

How to do a Science Case with your students

If you are reading this document, you probably want to do a Science Case with a group of Students. This is a printable downloadable guide with the necessary information to choose and prepare a Science Case.

There are Science Cases about lots of different interesting topics. All topics are equally didactic and suitable for involving students in a science experience. **You may let the students choose, or look for a specific case that suits a particular unit you are teaching.** However depending on the students' age and their knowledge about mathematics and physics, some Science Cases might be too difficult or way too easy. That is why the Science Cases are divided into difficulty levels. Teachers can choose the best level for their students. Although most of them are, not all the Science Cases are developed for all levels. **Make sure to look at the level indicator when choosing a Science Case and to read the Teacher's Guide for further information.**

Basic Level Science Cases are focused on teaching the main knowledge we have about the Universe and the basic science tools that are used to explore it. In this laboratories, understanding the concepts is more important than the measurements. Without any formulae, they are recommended for students from primary school or for those coming from other branches than science.

Intermediate Level Science Cases are intended to be done by students with basic knowledge of physics and mathematics. Fundamental physics laws will be used as well as basic trigonometric formulas. These exercises would be recommended for students from secondary school and higher students with basic science knowledge.

Advanced Level is suitable for students coursing the few years previous to the university. Students will put into use physics and math advanced knowledge. All the needed background is provided in the Science Case but students in this level should be able to move easily through math equations and science formulas.

The Super Hero level was recently developed to suit the most exigent students. Real science is done at this level, reliable data must be collected and analyzed in graphs and by programs that will have to be written by the students in some cases.

Once you have chosen your Science Case, if the desired level is available, you can download the documents and access the resources.

For each Science Case, we provide:

A teacher's guide: a guide where teachers can find the key information to organize the activity and solve any possible issues. All the answers you may need and step by step information is here. May sure to print a copy of this guide and keep it handy.

A student's guide: a manual for students that guides them through the whole laboratory. All the information to do the activity on their own can be found here. Print a copy for each student or group.

Booklet's Chapters: booklets with information about the topics treated in the case, some of them are necessary to understand the experiment and others are provided to offer further information.

Quiz: a set of questions that should be answered by the students to reinforce the learning and that might be used to check whether they understood the procedure.

Web tools: online programs that were specifically designed by the CESAR team to ease the tasks proposed in the student's guides.

Other resources as external links to databases, or sets of images that might be of use.

Make sure to read the Teacher's guide before organizing an activity, it will most likely solve all your doubts. After reading the guide, if you decide to go on with the activity, you should decide whether **you are printing the needed booklet chapters for the students, or preparing a class to teach them the needed background**. Whatever method you decide, make sure that students have the background before continuing. Once they read the booklet or attended the class, they are ready for the laboratory itself. **Print Student's Guides for them and make sure the needed material for the Science Case** (specified in the Teacher's Guide) is available. Now they are good to go.

Most of the Science Cases already have all the documentation and students may be able to complete them in 30-60 minutes if students have all the background knowledge beforehand. However, teachers are encouraged to test all the material they are to use. Feel free to contact us if you have any doubts or if you find any kind of error.

In some of the Science Cases, students will be asked to use the CESAR Observatories, which means they will have to follow all scientific method for the very beginning. They will program an observation and wait for the data to come. Remember to contact CESAR team in advance and check if the observatories are available.

For any further doubts, we remain at your disposal.

cesar.esa.int/index.php?Section=Contact

The CESAR team.