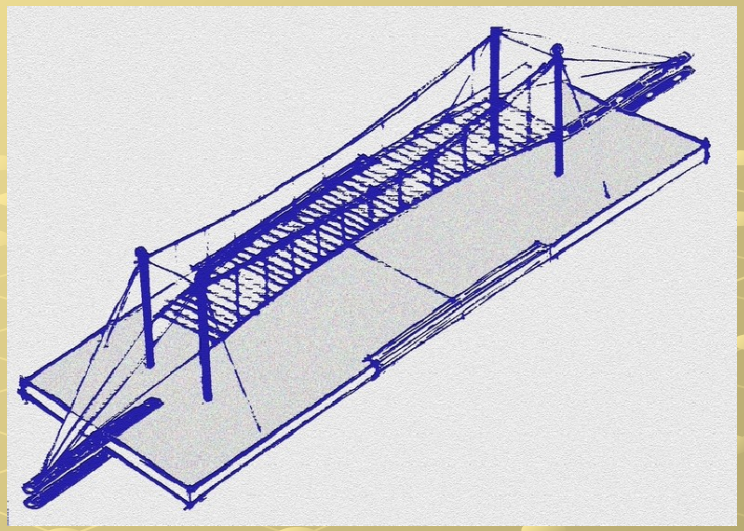
Product ideas that involved making and assembling.

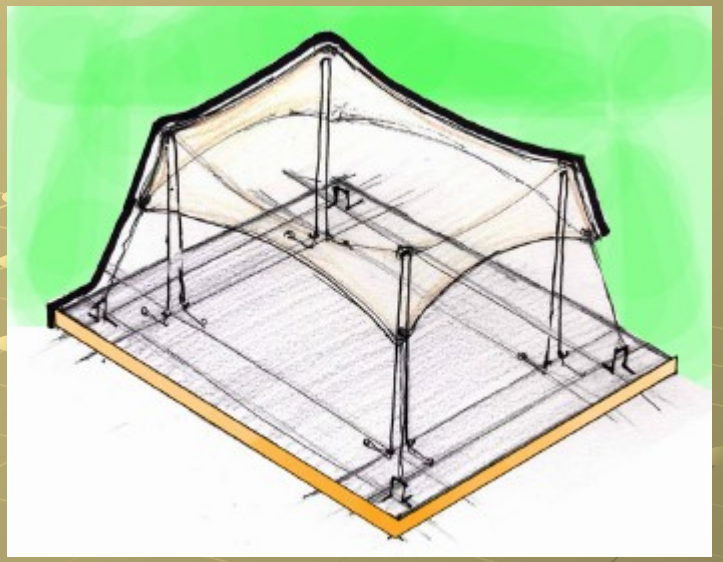
Tent kit











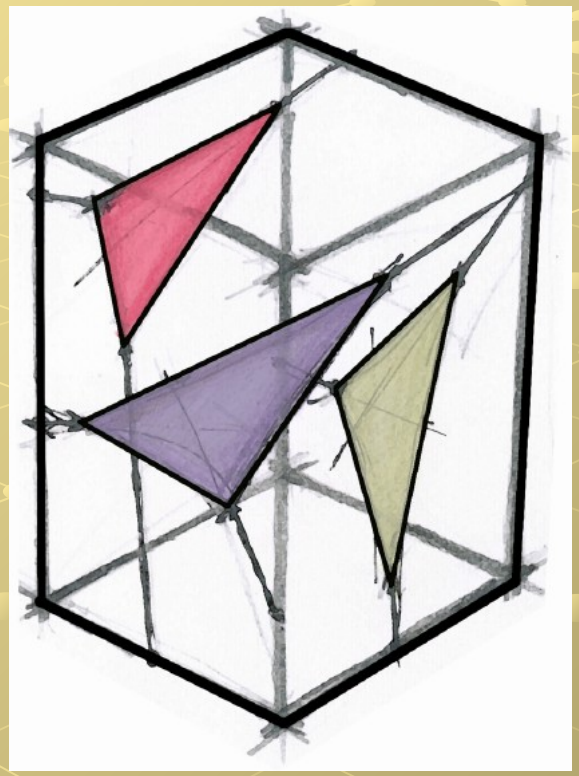
The tent kit was selected as the final concept and evaluated based on the following criteria

- Characteristic features
- Learning objectives
- Challenges
- Availability in the market
- Growing in complexity
- Variety that can be obtained

Characteristic features

- The kit comprises of modular base and components.
- Provision of personalizing the product by the user.
- Possibility of using materials other than the ones provided in the kit.
- The product can be used by both boys and girls.
- Group of kids can work together on the product.
- The user can obtain real life and abstract objects from the device.
- The product can be made culture and context specific.

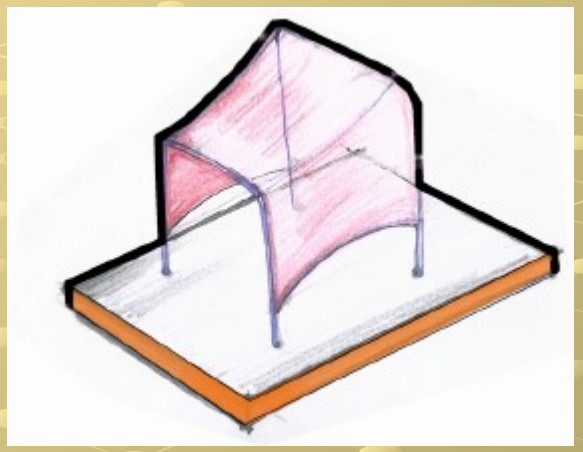
Learning objectives

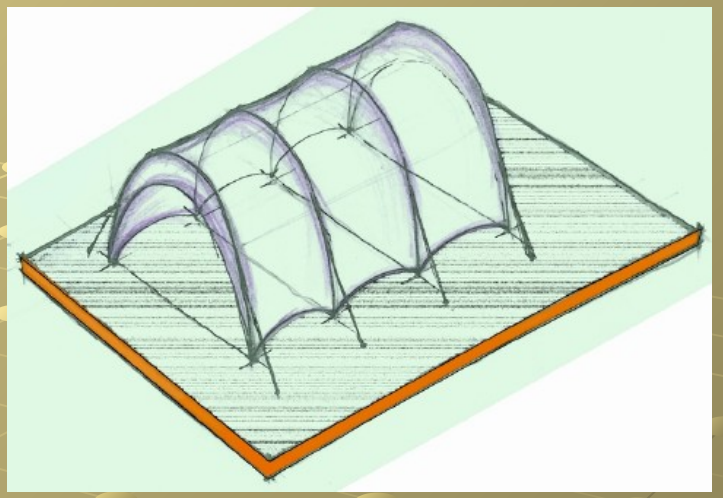


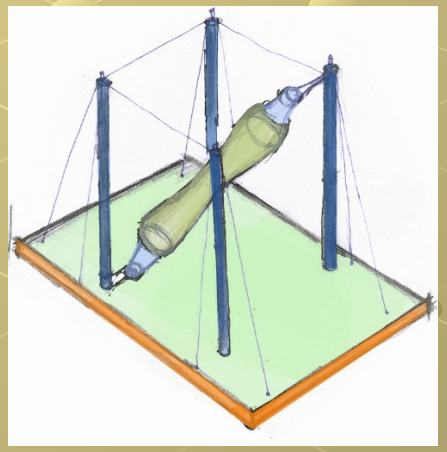
The learning objectives from the product can be classified into various categories like

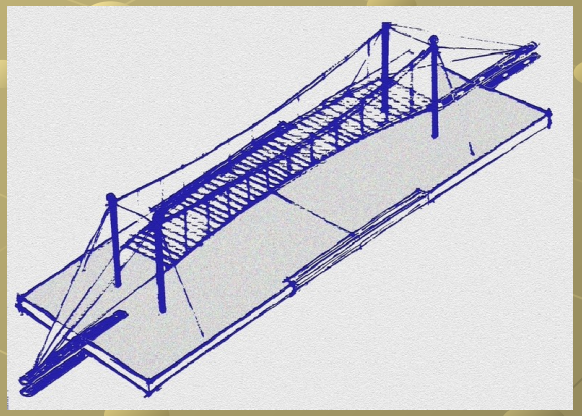
- Academics
- Visualization
- Planning
- Sequencing
- Accomplishment
- Multiplicity of use
- Group work
- Develop ones aesthetic sense
- Work within constraints

