NASE Video Clips Online

100 Astronomy, Astrophysics and Astrobiology Activities

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BOXES ONLINE

Network for Astronomy School Education
- International Astronomical Union -

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Editorial: Albedo Fulldome S.L. Barcelona, SPAIN, 2021.

ISBN: 978-84-15771-86-9

SUMARY

Workshop 1
LOCAL HORIZON AND SUNLOCKS

The complete content of the Workshop is in the book 14 Steps to the Universe, available on the NASE website. In explaining the concepts, several simple models are proposed. This article presents the short videos (1 to 3 minutes) in which the models are shown, which can be used for teaching Astronomy in other areas. They are made without audio, so that whoever presents it in the online course can make the explanations they see fit in the language in which the course is taught, more than twelve currently.

Workshop Nº 1 of the NASE course for teachers deals with the local horizon and sundials.

The first model of the Workshop is seen in this video. It uses a bulb like Sun and four small Earths, properly placed on an inclined plane. It serves to explain the movement of the Earth around the Sun, the inclination of the ecliptic, the seasons, etc.

The second model is that of the Parallel Earth. Here's how to do it on the terrace of your house. This other video shows a larger Parallel

Fig. 1. Model of the Earth's motion around the Sun.

Fig. 2 Parallel earth on the terrace.

Fig. 3. Parallel earth fixed outside.

Fig. 4 How the parallel Earth works in the Northern Hemisphere.

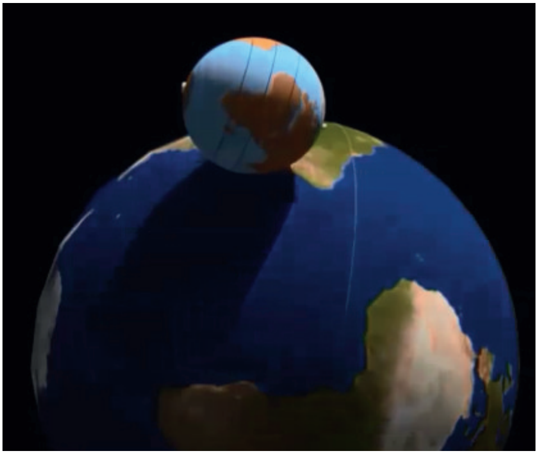


Fig. 5. How the parallel Earth works in the Southern Hemisphere.

Earth, installed in a fixed place in the open air. This third video shows how the Parallel Earth works in the Northern Hemisphere, and in the other video, how it works in the Southern Hemisphere.

The third model, which is explained in this video, reproduces the movement of the Sun in

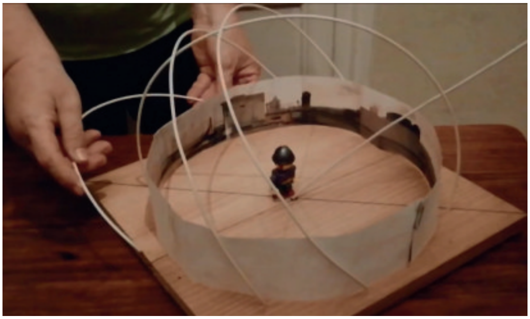


Fig. 6. Model of the movement of the Sun in the celestial dome.

the celestial vault, as seen by an observer on the ground. Photographs of the horizon are used, and the main lines are realized with wires: the Earth's axis of rotation, the celestial equator, the parallels, the cardinal points, etc. The celestial sphere can be seen from the inside (the real celestial sphere) and from the outside (the model). It can be seen that the sunrise and sunset points are moving every day, etc. This other video shows how to measure, with a

Fig. 7. How to measure the elevation of the Pole Star.

Fig. 8. How an equatorial sundial works.

simple quadrant, the elevation of the pole, in order to correctly position the axis of the world in the model.

A practical consequence of all that has been said are the sundials. In this video the equatorial clock is explained, and in the other video, the horizontal and vertical oriented, and a portable one.

We hope that these videos will help you and give you ideas for teaching Astronomy.

