TEACHING TRAINING COURSE ON ASTRO-CULTURE

- **Lectures Topics**
  - 3 – History of Astronomy
- **Workshops Topics**
  - 1 – Local Horizon and Sundials.
  - 2 – Stellar, solar and lunar demonstrators
- **Working Groups**
  - 1 – Preparing Observations
  - 2 - Astronomy in the city

WS1: Local Horizon and Sundials

Summary
The study of the horizon is crucial to facilitate the students' first observations in an educational center. A simple model that has to be made in each center allows us to make the study and the comprehension of the first astronomical rudiments easier. The model is also presented as a simple model of an equatorial clock and from it; we can make other models (horizontal and vertical).

Goals
- Understand the diurnal and annual movement of the Sun.
- Understand the celestial vault movement.
- Understand the construction of an elemental Sundial.

List of Materials.

Activity 1:
- 4-sphere model
- 1 Bulb,
- 1 Support for the light bulb,
- 2 meters of electric cable and a plug
- 4 balls of porexpan or icopor of 8 cm
- 4 sticks with 4 supports (2 of equal height, 1 lower, 1 higher as explained in the WS1 text)
- 1 circular mat that is used as a base for cakes or pies
- 1 a card with a cut angle of 23º

Activity 2: Model of the parallel Earth
- 1 terrestrial sphere that can be removed from your support. About 30 cm in diameter
- 1 bowl that serves to put the terrestrial sphere on it
- 1 compass
- 1 rope of 2 meters in length
- 1 box of chopsticks
- 1 package of play dough for children

Activity 3: Horizon model.
- a photo strip of the local horizon (taken as explained in the workshop)
- 1 Photo of stellar traces of the cardinal point east or west
- 1 Photo of sunrise at 2 or 3 minutes intervals (approx) made on the day of the equinox
- 3 photos of the sunrise (or sunset) on the first day of the solstices and an equinox
- 1 photo of the Orion belt area with about 15 or 20 minutes of exposure time
- 1 Wood sheet (cardboard or cork does not work because it is soft) of 40x 40
- 2 meters galvanized wire, cut into three sections, (simulation of the apparent path of the sun at solstices and equinoxes and to simulate the rotation axis of the Earth)
- 1 Flashlight (with the light jet inside a cardboard tube so that it focuses well on the jet)

- 1 compass

Activity 4: Equatorial Sundial
- 1 compass
- 1 wooden rod for the gnomon of the solar clock.
- Scissors and tail (for setting the sundial)

Activity 5: Reading Time
- Without equipment

WS2: Stellar, solar, and lunar demonstrators

Summary
This worksheet presents a simple method to explain how the apparent motions of stars, the Sun, and the Moon are observed from different places on Earth. The procedure consists of building a simple model that allows us to demonstrate how these movements are observed from different latitudes.

Goals
- Understand the apparent motions of stars as seen from different latitudes.
- Understand the apparent motions of the Sun as seen from different latitudes.
- Understand the Moon's movement and shapes as seen from different latitudes.

List of Materials

Activity 1: Stellar Simulator
- Extended photocopied material for the instructor, so it looks better.
- Scissors.
- Cutter, carving or scalpel
- Glue to paste.

Activity 2: Solar simulator
- Extended photocopied material for the instructor, so it looks better.
- Scissors.
- Cutter, carving or scalpel
- Glue to paste.
- 1 clip (to secure the Sun). You have to draw a sun and stick it on one end of the clip

Activity 3: Parallel Earth Simulator
- Extended photocopied material.
- Scissors.
- Cutter, carving or scalpel
- Glue to paste.
- 1 ping pong ball
- 1 piece of elastic band.
- 1 mobile flashlight.

Activity 4: Lunar Simulator

- Extended photocopied material for the instructor, so it looks better.
- Scissors.
- Cutter, carving or scalpel
- Rubber to paste.
- 1 clip (to secure the Moon). You have to draw a half moon and stick it on one end of the clip with the diameter of the half-moon perpendicular to the clip

WG1: Preparing for Observing

Summary

A star party can be a way to learn and have fun, especially if you do it with a friend or with a group of friends. You have to prepare for it, especially if you plan to use some instruments. But don't neglect the simple joy of watching the sky with the unaided eye or binoculars.
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Goals

- Explain how to choose the correct place, time, and date, what equipment you will take and how to plan the event.
- Recognize the Light Pollution problem.
- Learn to use the program Stellarium.