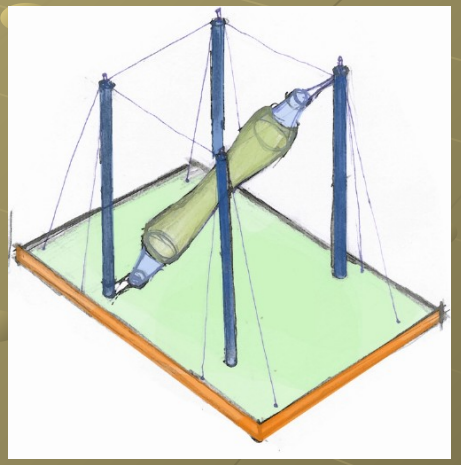
Variety that can be obtained:











Tests - interaction with kids

Method used for testing

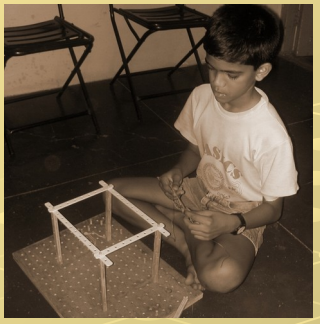
Step -01
Kids were to explore given parts without initiation.
Objects were analyzed for known and open-ended results.

Step -02
Kids were shown pictures of finished objects to create some of them.
The process was observed for ease of use of parts for obtaining known results.

Step -03
Making of the object after initiation was observed for the open-ended results.

The Test prototype

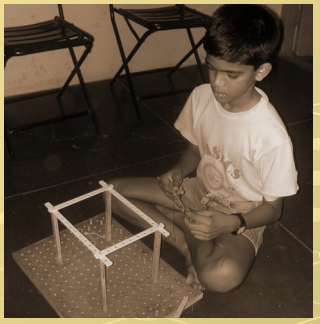
Test 01



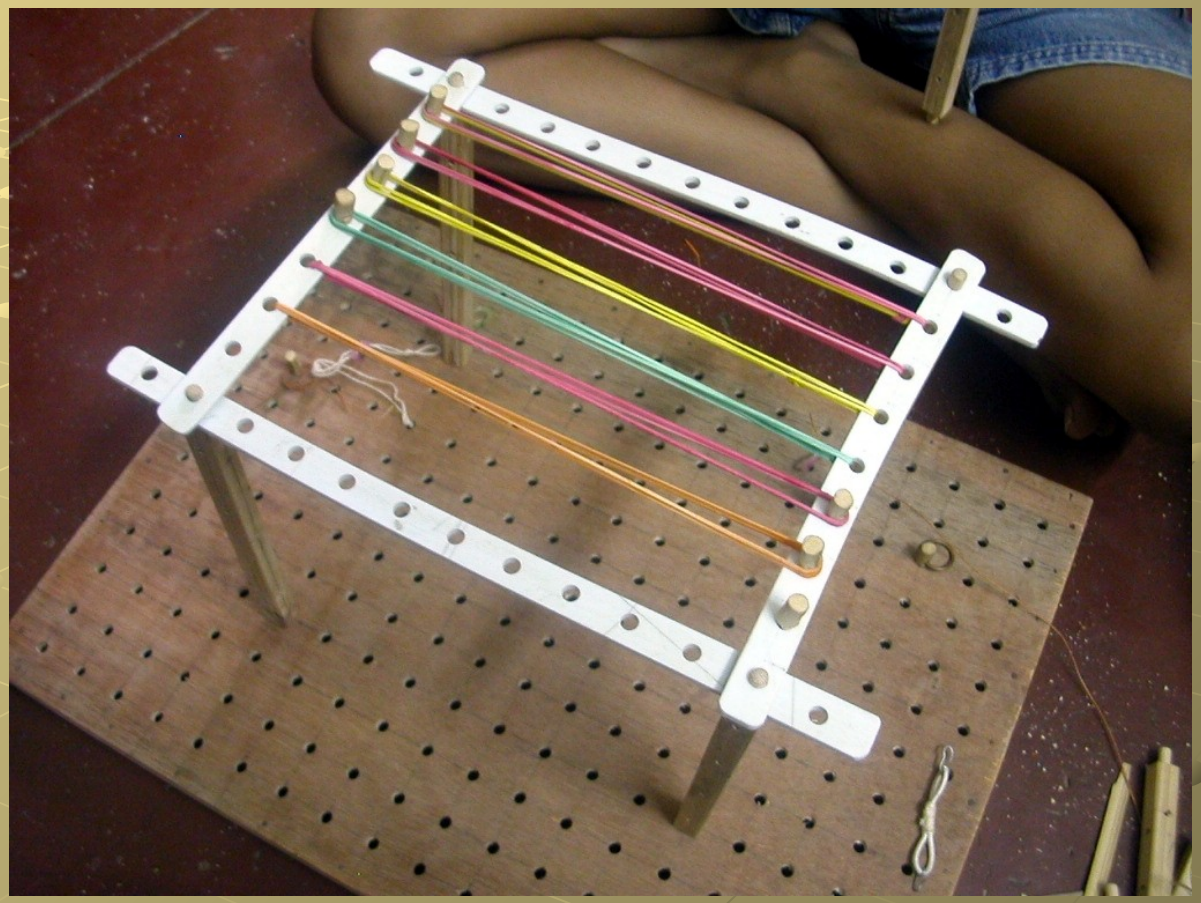
Akshay 12 yrs

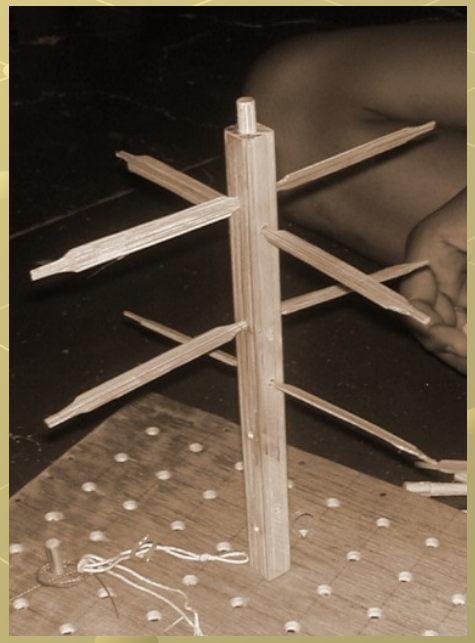
Expected result

Test 01



Akshay 12 yrs





Open-ended results

Test 02

Action taken after test -01

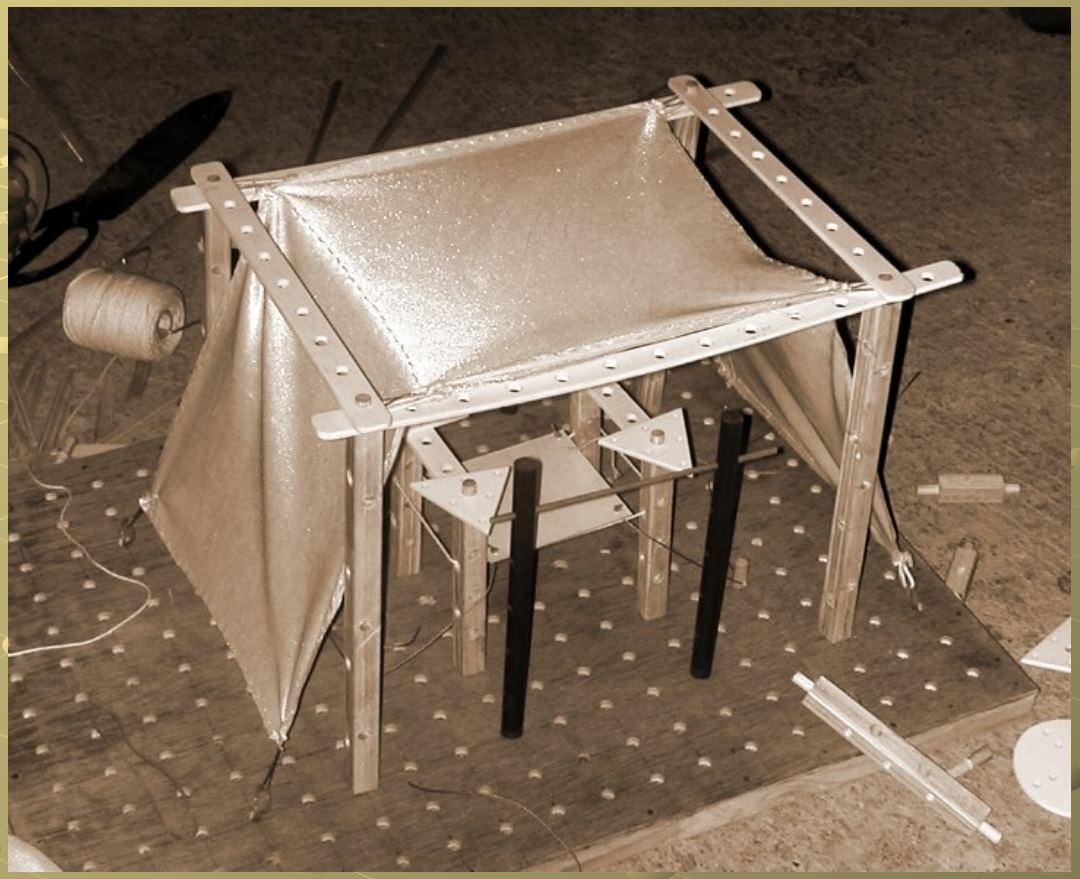
- Triangular and circular pieces added.
- Hole diameter in the square wooden posts increased
- More number of fabric pieces added
- Number of Elastic loops increased
- Quadrilaterals added for increased complexity in the maze.

