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Solar system to scale

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One of the most important successes in astronomical observations has been to determine the limit of the Solar System. It is said that the first man able to measure the distance Earth-Sun with only a very slight mistake, in the second century BC, was the wise Greek man Aristarco de Samos.
Thanks to Newton′s law of universal gravitation, it was possible to measure, with a little margin of error, the distances between the Sun and the planets.

Twelve-year old students are very interested in everything related to the universe. However, it seems too difficult to imagine and understand the real distances among the different celestial bodies. To learn the differences among the inner and outer planets and how far away the outer ones are, I have considered to make my pupils work on the sizes and the distances in our solar system constructing it to scale.
The purpose is to reproduce our solar system to scale on a cardboard.

The procedure is very easy and simple. Students of first year of ESO (12 year-old) receive the instructions in a sheet of paper (things they need: a black cardboard, a pair of scissors, colored pencils, a ruler, adhesive tape, glue, the photocopies of the planets and satellites, the measurements they have to use). In another photocopy they get the pictures of the edge of the sun, the planets, dwarf planets and some satellites, which they have to color, cut and stick on the cardboard.

This activity is planned for both Spanish and bilingual learning students as a science project. Depending on the group, they will receive these instructions in Spanish or in English.
When the time is over, the students bring their works on their cardboard to the class. They obtain a final mark: passing, good or excellent, depending on the accuracy of the measurements, the position of all the celestial bodies, the asteroids belts, personal contributions, etc. If any of the students has not followed the instructions they get the chance to remake it again properly, in order not to obtain the “failing” mark. When the teacher notices that some mistakes can be easily improved, students can do it. If the students have forgotten to write the names of the celestial bodies, they should add them.

Finally, their works will be exposed in the classroom.