List of materials

Activity 1: Umbrellas of the Celestial Vault

- ✓ 1 black umbrella.
- ✓ 1 Liquid corrector used in order to correct written text on a piece of white paper
- ✓ 1 beamer for projection the North Hemisphere (or the Sothern Hemisphere) on the umbrella and paint the constellations with the corrector.

Activity 2: Light Pollution

- ✓ 1 shoe cardboard box or similar.
- ✓ 1 punch or compass point.
- ✓ 2 ping-pong balls with a hole in one of its poles to introduce a flashlight
- ✓ 2 flashlight which can be introduced in the hole of each ball.

General: 1 netbook for Internet access (recognition of heavens-above) and demonstration of the use of the Stellarium.

WG2: Astronomy in the city

Summary

The potential of archaeoastronomy in the teaching of astronomy is that it can inspire the hearts and consciousness of young apprentices to see their own culture reflected in the way of understanding the cosmos of their ancestors. In this sense, archaeoastronomy can provide a direct connection to their immediate environment as opposed to the apparent remoteness of the sky and the universe in general. If this is true, it would be interesting to conduct research on the pedagogical effects of either archaeoastronomy or ethnoastronomy or even a combination of both.

These approaches open up opportunities for students to stimulate dialogue with elders to learn traditional knowledge of the sky, particularly if they are located near or in agricultural or hunter-gatherer societies. In modern urban societies knowledge is transmitted more formally through schools and the media.

On the other hand, it is almost certain that in the immediate environment of the young astronomy apprentice, wherever he or she is located, there will be a series of buildings that could have a marked symbolic character and which already have a religious or secular function. Those buildings, or urban spatial planning, are potential objects of archaeoastronomical experimentation. Therefore, cultural astronomy can become an effective and valuable approach that can bring astronomy to the general public, and especially to young people.

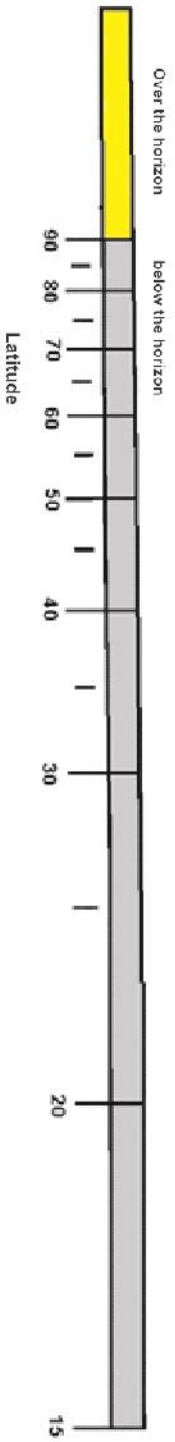
Goals

We quote some examples:

- Churches in a Christian environment.
- Mosques in a Muslim environment.
- Temples in a Hindu environment, Buddhist or Shinto (pagodas or gopurams included)
- Urban plans, especially those with a clear organized orthogonal frame (very common around the world).
- Sanctuaries of indigenous societies (Polynesia or America)
- Other places of worship in tribal societies.
- Ancient monuments if there were any.