Test 02

Sagar 12 yrs

Expected result

Test 02

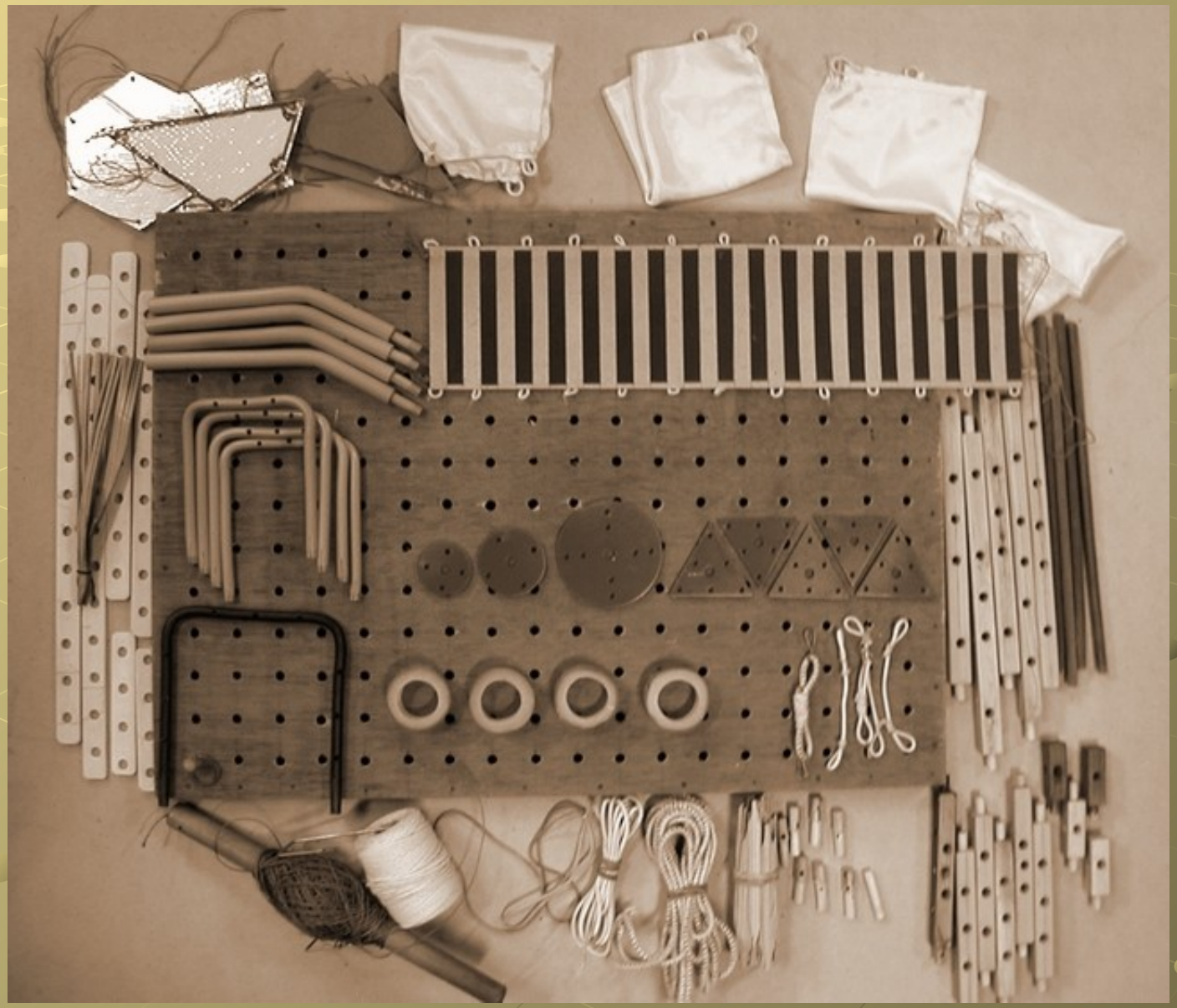


Open-ended results

Test 03

Kaustubh 17 yrs

Test 04



Test 04

Roshan 12 yrs

Test 05

Viola 12 yrs

Test 05

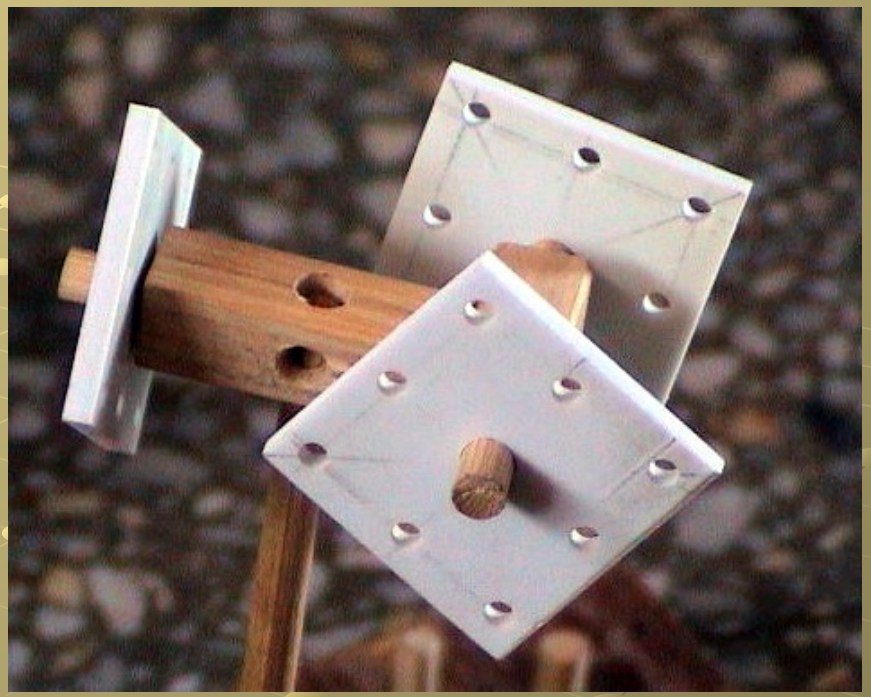
Roshan, Viola, Ria – 12 yrs
Prachee, Sushmita – 13 yrs

