

## The Big Planck Knowledge Quiz

Christian Wolff

### Basic information

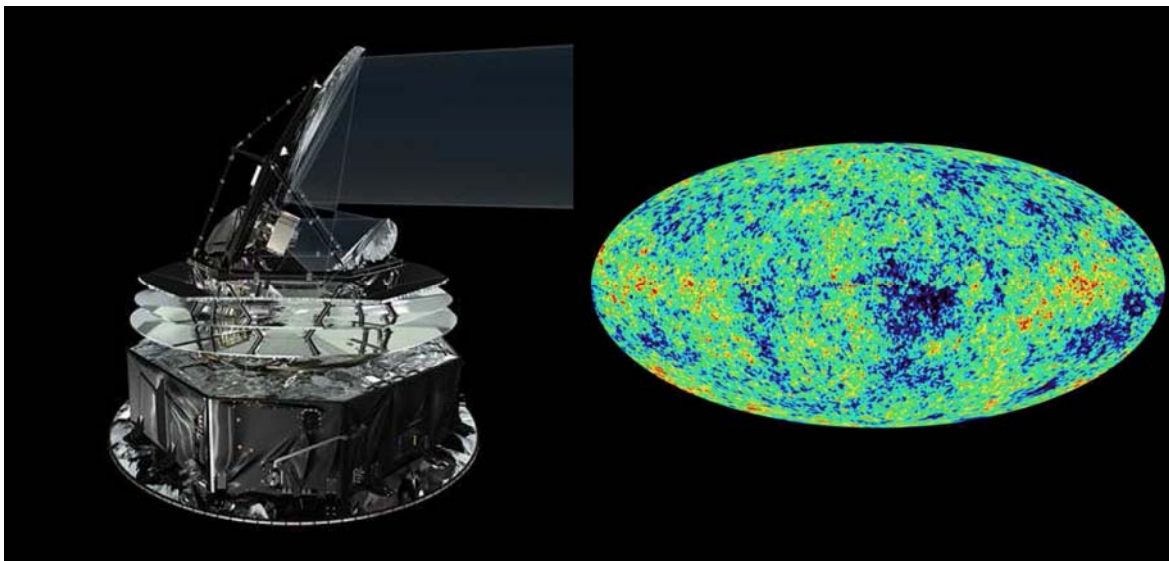
The European Space Organisation ESA is currently developing a very special satellite: The probe, called Planck, is due to depart for outer space on 31st July 2008 together with the Herschel infrared telescope on an Ariane 5.

Planck's goal is to map the cosmic microwave background radiation in the frequency range of 25 to 1000 GHz. With approx. 5 arc minutes, Planck's spatial resolution will be considerably more accurate than with comparable earlier projects such as COBE and WMAP. Its instruments can perceive differences in temperature of a few millionths of a degree and are expected to scan the entire sky in nine wavelengths. Additional primary objectives of this important mission are investigating the immediate consequences of the big bang and the basic preconditions for the development of the structure of the universe. Furthermore numerous new findings are expected with regard to the composition and quantity of dark material, i.e. matter which is apparently missing from the universe, and also the characteristics of the dark energy and the expansion of the universe.

(Source: ESA)

A knowledge quiz on ESA's upcoming Planck mission is presented below for junior and intermediate level with various playing options (e.g. in the form of a class quiz à la *Who wants to be a millionaire* or as a *board game*).

Overview of references		
Astronomy	Space travel	Space probes, space telescopes, cosmic background radiation
Related disciplines	Astronomer's English	Speed-reading techniques, increasing reading skills



**Fig. left:** The Planck telescope for exploring the cosmic background radiation (image source: ESA) -  
**Fig. right:** Map of the microwave background radiation of the entire sky (image source: NASA)

## General tips and preparation:

The general starting point for the various possible ways of playing the knowledge quiz is reading the leading article *'The key to the beginning of everything'* in *Astronomie Heute* [Astronomy Today] 1-2/2008. The speed-reading technique, which is primarily used in English lessons, is recommended as an additional approach. In the classroom, students first receive the hidden text. When the signal for the class to start is given, the text is turned over and, depending on the students' level of reading proficiency, the students are given several minutes to read the text and commit the most important facts to memory. When the time is up the text is covered again.