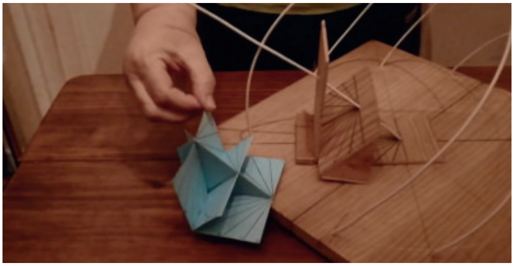
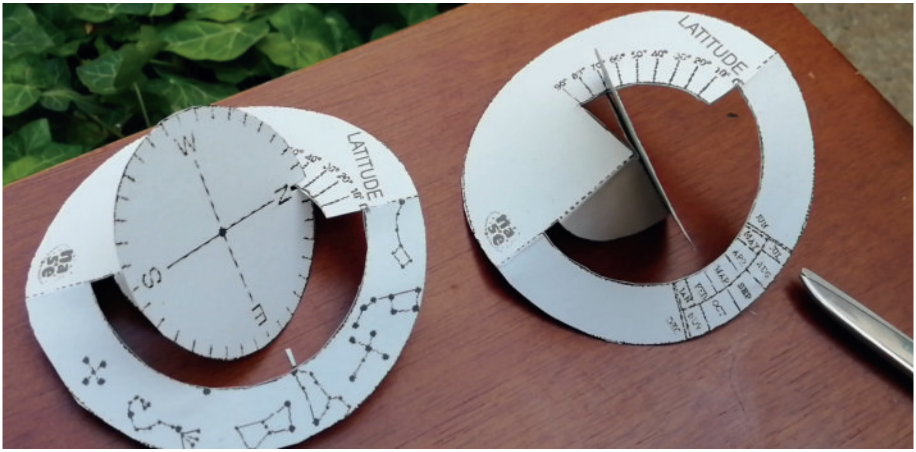


Fig. 9. Three sundials: vertical, equatorial and horizontal.

References

NASE website: http://sac.csic.es/astrosecundaria/en/Presentacion.php
NASE YouTube channel: https://www.youtube.com/channel/UClhE_31rV-895n_fm069PgA/

Workshop 2
SIMULATIONS OF THE STELLAR AND SOLAR MOVEMENT



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Workshop № 2 of the NASE course for teachers deals with the movement of the Sun and the stars as seen from different places on Earth, working with two simple-to-manufacture and very effective teaching simulators.

The first video shows how to make the star motion simulator. With it, you can explain the concept of circumpolar stars, with invisible rising and setting, the movement of the stars in the sky, the inclination of the traces of the stars in photographs, etc. And all this, varying the latitude of the place of observation.

The solar simulator in this video is similar, and it helps us to reproduce the diurnal

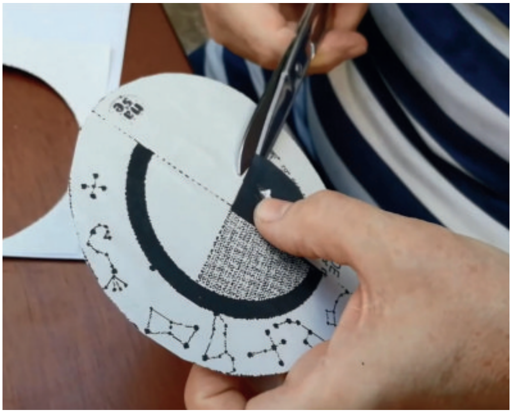

Fig. 1. Simulator of the movement of the stars. The dark part is cut out.

Fig. 2. Part of the central zone is bent.

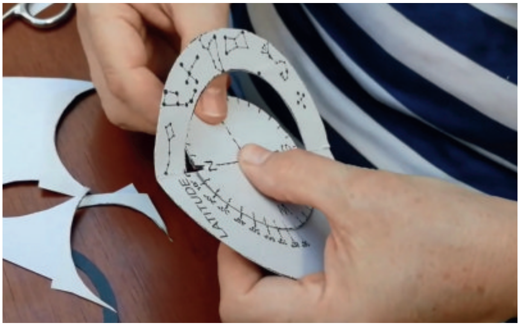

Fig. 3. The part that makes the floor is glued.