Test 05

Test 05

Test 06

Sharda 11 yrs

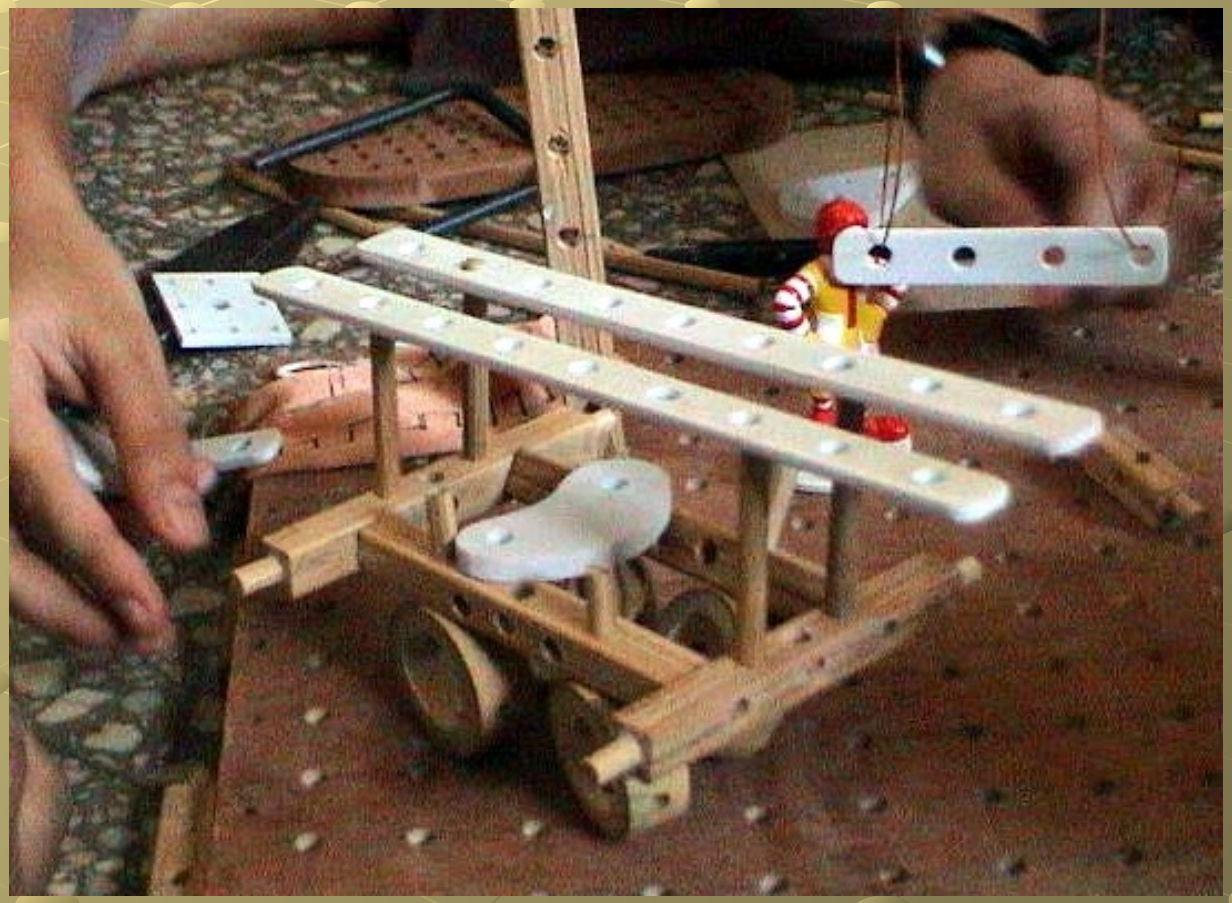


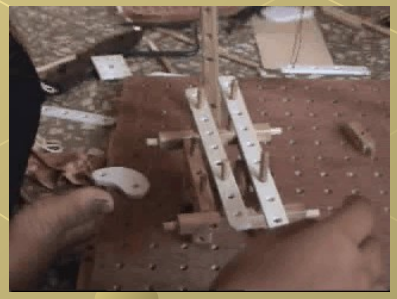
Test 06

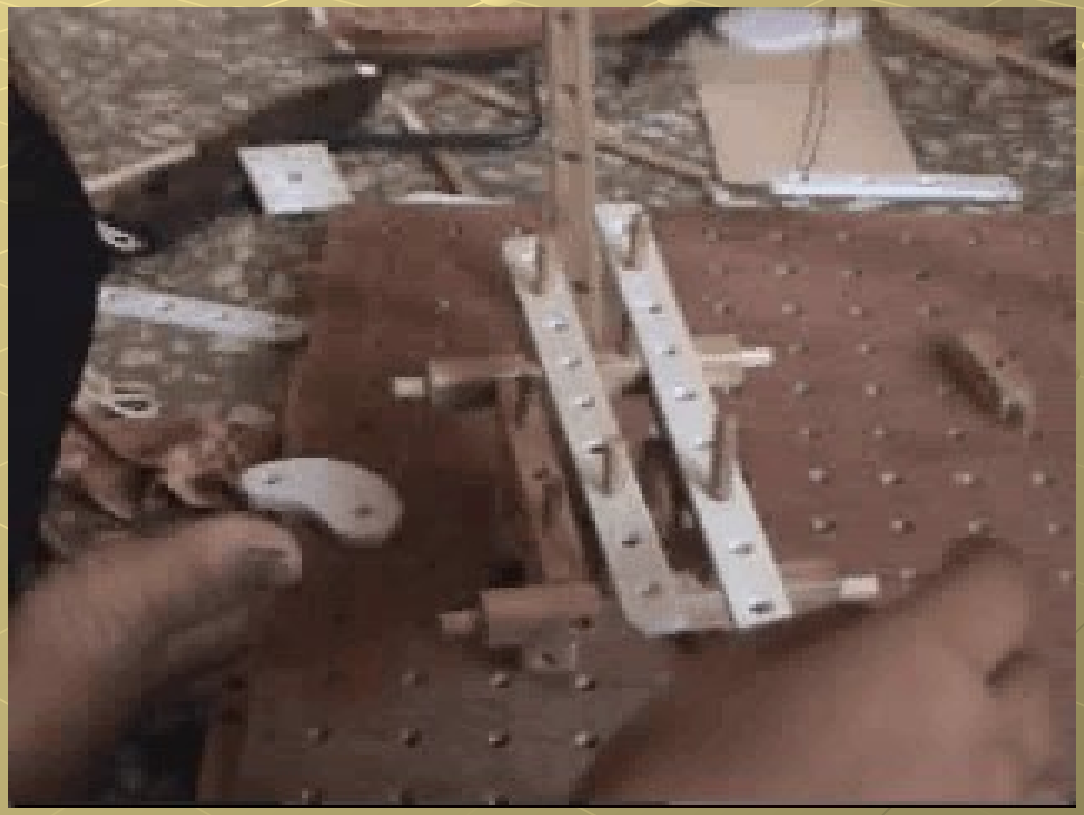
Test 06

Test 07

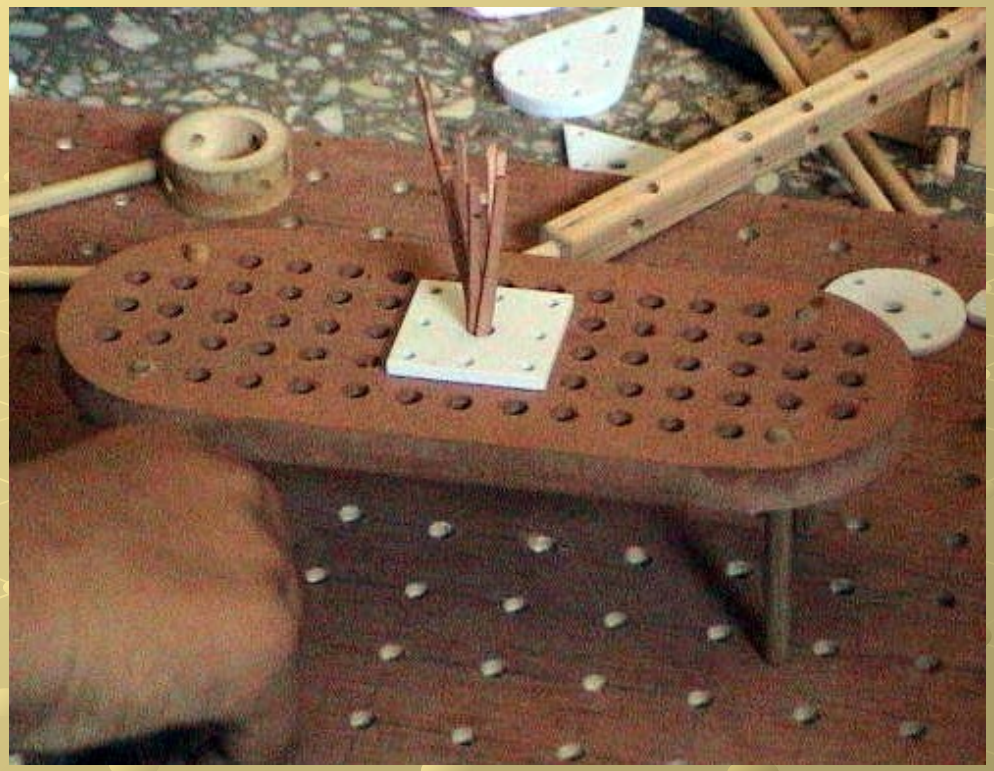
Roshan, Viola, Ria – 12 yrs
Prachee, Sushmita – 13 yrs

