

## Rosetta's Comet Touchdown educational kit

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### Abstract

In 2010, Lightcurve Films in collaboration with and with support from ESA, DLR, EuroPlanet and the LEGO® Company, Denmark, produced an educational kit called **Rosetta's Comet Touchdown**. The kit is centered around the Rosetta Philae lander and composed of an explanatory video with a set of Interdisciplinary Activity Sheets (IAS). The IAS contain proposals and suggestions for how to explore the topic of cometary research in a class room setting, using the video as a point of departure. The target audience for the kit is students aged 16 and older. Two high schools, one in Hungary and one in Portugal, tested the kit in 2011.

### Introduction

The idea to create a video around the Philae lander started with a conversation with Detlef Koschny (ESA), who had been using LEGO® to help with Rosetta mission operation planning purposes. We produced a short educational video about the Rosetta Philae Lander. In the video Planetary scientist Dan Andrews (Open University, UK) and Engineer Ulrike Ragnit (ESA) explain the science behind and working of Philae, using a LEGO®-comet-landscape and a LEGO MINDSTORMS® version of the lander. The LEGO® lander was built by Dutch LEGO® specialist builders Martijn Boogaarts, Gerrit Bronsveld and Eric Steenstra. The video can be found at [www.lightcurvefilms.com/rosettas-comet-touchdown](http://www.lightcurvefilms.com/rosettas-comet-touchdown).

At this link, several other videos can be found, such as two videos with Detlef Koschny (ESA), a documentary about the Dutch LEGO® builders and videos produced by the Hungarian high school group that tested the kit.

To provide with ideas of how to use the video and explore the topic of cometary science in a class room setting, *Interdisciplinary Activity Sheets* (IAS) were put together and made available as part of the kit. These sheets contain suggestions of how to use the film, LEGO® and LEGO MINDSTORMS® and other ideas to explore cometary science in an interdisciplinary way, including art, languages, culture, science, technology, etc..

### Testing the kit

The kit was first presented in Rome during the EPSC 2010. Twelve student of aerospace engineering (3rd year) and 3 students of design (European School of Design) were found interested to participate. LEGO® MINDSTORMS® expert Martijn Boogaarts was also in Rome and brought the demonstration model. He participated in the event, demonstrating the model and guiding the students. The aerospace students were invited to build their own model and the art student to make a work of art around the theme during 3 hours.



Figure 1: The kit first presented and tested in Rome.

The kit was next extensively tested by two high schools: the Széchenyi István Gimnázium in Sopron, Hungary, and the Escola Secundária do Bocage in Setúbal, Portugal. The Hungarian group was led by physics teacher Ágota Lang, and had the collaboration of teachers from other disciplines. The Portuguese school team was led by physics teacher Filomena Rodrigues.

The Hungarian group were 31 students of average age 15. They divided in several smaller teams focusing on History, Arts, Science, LEGO® building and media production



Figure 2: The students from the Széchenyi István Gimnázium in Sopron, Hungary, presenting their work.

The general evaluation from both schools was positive, both by the students and the teachers. It was not possible to create a connection between the two groups, due to very different time and work schedules in both countries.

From the Hungarian report: “... the proposed activities in the Interdisciplinary Activity Sheets cover three areas: science, art and building (engineering), so every student can find and work on a favourite theme. The Interdisciplinary Activity Sheets are also very useful, because they provide with starting-points and ideas for the project-leader. .... The interdisciplinary aspect is an excellent idea. All the 3 colleagues - who took part in project - think the same about this and they helped the work of the class 9A pleasantly”. The Hungarian team later presented their work as a poster during the EPSC 2011 [1].

The group in Portugal was smaller in number. One sub team worked on a LEGO® model, the other sub team focused on art, creating a surrounding for the

model, with the information in the IAS as a starting point. From the Portuguese report: “In our opinion is that the kit should become broader in terms of the theme, not just Rosetta.”



Figure 3: The result of the work by the Escola Secundária do Bocage in Setúbal, Portugal.

## Acknowledgements

Financial support was provided by ESA, DLR and EuroPlanet. The LEGO® company provided with all the necessary LEGO MINDSTORMS® elements and 40,000 2x4 LEGO® bricks to build the cometary surface for the video.

## References

- [1] Lang Á., et al.: Touch the comet! Testing of the “Rosetta’s Comet Touchdown” educational kit in the Széchenyi István High School, Sopron, Hungary. EPSC-DPS 2011, 2-7 October, Nantes, France, 2011.