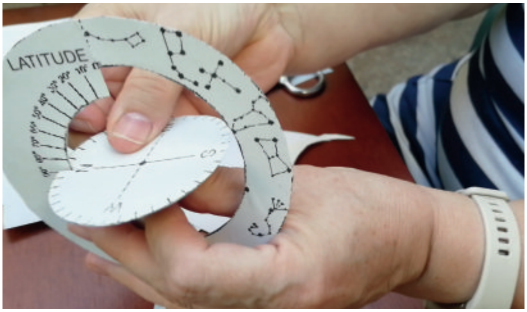

Fig. 4. The part that makes the floor is glued.

movement of the Sun, at different times of the year. It is seen how the trajectory in winter is very low, in summer the Sun rises very high, whether or not it reaches the zenith depends to the latitude of the place of observation, etc. It can be shown that on the first day of spring and autumn the Sun moves on the celestial horizon, on the days that begin summer and winter, the

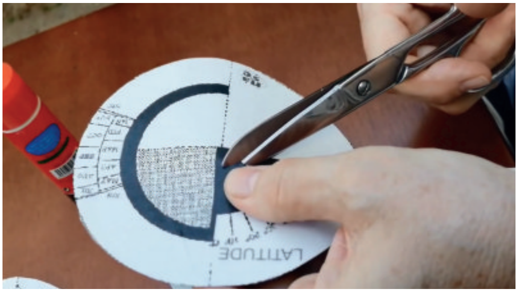

Fig. 5. The solar motion simulator is similar, but the Sun can move only in one area.

Sun has a declination of 23.5 degrees, positive or negative, the daily displacement of the place of sunset and sunrise, etc. And since the latitude can be varied, you can see the movement of the Sun in particular places, like at the pole, the equator, explain what the midnight Sun is, etc.

In this short video the passage of the Sun through the zenith is simulated, only in the areas close to the Earth's equator, where the astronomical seasons are not noticeable (they have periods of dry and wet weather that do not have their origin in astronomical aspects).

Finally, in this video we can explain the different position of the Moon that we see in the equatorial zone and in the two hemispheres: in the north we say that the Moon is a liar by appearing as a D when it is Crescent. In the southern hemisphere it is the other way around: we say that the Moon is sincere, appearing as a C when it is Crescent.

We hope that these videos will help you and give you ideas for teaching Astronomy.

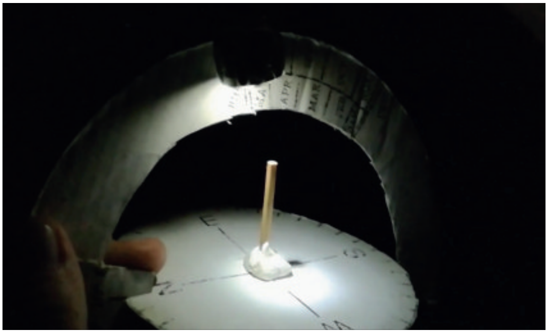

Fig. 6. Simulation of the Sun's passage through the zenith.

Fig. 7 Why do we see the Moon as a C or a D?

References

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Workshop 3
PHASES AND ECLIPSES

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Workshop Nº 3 of the NASE course for teachers deals with the Earth-Moon-Sun system, that is, about the lunar phases and the lunar and sun eclipses.

The first model works with the movement of the Moon around the Earth, and around itself, how these two movements are coupled, which means that we always see the same face of the Moon. It is shown in this video.

A second model uses a slide or overhead projector (or a flashlight) for the Sun, and four people with paper masks for the Moon in the

Fig. 1. We always see the same face of the Moon.

different phases. You can simulate the eclipses of the Sun and the Moon, and see in a reasoned way when they occur and from where they are seen on Earth. There is a video for the Northern Hemisphere and another video for the Southern Hemisphere.

Fig. 2 Model of the lunar phases, with the Earth in the centre.

Fig. 3. The lunar eclipse occurs only in the full moon phase and is seen from all over the Earth wherever it is at night.

The following model is of the Earth and the Moon, with sizes and distances to scale. It serves to become aware of how far apart they are. Used outdoors on a sunny day, the phases of the Moon are very good, as shown in this video. The eclipses of the Moon (video) and of the Sun (video) can also be reproduced very well and experience the alignment to be so precise for them to occur. This model works very well for outdoor use, but for online courses, a smaller model is used, scaled about 1/5 of the initial one, which is shown in this video.

Fig. 4. Eclipse model: the alignment must be very precise.

Fig. 5. Simulating an eclipse of the Sun on Earth.

Fig. 6. Mini-size eclipse model.

Another larger model of solar eclipse, with a Sun of diameter 220 cm that is seen in this video, has more effect in the distances.