From this point onwards there are various possible ways of playing which are presented here in detail. However, first some tips on advance preparation:

### Creating the playing cards:

The playing cards are completely cut out from the entire sheet with the front (left) and reverse side (right), folded vertically down the middle and glued together. This makes the playing cards much firmer. The cards should only be cut out of the sheet individually after they have been glued.

The playing cards are numbered consecutively in accordance with the sequence in the text of the leading article for the *'Who wants to be a millionaire'* option (EN\_09aPLANCK\_WWM.pdf). For motivational reasons the questions have not been designed to become progressively more difficult.

An additional page with 'empty' playing cards allows for a further different format. Now let's return to the individual playing options.

### Playing options:

1.) The Big Planck Knowledge Quiz in the form of a class quiz à la **'Who wants to be a millionaire'**:

#### Lesson format:

Plenum - The whole class divided into two groups

#### Required materials:

Overhead projector, transparencies *'EN\_09aPLANCK\_WWM.pdf'*, playing cards

#### Preparation:

The document *'EN\_09aPLANCK\_WWM.pdf'* is printed onto a transparency. The arrows to show the score and the crosses to show the jokers that have been used are cut out individually. They are used to show the current score.

## Wissenschaft in die Schulen!



### Instructions:

In order to be able to use all of the jokers, it is recommended that one official candidate per group be nominated who answers on behalf of the entire group. With this option both 'telephone jokers' and 'audience jokers' can be used.

In a second option the entire group can take part in guessing. Here the two above-mentioned jokers are unfortunately no longer able to be used as an aid.

The two groups and their individual candidates now take turns competing. The teacher reads out the questions. You should ensure that the groups or the individual candidates are asked the questions in the sequence in which they are numbered (01-15). If a question is answered correctly the scoring arrow is moved one position upwards on the transparency. The group that is first to answer a question wrongly loses. Because of this rule, frequent use of the joker should be suggested when the need arises. Of course other more accommodating rules are also possible here.

### Key:

	<i>Telephone joker:</i> A fellow student in the group is allowed to be asked.
	<i>Audience joker:</i> The entire group is allowed to be asked for advice.
<b>50:50</b>	<i>50:50 joker:</i> One wrong answer is dropped.

## 2.) The Big Planck Knowledge Quiz in the form of a **board game:**

### Lesson format:

Pairwork - 2 students


### Required materials:

Board, playing cards, 2 tokens (or alternately 1 or 2 cent pieces), 1 die

### Instructions:

The player to first throw a '6' may begin. The number on the second throw of the die then determines the number of fields to be covered. If the player reaches a question field, his/her partner draws a playing card and asks him/her the associated question. If the question is answered properly, the player may move ahead one field. However, if the answer is wrong he/she must move two fields backwards. If one of the players lands on a playing field that is already occupied, the player who was occupying the field must move his/her token back to the 'start' position. The player who is first to move into the home field at Lagrange point 2 with the appropriate number on the dice finally wins.

### Key:

S	Start
	Question field - Please draw a card!
H	Home

Instructions:

Split into two groups, the students compete against each other (e.g. 'group A'/'door group' or 'group B'/'window group'). This takes place in turns. One student draws a question card and asks his/her group the question. If the answer is correct, the group receives one point. However, if the answer is wrong the other group has the opportunity to answer. If both groups cannot answer the question, this is set aside and saved for a bonus round. In the bonus round the questions that were unanswered are read out again. The students are then given one more brief opportunity to look at the text. The first student able to answer the question may call out his/her answer to the plenum and as a result wins two points for his/her group. The game finishes at the latest after all 30 questions have been used. An award ceremony follows.

A still less complicated option is as follows:

If there should be no time remaining for extensive preparation, you can completely dispense with cutting out the playing cards. The questions can also be asked of each of the two groups in turn using this 'very quick option'. The 'very quick option' also uses a handwritten table on the board with e.g. 'group A' and 'group B' for scoring.

Group A	Group B