centre de développement pédagogique
pour la formation générale en science et technologie

The planetary

Design booklet

WORKING DOCUMENT

November 2006

SPECIFICATIONS
FOR MAKING A PLANETARY

Global function (service function)

The planetary must represent the Sun, the Earth and the Moon as well as their relative movements.

In terms of the *human aspect,* the planetary must:

- Be attractive, light, not too bulky and safe;
- Measure at most 200 mm. high, 300 mm. wide and 300 mm. deep;
- Be equipped with a mechanism allowing the user to observe all the movements simultaneously.

In terms of the *physical aspect,* the planetary must:

- Be built with durable materials.

In terms of the *technical aspect,* the planetary must:

- Be manually activated;
- Be assembled in such a way as to allow for the replacement of certain parts worn through normal use;
- Be stable on a flat surface.

In terms of the *industrial aspect,* the planetary must:

- Be able to be entirely built in a science and technology laboratory of the 1st cycle of secondary school.
- Be entirely built with the available materials and with the raw materials put at your disposal.

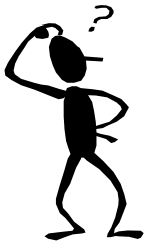
  Note: Pressure-tack, adhesive tape and elastics are not allowed as technical links.

In terms of the *economic aspect,* the planetary must:

- Be cheaper than $3.00

In terms of the *environmental aspect,* the planetary must:

- Be designed in such a way as to allow for the recycling of the mechanical components and spheres of Styrofoam at the end of the useful life cycle of the object.



What do I know?

Describe the rotation and revolution movements of the Earth and Moon:

Diagram:

Will you be able to respect the scale for diameters and distances? Explain.

Study of the mechanisms for transmission of movement

With the help of the components supplied to you, produce five different assemblies:

Gears (combination of 2 and 3 cog wheels)
Pulleys and belts (2 pulleys combined, 3 pulleys combined)
Friction wheels (2 wheels combined)

- To be observed and explained in each assembly: the number of elements involved, the speed (number of turns) of one in relation to the others and the direction of rotation of the different elements.

- To be diagramed: each of your assemblies. Use the sheet entitled "Summary of main useful symbols in initiation to technology" to help in your diagram.

- In your own words, describe the advantages and disadvantages of each of the assemblies that you have built.

Enrichment: combine different systems and note your observations:

GEARS

Combination of two cog wheels

Combination of three cog wheels

PULLEYS AND BELTS

Combination of two pulleys

Combination of three pulleys

FRICTION WHEELS

Combination of two wheels

REVIEW OF THE FIVE ASSEMBLIES

Advantages and disadvantages of the assemblies

You have just gone through the first stage of reflection and experimentation in relation to the design of a planetary.

In your own words, explain what your planetary must represent and give a glimpse of how it will work.
(Which astral bodies must you show? What is fixed and what moves? Will it be to scale? …)

My ideas

Evaluate in terms of the specifications and take into account the capacity to produce it in the allotted time.

1)

Advantages and disadvantages:

2)

Advantages and disadvantages:

3)

Advantages and disadvantages:

Eureka, the solution!

I have chosen the ____idea.

Justification:

_____

_____

_____

_____

Principles diagram:

_____

_____

_____

_____

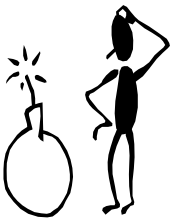
Summarise all the decisions and adjustments made in the course of designing your planetary.

Working document

Construction diagram

Notes:

I evaluate my solution.



The positive aspects of my planetary:

_____

_____

_____

_____

_____

Aspects to be improved upon:

_____

_____

_____

_____

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