THE GEOLOGY OF MARS THROUGH 3D DIGITAL VIDEOS IN THE CLASSROOM. *A.B. Nieto[1], C. López[2], M.A. de Pablo[1,3,4], G. Castilla[4], I. Montoya[1]*. [1]Facultad de Ciencias Geológicas. Universidad Complutense de Madrid. 28040 Madrid. Spain. [2]I.E.S. 'María Zambrano'. C/ Alpujarras, 52. 28915 Leganés, Madrid. Spain. [3]Área de Geología. Escuela Superior de Ciencias Experimentales y Tecnología. Universidad Rey Juan Carlos. 28933 Móstoles, Madrid. Spain. (de-pablo@geo.ucm.es). [4]Seminar on Planetary Sciences. Facultad de Ciencias Geológicas. Universidad Complutense de Madrid. 28040 Madrid. Spain.

Introduction. The study of other bodies (planets and satellites) of the Solar System, and especially Mars, it is a very attractive form of introducing to the Obligatory Secondary Education students on the Planetary Sciences in general, and to the Planetary Geology in particular [1,2]. Moreover, to study other planets is a very useful tool to consolidate the basic geological knowledge contents in the curriculum of subjects, like Geology and Sciences of the Earth and of the Environment, imparted in the Secundary Education in Spain [1,2,3]. If the didactic activities are reinforced with the employment of informatic tools, will be obtained a better learning of the concepts that are intended to teach [4]. In this work we show an activity about the geology of Mars, employing informatic tools, developed within a greater didactic unit on Planetary Geology [3].

Objetive. The objective of that didactic activity is to introduce to the students, between 14 and 17 years old, on the geology of Mars after have studied the shapes of the relief, the processes and the energetic sources that control the terrestrial geology. This activity is only one more of others activities contained in the designated didactic unit 'Portrait of the solar family' [4] created for students of Geology of the Obligatory Secondary Education (ESO).

Materials. For the development of that didactic activity were necessary the topographic data of Mars and the general photomosaics, obtained as describe Montoya *et al*. (2003) [5]. In the same way, the digital videos were developed with the mentioned topographic data and employing the computer program 3Dem®, in a very similar way that is employ by these authors to obtain the images of the 3D digital elevation models [5]. These videos show some virtual overflies over the surface of Mars represented through digital elevation models 3D (Fig. 1). These videos were requiring the net employment red-blue glasses that were elaborated by the students that previously they had developed other activity employing three-dimensional images and anagliphs of the martian surface [5]. In order to facilitate the work of the students, counting with a form in which they have to describe the most characteristic features observed, to accomplish geological maps and to locate in a schematic martian map (Fig. 2), in a approximate way, the area overflied in each one of the videos.

Martian geology. The selection of the more important martians geological feature was based on the descriptions finding in the general available bibliography [6,7,8,9,10,11,12,13]. The regions and geological features that were employed to generate the digital videos were: highlands, lowlands, dicotomy, polar regions, impact craters, channels, volcanoes and canyons.

Metodology. The simplified study of the general geology of Mars was developed once the pupils studied, in a detailed way, the geology of the Earth, like it is demanded in the curriculum of the Geology subjec in the Obligatory Secundary Education in Spain. The methodology consisted, first, in the observation of some digital videos that were showing, with three-dimensional digital elevation models of the surface of Mars, the most important features of this planet, in order to that the students, in a individual way, located and described, with the aid of a form, the more interesting geological and characteristic features observed. After the observation of all the digital videos and once filled the forms, is accomplished a set in common with the observations made for all the pupils in order to complement the the most interesting characteristics of the martian geological features. Once it ended this phase, the activity was complemented with the visit of a researcher on Planetary Geology in order to solve the emerged doubts and to reinforce the knowledge acquired with new data based on the last more relevant investigations.

References. [1] López, C., Castilla, G.. De Pablo, M.A. 2002. La Geología Planetaria en el aula: justificación, diseño y desarrollo de contenidos. *Actas de las X Jornadas astronómicas de Castellón*. Castellón, Spain. (in press). [2] López, C., Castilla, G. De Pablo, M.A. 2002. La geología planetaria en la educación secundaria. *Foros de Experiencias. Cosmocaixa 2002*. 79-93. [3] López, C., Castilla, G., De Pablo, M.A. 2002. Retrato de la familia Solar: una unidad didáctica de Geología Planetaria. *Actas del XII Simponio sobre enseñanza de la Geología.* Gerona. *Rev. Asoc. Esp. Enseñ. Geol.:* 10. 1, 41-46. [4] Alba, C. 2002. Utilización didáctica de recursos informáticos. In *Formación de Profesores de educación secundaria.* ICE-UCM. Madrid, Spain. 715-726. [5] Montoya, I., Nieto, A.B., De Pablo, M.A. 2003. Mars 3D: a virtual fieldtrip by the Red Planet in the classroom. *LPSC XXXIV*. (This volume). [6] Greeley, R. 1987. Planetary Landscapes. *Allen&Unwin, Inc.* Boston, USA. 275p. [7] Hartmann, W. 1983. Moons and Planets. *Ed. Wadsworth.* Belmont. USA. 509p . [8] Beatty, J.K., Chaikin, A. (Editors). 1990. The new Solar System. *Cambridge University Press*. Cambridge, USA. 326 p. [9] Anguita, F. 1993. Geología Planetaria. *Ed. Mare Nostrum*. Madrid. Spain. 136p. [10] Anguita, F. 1998. Historia de Marte. *Ed. Planeta*. Barcelona, Spain. 314p. [11] Cattermole, P. 1992. Mars: The Story of the Red Planet. *Chapman&Hill*. London, England. 224p. [12] Carr, M.H. 1981. The surface of Mars. *Yale University Press*. Yale, USA. 232p. [13] Henbest, N. 1992. The planets: portraits of new worlds. *Penguin Books, Ltd*. London, England. 208p.