List of materials

It is only necessary to have the planisphere made in working group 1 and the two demonstrators completed in workshop 2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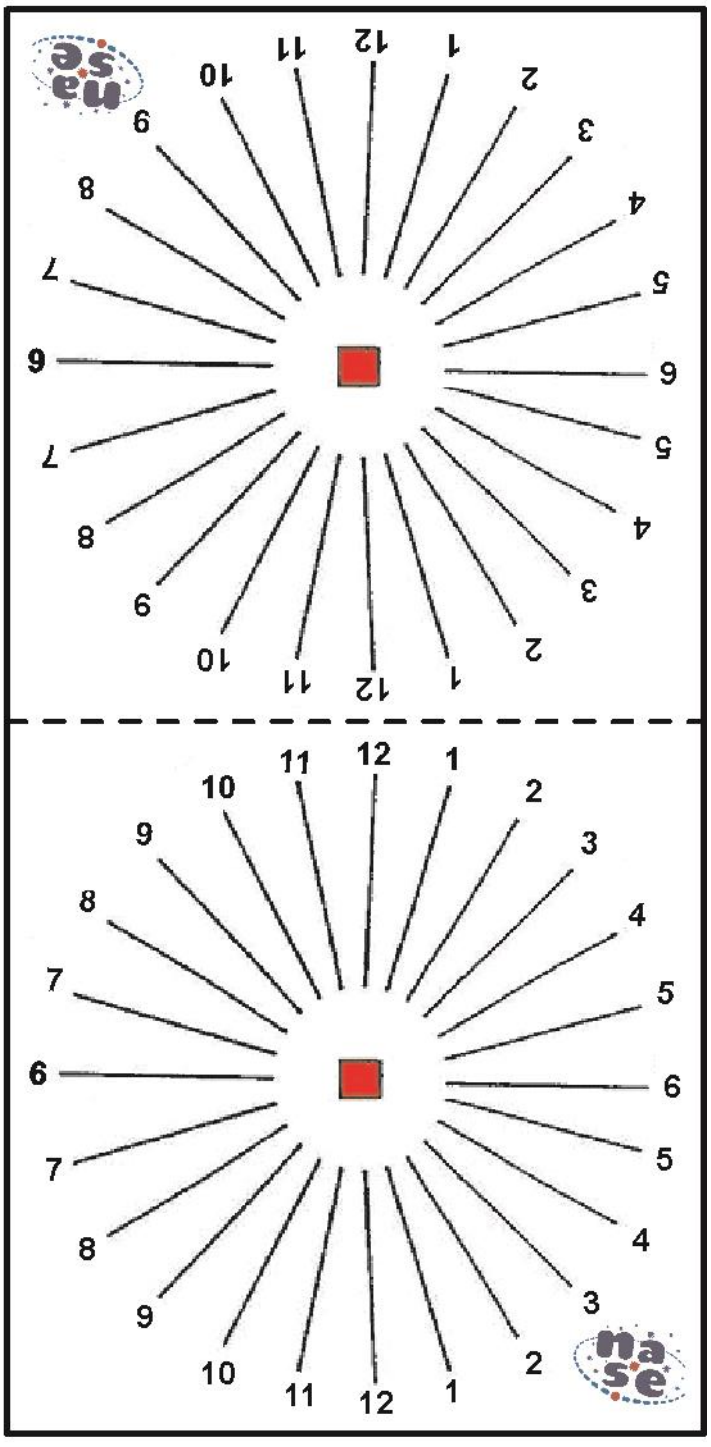
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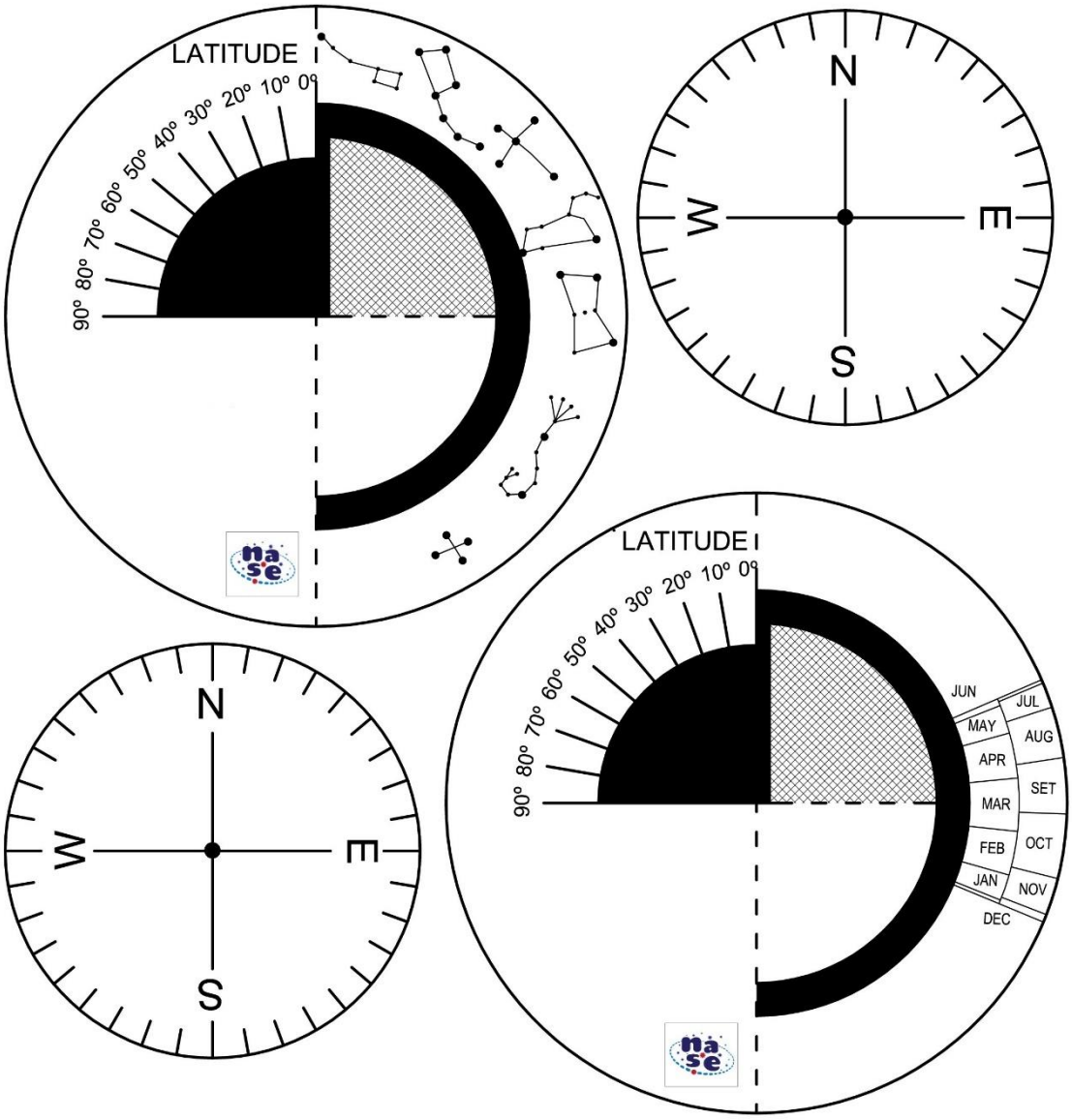