For young students, a solar eclipse can be simulated in a simple way by pasting photos in

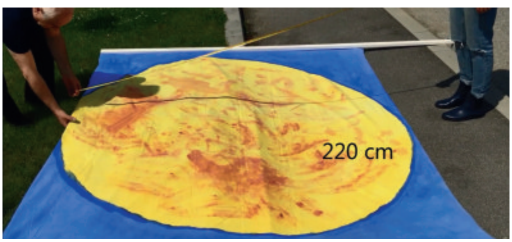

Fig. 7. Solar eclipse model with the Sun of 220 cm diameter.

Fig. 8. The Sun must be taken to a distance of 235 m to cover it with our Earth, which is held just 60 cm away.

a notebook, and running the pages, as seen in this video. What we could call a "finger cinema" is manufactured.

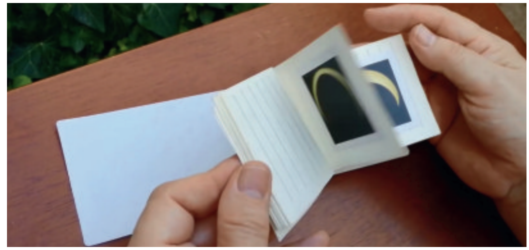

Fig. 9 Eclipse of the sun in the finger cinema.

Finally, a model is proposed in this video that uses a camera obscura. It is made with a cardboard tube (or with a cardboard roll), a perforated aluminium foil and a semi-transparent piece of paper or plastic. With it you can measure the diameter of the image of the Sun and do some simple calculations.

We hope that these videos will help you and give you ideas for teaching Astronomy.

Fig. 10. Observing the Sun in a dark chamber.

References

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Workshop 4
YOUNG ASTRONOMER'S BRIEFCASE

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Workshop № 4 of the NASE course for teachers is entitled "Young Astronomer's Briefcase" because it tries to reproduce some tools that have been used in Astronomy, which have many educational applications.

The first tool, seen in this video, is a ruler that, placed at the appropriate distance from our eyes, allows us to measure angles. I mean, it's a kind of crossbow.

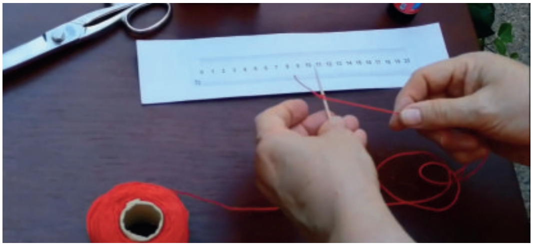

Fig. 1. Ruler to measure angles.

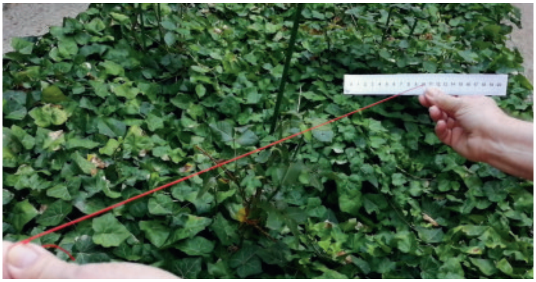

Fig. 2. Placed at a suitable distance, it measures angles.

The following is shown in this video. It is a quadrant for measuring vertical angles, for example the elevation of the Pole Star. The dial is called “pistol” because of its shape.

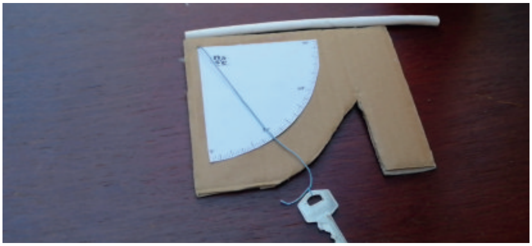

Fig. 3. Gun dial, to measure vertical angles.

The third object in the briefcase is a goniometer, which is used to measure angles in the horizontal plane, and is seen in this video.

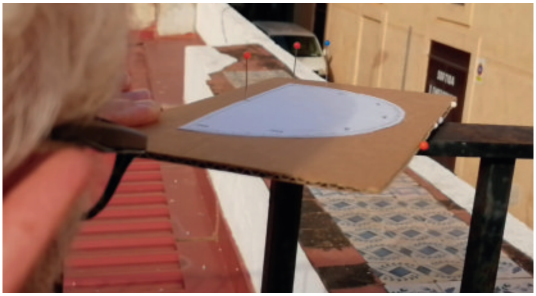

Fig. 4. Goniometer used for horizontal angles.