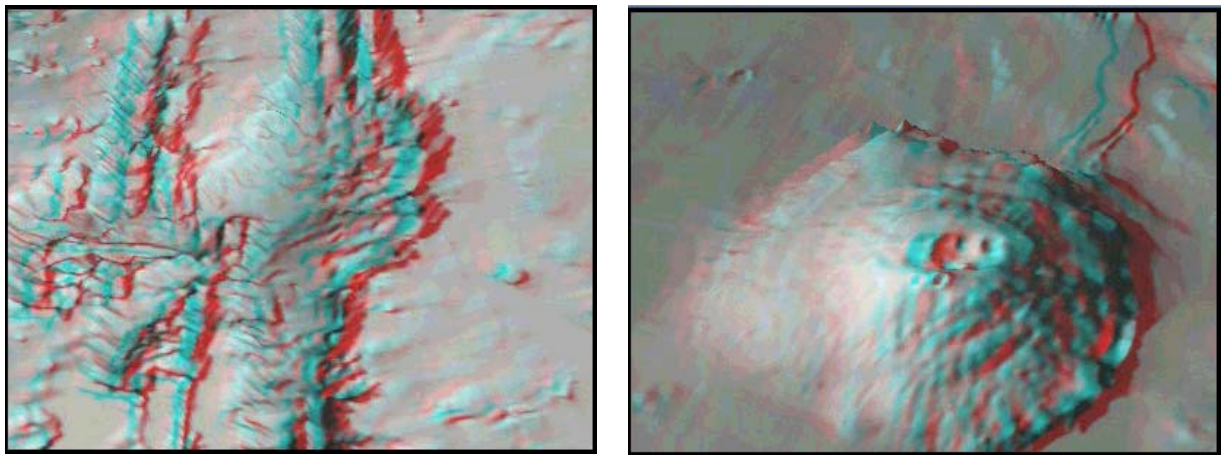

Fig. 1: Example of two frames of the digital videos used in this activity in those which are shown some of the most important features of the surface of Mars: the cannons (left) and volcanoes (right).

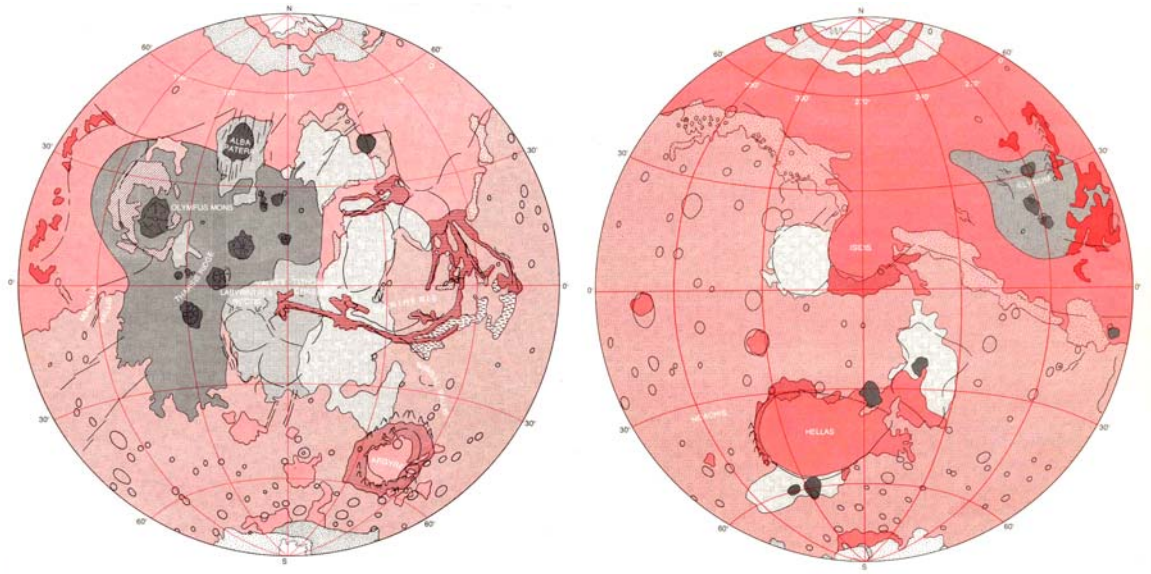

Fig. 2: Schematic map of Mars where the pupils should represent the approximate area of the overfly observed in the digital videos (from Beatty and Chaikin, 1990 [8])