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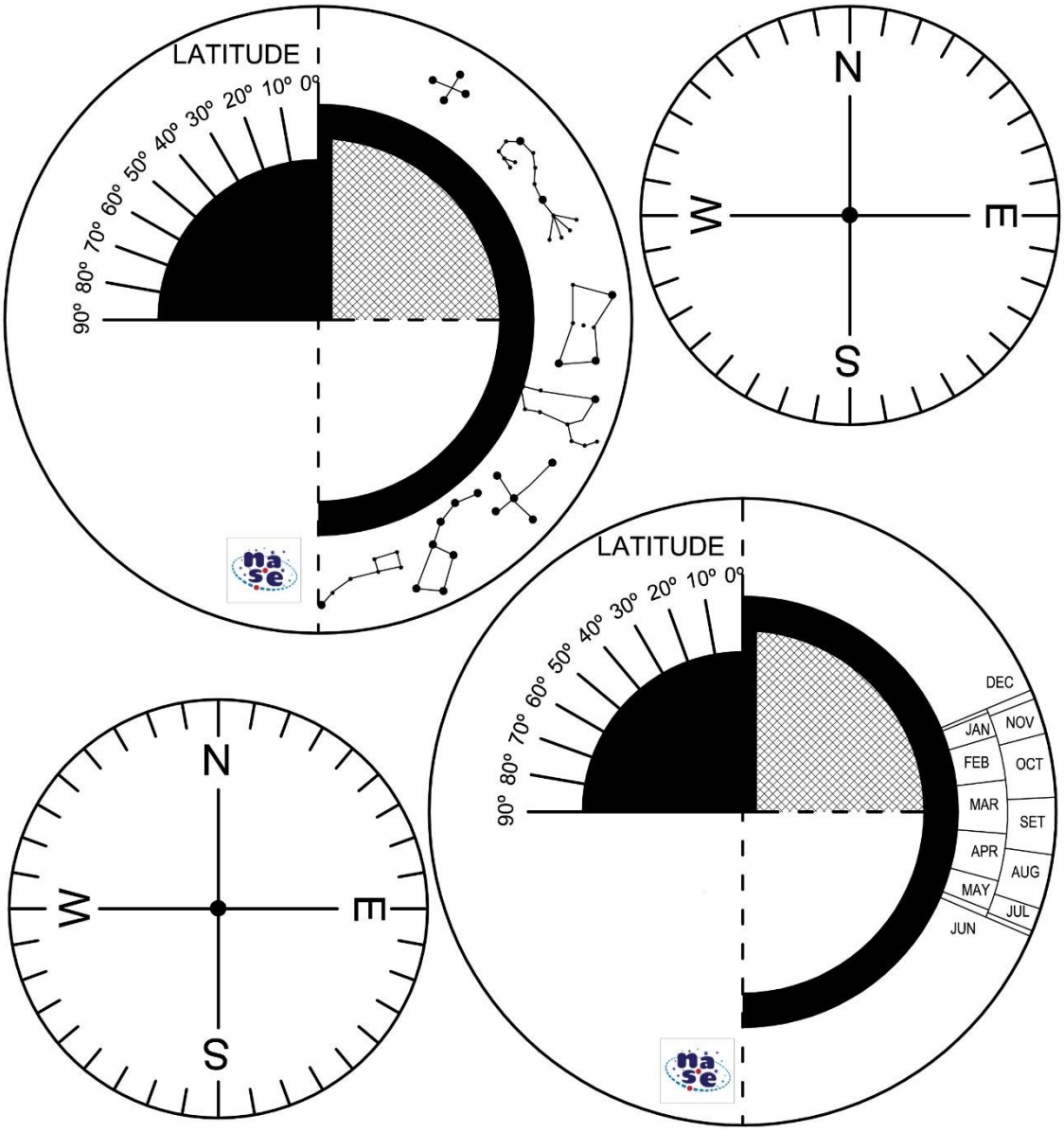
