

AESTIT MODULE STRUCTURE
From the Earth to the Stars
Ponta Delgada, July, 2007

Teacher's Guide

1. Introduction to the module
2. Required Prior Knowledge
3. Background Theory
4. Aims of the module
 - Scientific Concepts
 - Methodological / Procedural Skills
 - Thinking Skills
 - Epistemological understandings
5. Pedagogical approach and context
6. Relevant ICT tools
7. Common student difficulties (with references to the literature)
8. Other useful information – list of articles, links to web sites etc.
9. References

Student Activities

<i>Activity 1. Title "From the Earth to the Stars"</i>
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Applied ICT Technology:

Student level: Science teachers (basic and high school level)

Recommended settings: Teacher led discussion and some student activity needed to build apparatus

Learning Objectives:

To correlate the interactions between the Earth, the Moon and the Sun with the seasons of the year, tides, eclipses (solar and lunar) and moon phases.

To measure angular distances at the sky using simple apparatus.

To understand how to measure astronomical distances using the parallax method.

To understand the limitations of parallax method;

To understand that stars are formed by the same chemistry elements found in earth;

To correlate the colour of stars with temperature;

To understand how the stellar radiation can be used to determine the properties of stars

To analyse the Hertzsprung-Russell diagrams

To understand the steps involved in the formation of stars

To understand the stellar evolution

Operational skills:

Materials:

Teacher led discussion helped by slide projection

Materials to build a simple quadrant: scissors, board paper, straw, sticky-tape, string, little stone, transferor, pencil.

Activity method

To build a quadrant

To construct a system to help to find the local meridian

Important Questions

Why there are seasons of the year?

What is the cause of having higher atmospheric temperatures during summer?

Why southern hemisphere seasons are in opposition with northern hemisphere ones?

Why the day begins before the sunrise? Why the day maintains after the sunset?

Is the duration of the seasons constant? Why?

Why there are phases of the moon?

Is there a “dark side of the moon”? What is the “dark side of the moon”?

What is an eclipse?

What are the necessary conditions to have solar and lunar eclipses?

What is the mechanism that explains the existence of tides?

How can the man measure astronomical distances?

How do we know the distances to stars?

Why are some stars red and others blue?

How can astronomers measure the temperatures of the Sun and stars?

What are the stars made of?

What steps are involved in forming a star like the Sun?

How will our Sun change over the next few billion years?

Why are red giants larger than main-sequence stars?

What kinds of nuclear reactions occur within a star like the Sun as it ages?

What is a white dwarf star?

What happens within a high-mass star to turn it into a supernova?

Analysing activities

Hints and Tips

<i>Activity 2. Title</i>

etc

Evaluation tasks for whole activity sequence or individual activities