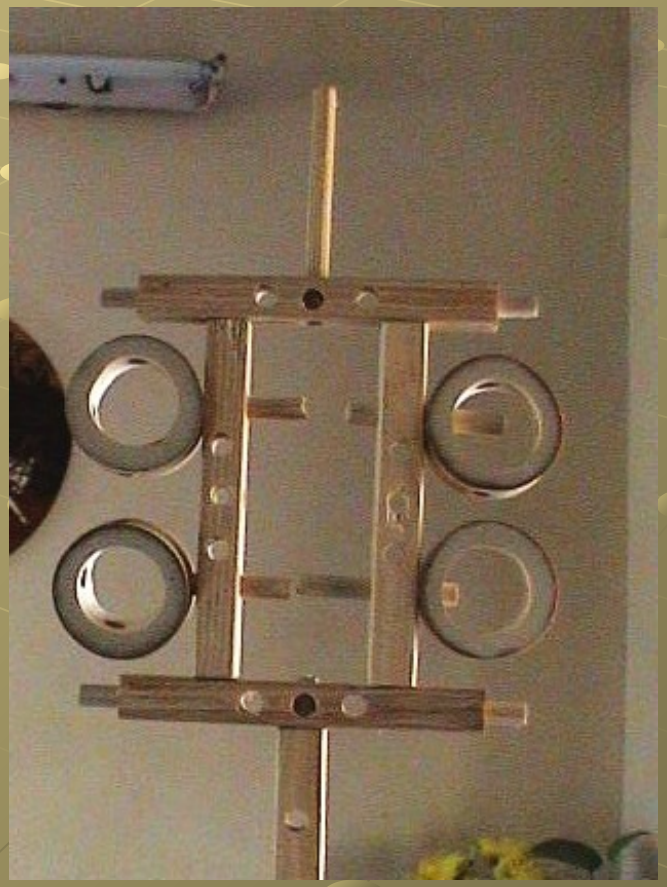




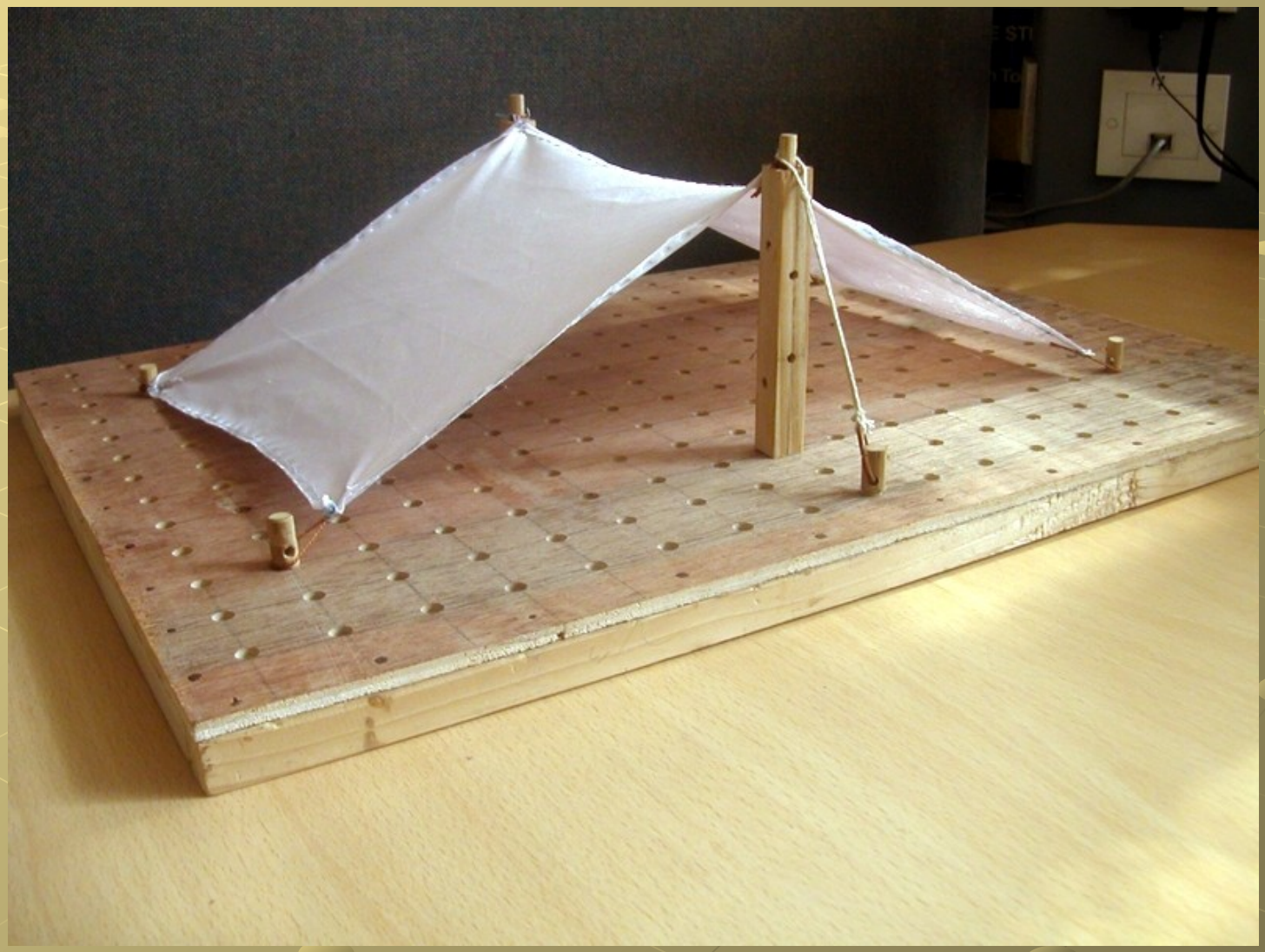


Test 07





The images shown to the kids as initiators



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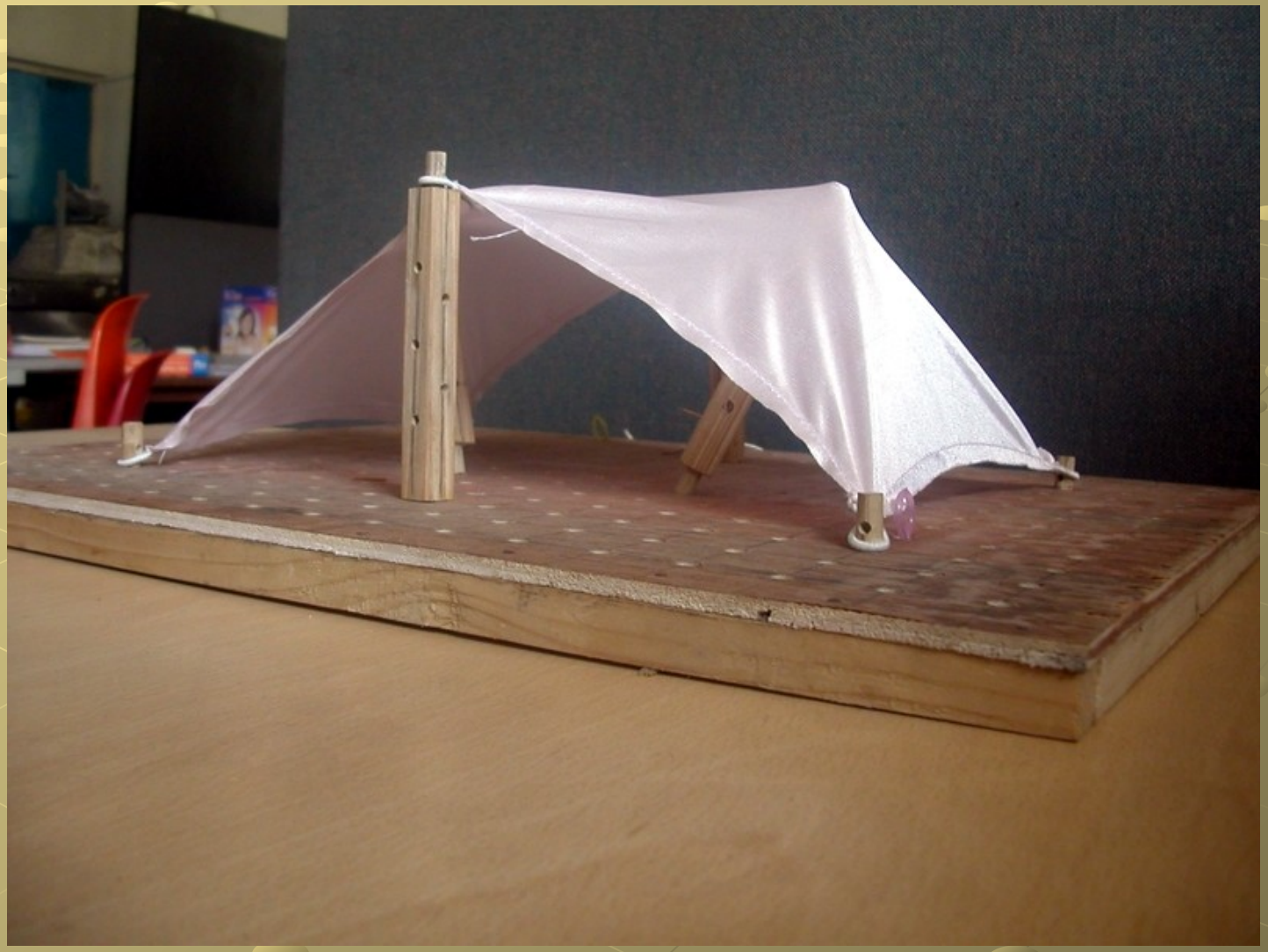

