

REGULAR POLYHEDRA AND PLATONIC SOLIDS

STUDENT'S WORKSHEET

1 – Teamwork

Give examples of regular polygons and memorise these words in English: triangle, square, rectangle, quadrilateral, pentagon, hexagon,

solid, polyhedron (plural, polyhedra), face, vertex (plural, vertices), edge.

A **regular polyhedron** is a solid whose faces are all congruent regular polygons and such that the same number of faces meet around each vertex.

Memorise this definition with pronunciation.

You are given paper card regular polygons and glue (blue tack). Construct examples of regular polyhedra. For each of them explain the reason why it is or isn't a regular polyhedron. Find numerous examples.

2 – Nets and Solids

Crash down the card board constructions onto the table to find nets for each polyhedron. Sketch a diagram of this net. Is this net unique for this polyhedron?

Here are some nets of regular polyhedra.

Cut out these nets and glue the corresponding solids.

Source: <http://www.mathsisfun.com/geometry>

3 – The Platonic Solid Rocks

Video “The Platonic Solid Rocks” at :

Youtube : <http://www.youtube.com/watch?v=Ye24b3ebHcw>

12/29/2006 (length : 10 minutes)

or <http://www.platonicsolids.info/PlatonicSolidRock.htm>

Final help is given with the script of the video.

4 – Instructions for an individual written report

Write an individual 4 page report about the solids that have been found recently in your team work.

Your written report should look as an article for a scientific magazine such as "Sciences et Vie Junior" mixing text and diagrams. To avoid a time consuming repetitive work, diagrams can be cut out of previous work and just glued at the right spot in your presentation.

Use as many specific words as possible in the fields of mathematics and sciences.

It should contain the following elements in a logic order:

- a title, not necessarily the one given above*
- a short introduction to present the given problem to solve*
- the definition of a regular polyhedron*
- the method used in class to start the team work in order to give examples*
- a presentation of a non regular polyhedron and the explanation why this one is not regular*
- a presentation of all regular polyhedra that emerged from the team work*
- a grid to recap the number of faces, edges, vertices of all presented solids*
- a personal comment on the results contained in the grid*

Criteria for evaluation (20pt)

- Title and introduction (1pt),
- Definition of a regular polyhedron (0,5pt)
- An easy example (0,5pt)
- An example of a non regular polyhedron (1pt)
- The reason why this example is not regular (2pt)
- Practical method followed to find regular polyhedra (3pt)
- Description of the 5Platonic solids (4pt)
- Grid of numbers (faces, vertices, edges) (1pt)
- Comment on the grid (4pt)
- English language, frequent mistakes already given in class (3pt)

5- Instructions for a collaborative poster

Team work: **Poster and oral presentation on a given subject.**

Final task: **A poster and an oral presentation.**

Time given: **4 teaching periods**

Subject content

Basically what was already described in your written report for this class.

Additional content: give a cultural point of view about your subject e.g. « who was Plato? »

Working procedure

Subject and team members are assigned and not chosen on a voluntary basis just the way it usually happens in your future professional life. You have to collaborate with everyone in order to achieve a team task. The goal is here to turn the written report, individual task, into a collaborative task, where all members are involved taking advantage of their similarities and differences.

Team Work Diary

One member is secretary for the diary of the team: at the end of each period, the secretary summarises the achieved work and the intermediate tasks that are assigned to each member for the next time. This diary is to be returned to the teacher at the end of each working period.

Poster

The poster should be visually very attractive and understandable. Use titles, keywords, and coloured diagrams.

Oral presentation

The presentation should last 6 to 8 minutes.

Remember that all member have to speak in the presentation. Assign a role to each member.

Final evaluation

You will be given a final mark for the intermediate work, for the poster and for the presentation.

Subjects

- Volume of our classroom.
- Introduction to Platonic solids.
- Five and only five Platonic solids.
- Introduction to Archimedes' puzzle.
- Numbers properties in Archimedes' puzzle.