A practical instrument for observing the sky is the planisphere. In the book there are different templates to build it, depending on the latitude of the place. This video shows how it is made and how it is used.

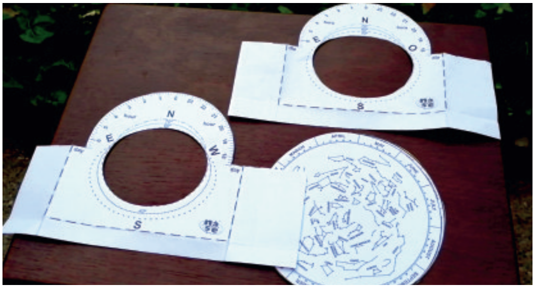

Fig. 5. Planispheres. They depend on the latitude.

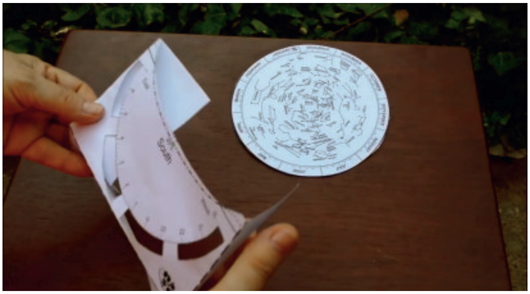

Fig. 6. Another planisphere model.

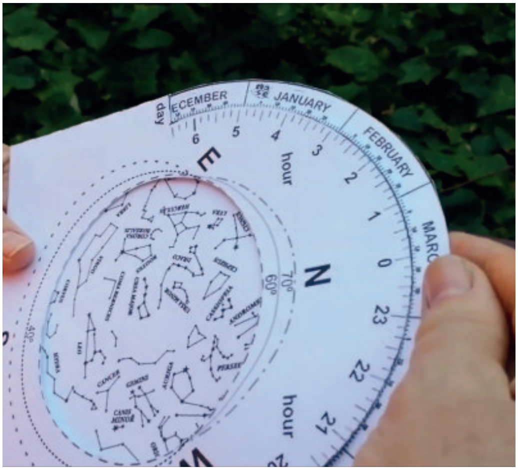

Fig. 7. How to use the planisphere.

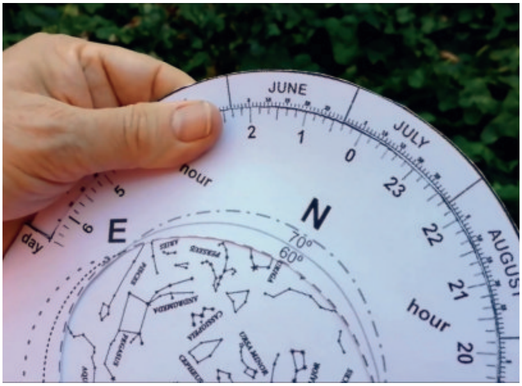

Fig. 8. The time is matched with the observation date.

In the briefcase you should not miss a map of the Moon, like the one shown in this video, which helps us to recognise the details of its surface. Also there are some accessories such as a red flashlight, a compass and a star map, which are seen in this video.

Fig. 9. Other materials: compass, red flashlight, notebook, etc.

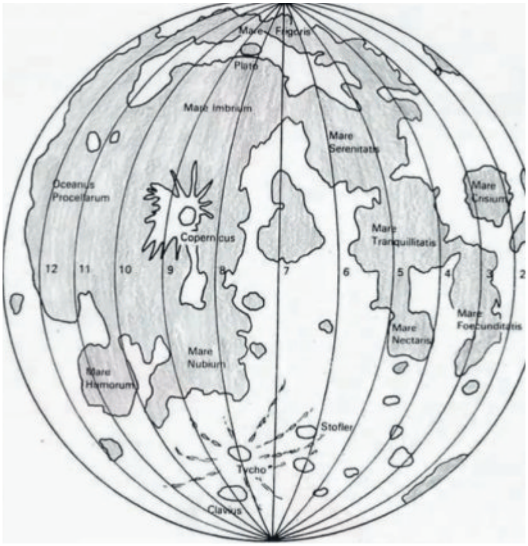

Fig. 10. A map of the Moon should not be missing.

Fig. 11. Matchbox spectroscope. With a piece of CD.

Fig. 12. Through the slit, the spectrum of light can be seen.