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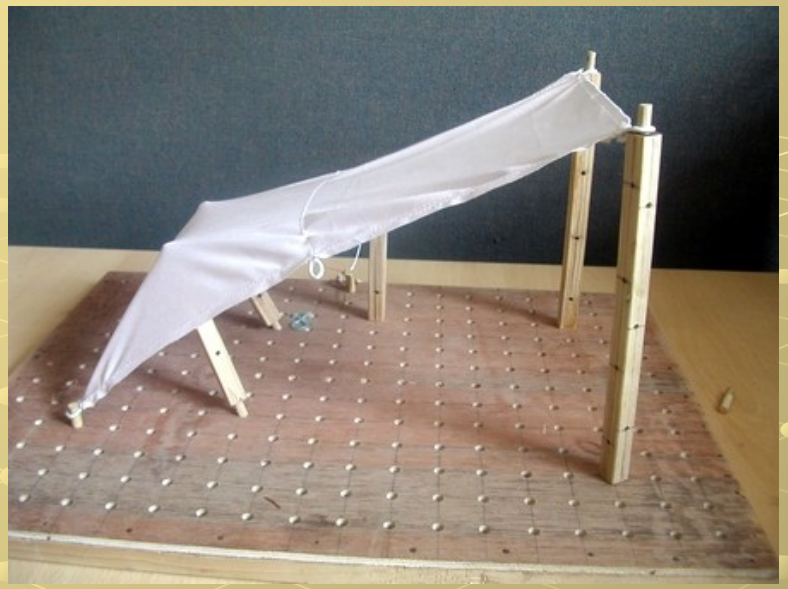

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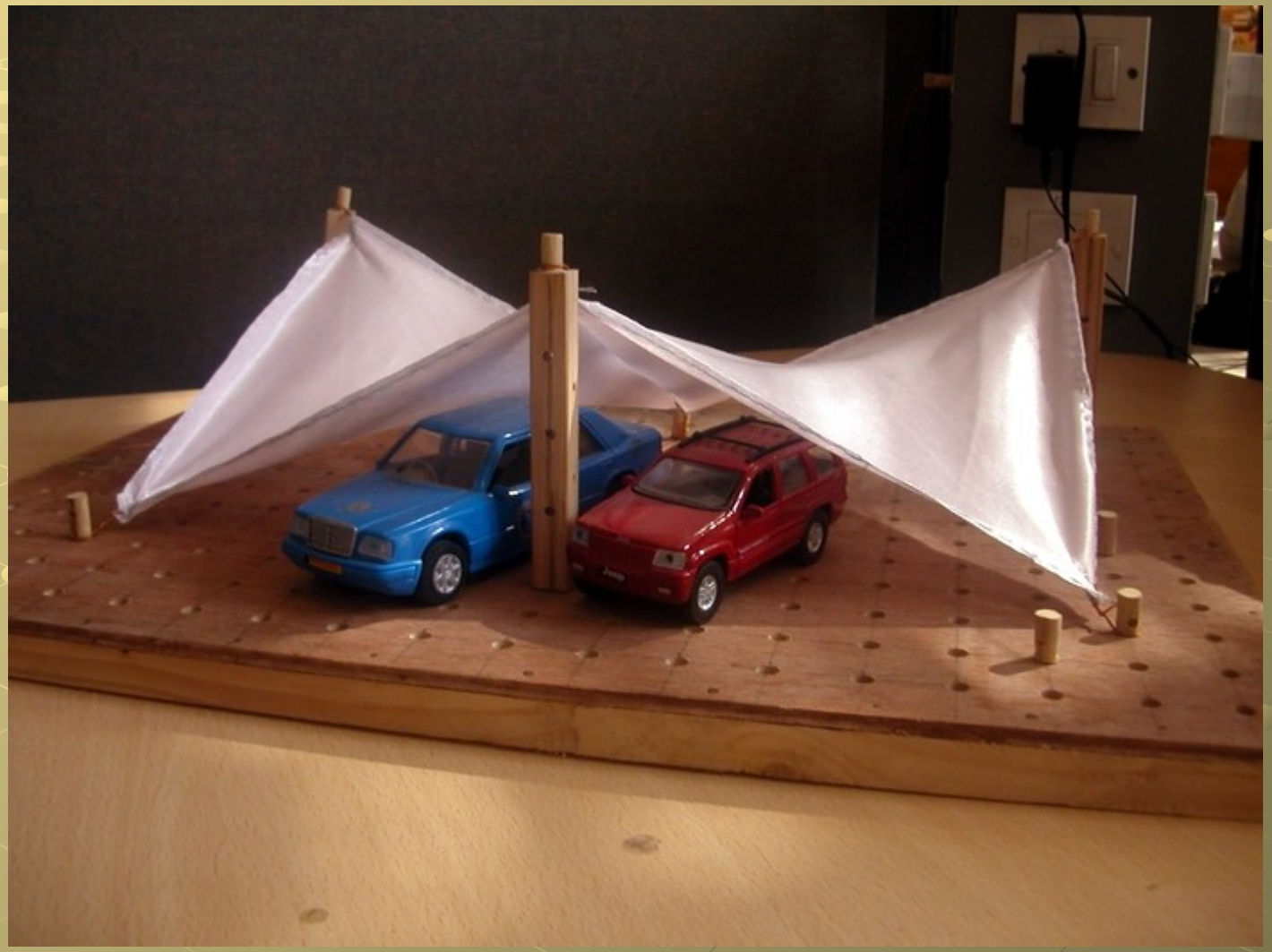