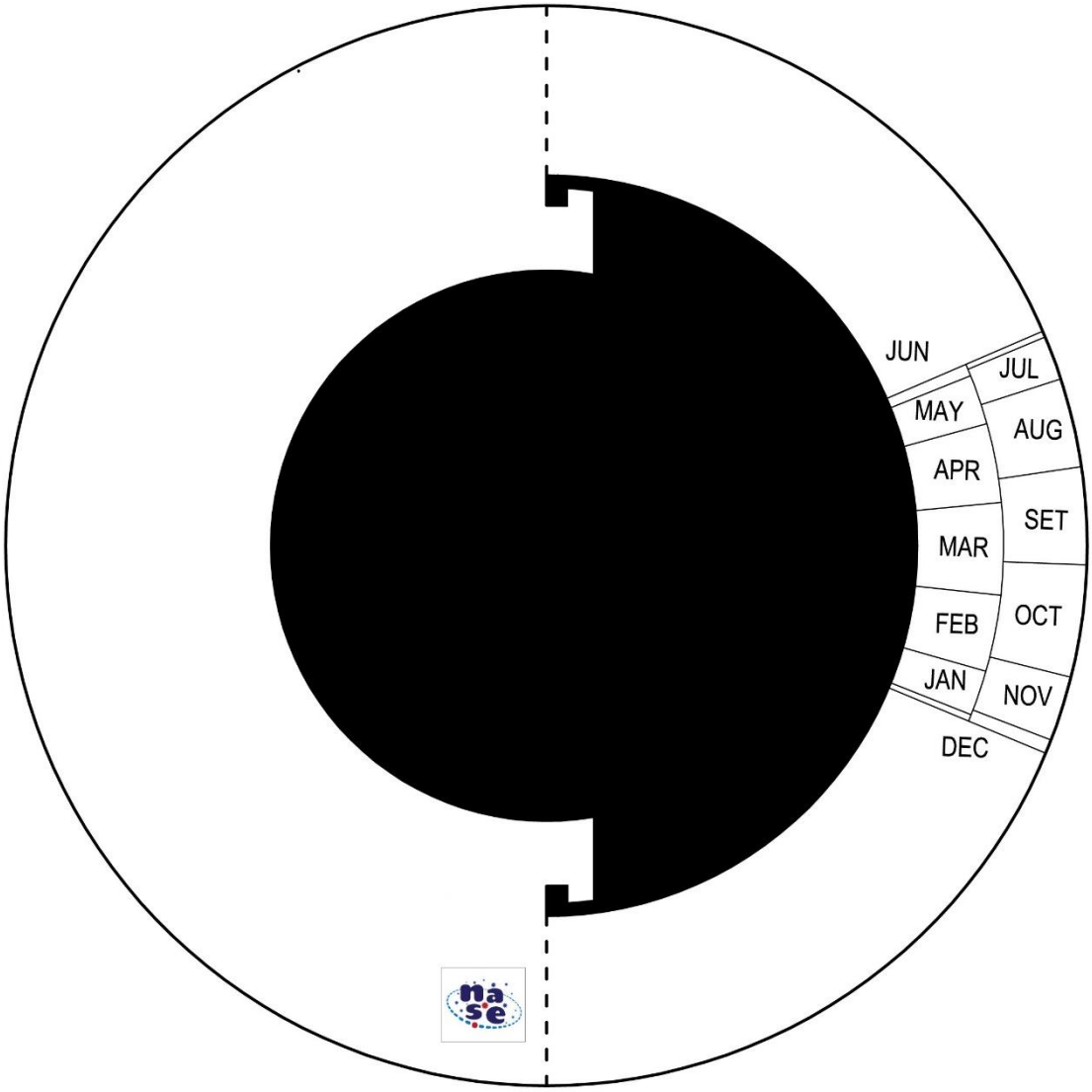
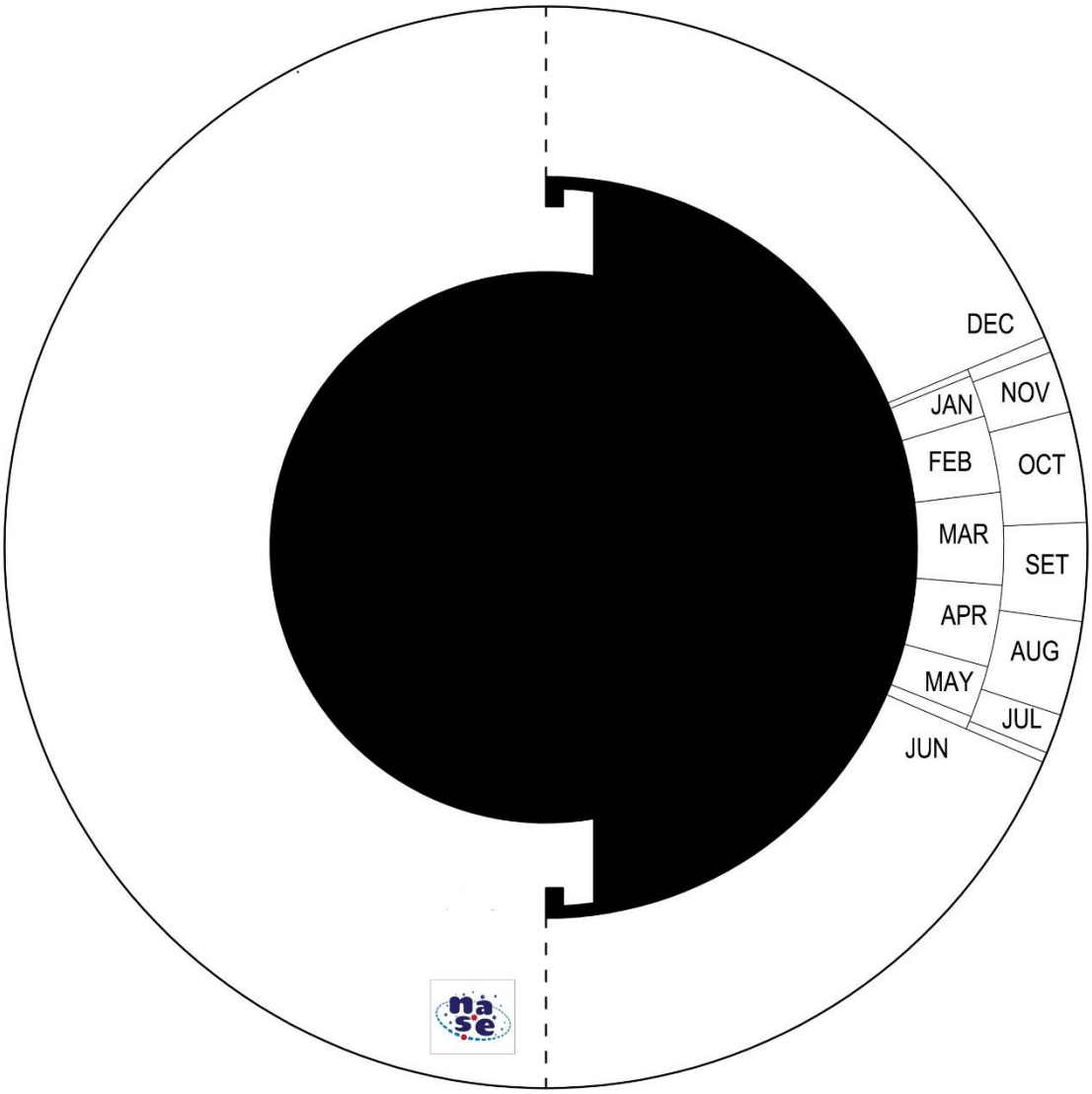


WORKSHOP 2





WORKSHOP 2