Name (Nazwa)
Planetary System - how planets move?

Subjects (Przedmioty)
Mathematics, Physics, Astronomy, IT

Grade Ranges (Poziomy/Klasy)
9 10

Languages (Języki)
English

Materials Needed (Potrzebne materiały)
Internet, Spreadsheet

Communications (Porozumiewanie się)
On paper

Target Groups (Dla kogo?)
Pupils

Authors (Autorzy)
Witold Kranas

Introduction (Wprowadzenie)

Planetary system is comparatively well known. First, we should gather data and then answer the question: How planets move? The main force acting on a planet is gravitational pull from the Sun directed always to the centre of Sun. The force is described by Newtonian Law of Gravity. It is inversely proportional to the square of distance between Sun and a planet. What is the result? Planet is moving according to the Second Newton's Law. During the motion velocity vector is changing only due to the acting force. What is a shape of orbit (First Kepler's Law)? What is the dependence between distance and a period of motion (Third Kepler's Law).

Task (Zadanie)
Look at the prepared table (spreadsheet). There are a lot of empty spaces there.
Try to find in the Internet appropriate data and fill in the table.
Process the data and calculate new values (volume, mass, density)
Find in the Internet the description of the movement of planets and a pictures.
Find in the Internet the rules of the motion.
Check the rules on the data in table.

Goals (Cele)
Comprehension of the motion of planets.
Ability of data processing in a spreadsheet.

Process (Przebieg)
Looking at the data in spreadsheet (PlanSysEn0.xls) – description by teacher
Searching in Internet for missing data. Filling the table with found data.
Processing the date to calculate density – supervised by teacher.
Sorting the data using different keys – supervised by teacher.
Playing with a model of planet motion.
Searching in Internet for the rules of the motion of planets.
Recalculating the rules in spreadsheet – supervised by teacher.

Sources (Źródła)
To search for Planetary System data:
http://www.nineplanets.org
http://www.solarviews.com - and a lot of other...
A model of planet motion:
http://colabs.oeiizk.waw.pl/projects/vectorFA.htm - microworld to play with
(The microworld is a product of CoLabs Minerva project prepared by Polish team from OEIiZK).
http://colabs.oeiizk.waw.pl/documents/vectorFActivA.pdf - activities book

PlanSysEn0.xls – a spreadsheet with a table to fill.

Product   **(Wynik/produkt)**
Spreadsheet with planetary system data and rules of planet motion – to revise by teacher.

Structure   **(Strukturyzacja)**
Medium

Cooperation   **(Współpraca)**
Low (individual)

Reading Level   **(Poziom umiejętności czytania)**
High

Time   **(Czas trwania)**
2 or 3 hours

Linked Assignment ID   **(ID ćwiczenia pokrewnego)**
BG - Solar System

Date   **(Data)**
2005-04-05