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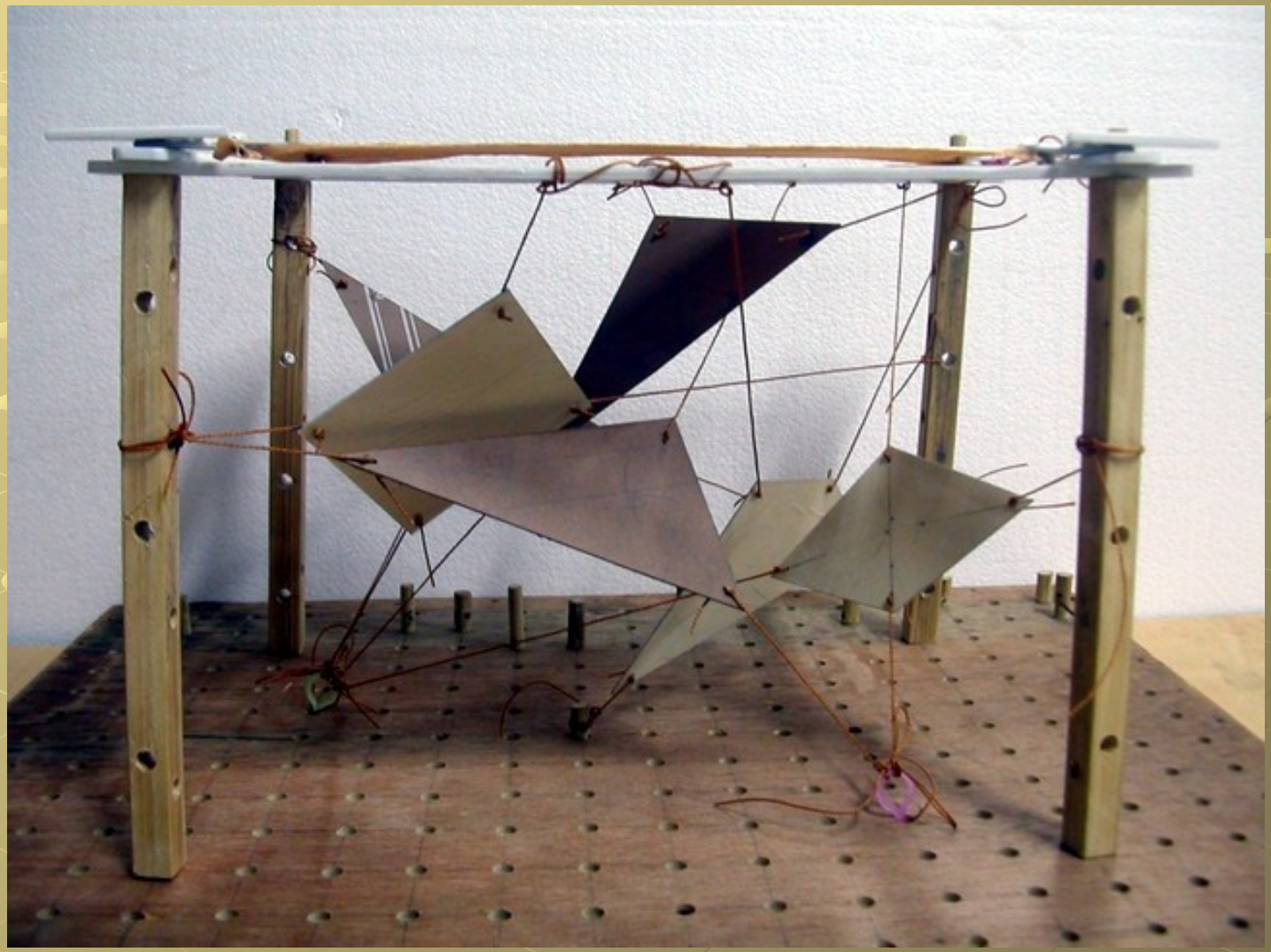

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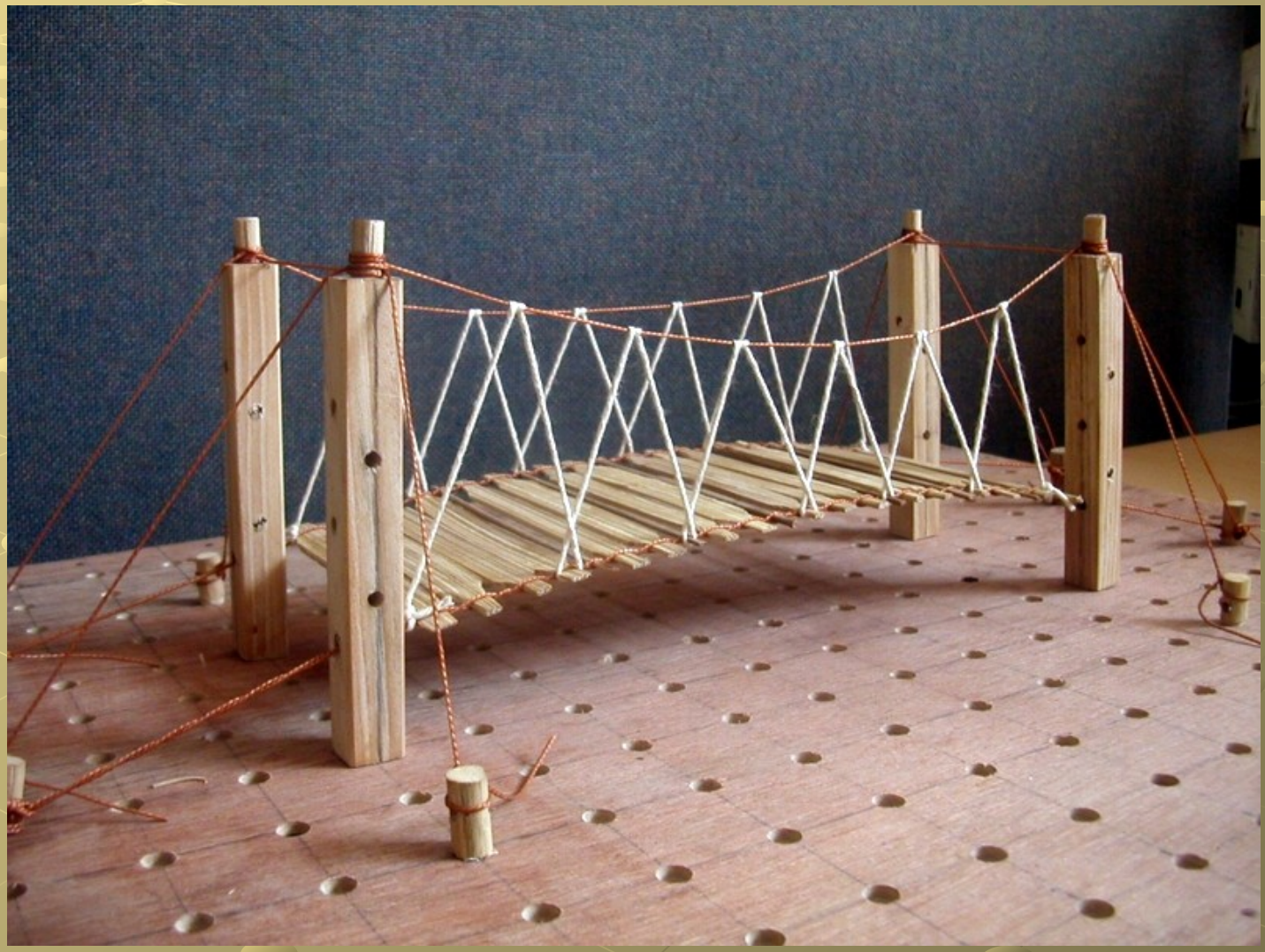
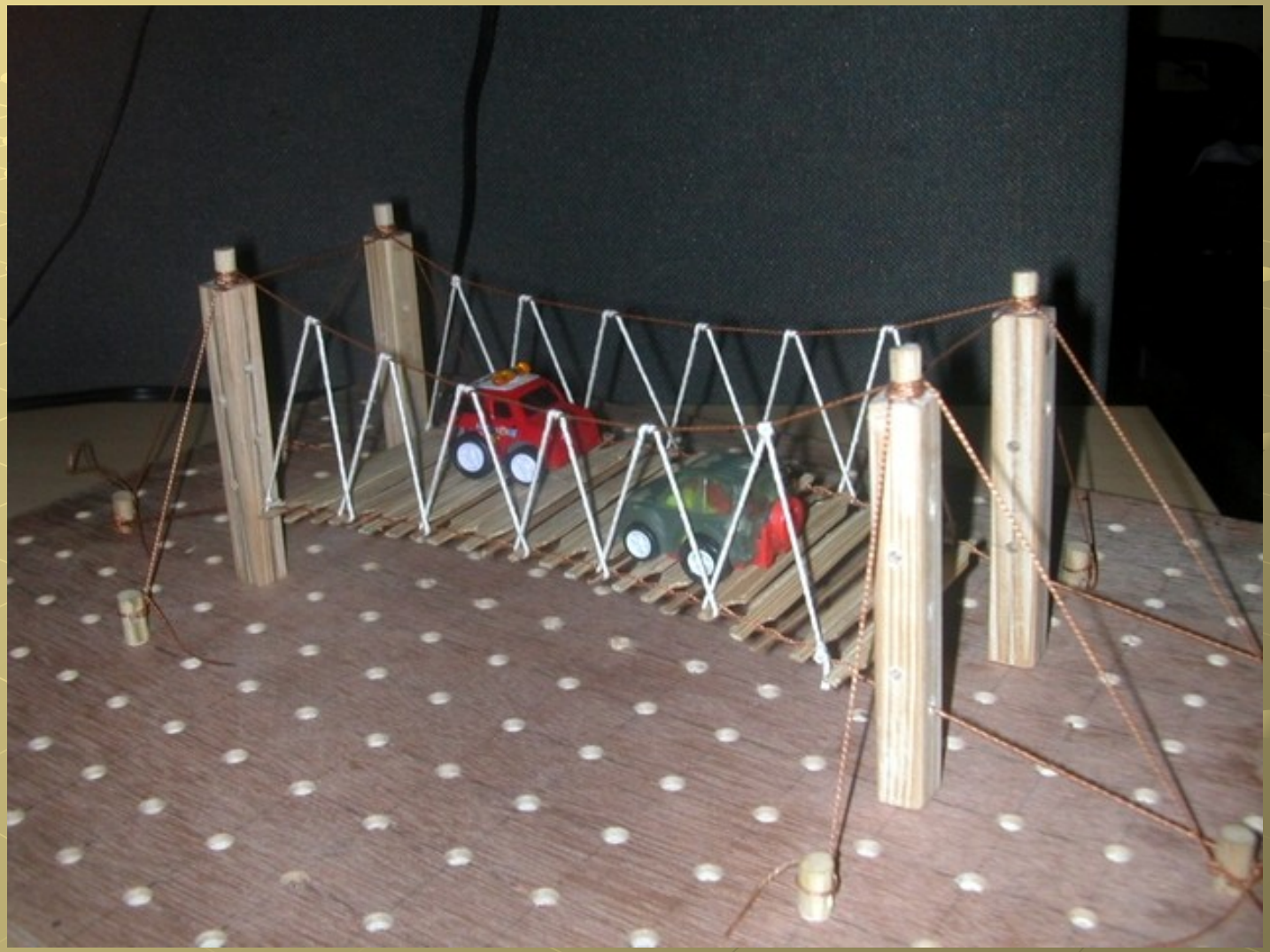


The images shown to the kids as initiators



Similarities and dissimilarities between data collection and tests

Kids who seemed to be dull in their extracurricular activities during initial interactions obtained interesting results during the test

Kid of lesser age of the same gang took more time to adapt compared to her seniors of one year

Most of the children have hidden hobbies and interests, which need an outlet that can give open-ended results.

The child is greatly influenced by the peer group, which influences the way the kit is going to be used.

Children like to show off their achievements

Learning theories observed during the tests

The Spiral Curriculum from Bruner's construction theory
It was observed that a kid was able to use the components more fluently for the second time.

Also observed were Zoltan Dienes theory of primary and secondary learning.

- Initial exploration of the components.
- Making of objects as per image shown.
- Open-ended object made later.

Maadu – to make

The final product

The final product
Final product is a combination of

Components	Tools	Consumables
Square post Circular post Pegs Connectors	Circular template Base-board	Thread Wire Sticks

Marketing strategy

Maadu can be marketed to different age groups specifically by the type of instructions given.

Separate kits can be developed to be used by schools and by individuals.

The kit for the school can have 4 to 6 baseboards.

The school kit can have more number of components.

Specific tools can be developed so that the teachers can take part in the process with the kids by giving instructions.

How will Maadu come into being

The prototype **Maadu** has been developed considering a manufacturing setup specializing in woodwork.

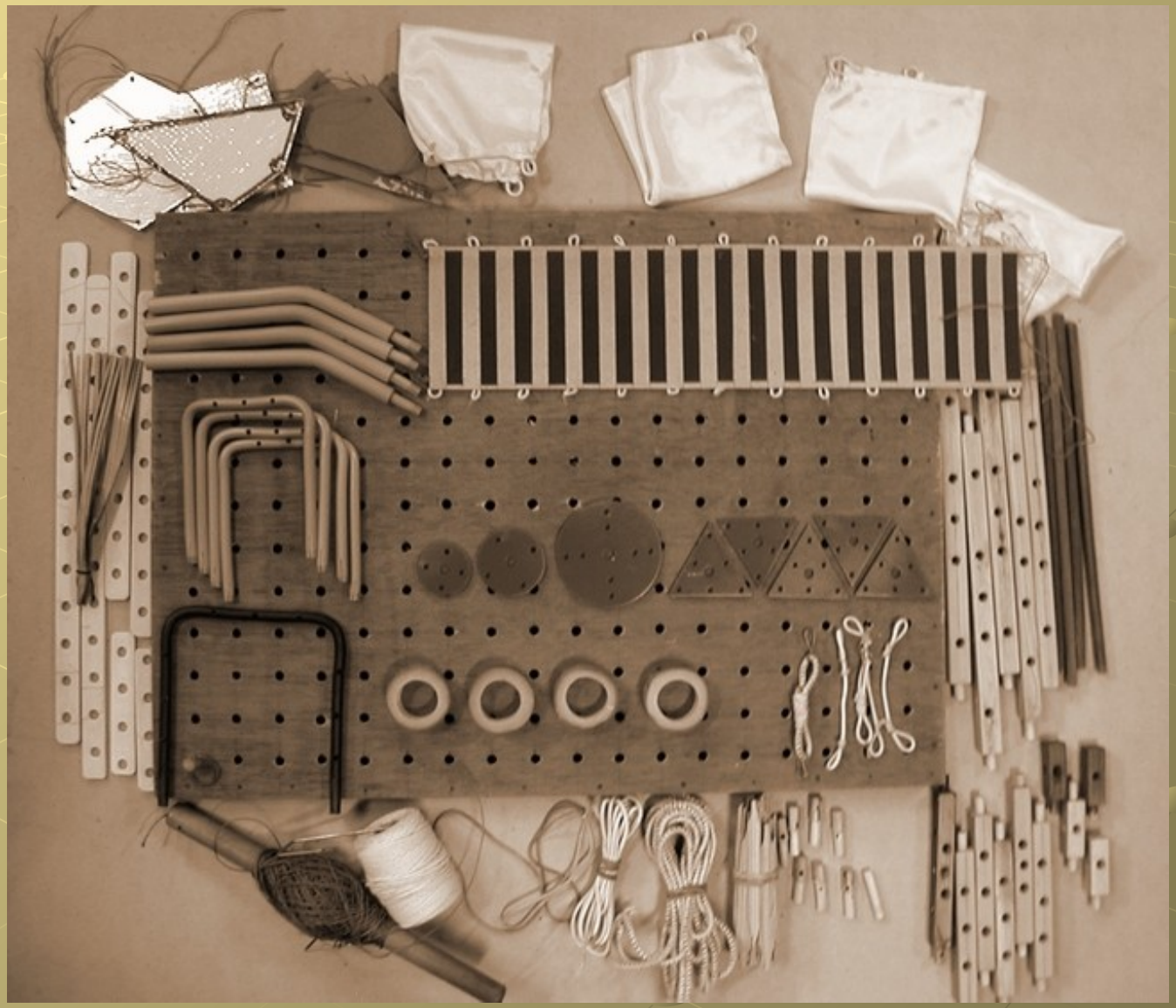
The size of the baseboard has been obtained considering the economical cutting patterns that can be obtained from 4' x 8' boards.

Hole spacing on the baseboard has been decided based on the 32mm c/c followed in the wood working industry.
The system has been worked out in manner where outsourcing of components is possible.

Bakelite hylam boards can be used for the baseboard.

Rubberwood with different stains can be used for the various wood based components.

The test prototype



The Prototype

The Prototype

Maadu