Another interesting object is a simple spectroscope made from a matchbox and a piece of CD, seen in this video. It is not going to be of much use for observations, but the concept of decomposition of the light that comes to us from the stars is fundamental in astronomy. In another workshop, another spectroscope is manufactured with which to make measurements.

It is at the discretion and initiative of the student to keep all these gadgets in a box or briefcase.

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References

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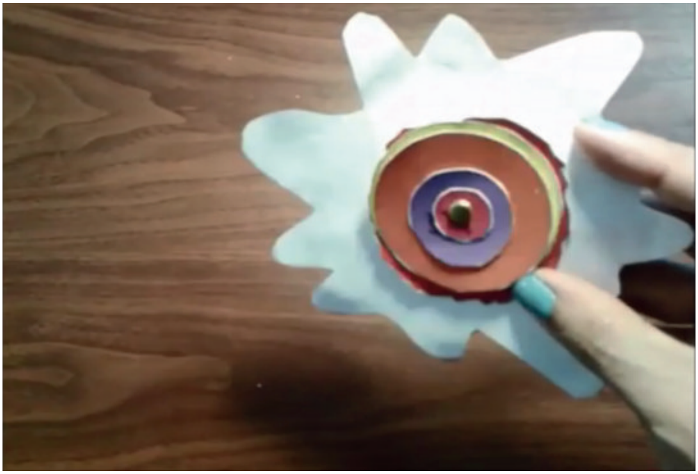
Workshop 5
THE SPECTRUM OF THE SUN AND SUNSPOTS



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Workshop nª 5 deals with the Sun: its structure, sunspots, how it generates the light and energy that it transmits to us, and continues by studying various issues of the solar spectrum, from its wavelengths to the modifications it undergoes when it enters our atmosphere, such as polarization and scattering.

In Activity 1 we talk about the polarization of part of the light that comes to us from the Sun. In a first video it is explained what polarizing filters are and how they can be found in some sunglasses or 3D cinema glasses. In a second video those polarizing filters are used with the light reflected off the windows, pictures, floors and dashboards of

Fig. 1. Model of polarizing filters.

Fig. 2. Polarized light in the sky.

Fig. 3. Polarized light in reflections.

Fig. 4. Polarized light in the reflections inside the car.

Fig. 5. Polarized light from a computer screen, with several layers of adhesive tape.

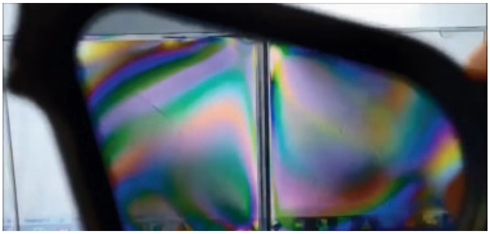


Fig. 6. Polarized light passing through plastic, reveals internal tensions and weak points.

Fig. 7. Some sunglasses are polarized.

Fig. 8. Model with the layers of the interior of the Sun.

the car. There is a third video and a fourth video and even a fifth video that uses polarized light from laptop screens with plastics and adhesive paper.

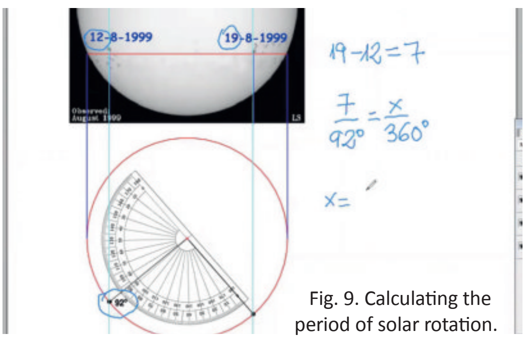
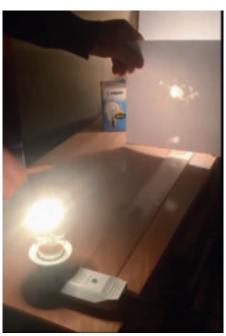


Fig. 9. Calculating the period of solar rotation.



Activity 2 consists of a toddler model of the parts of the Sun, seen in this video.

Activity 3 describes how to track sunspots, and how to calculate the

Fig. 10. Oil spot photometer.

Fig. 11. Comparing a light bulb with the Sun.

period of solar rotation with them. It is done in this video.

Fig. 12. Calculating the power of the Sun with the cheek.

Activity 4 deals with determining the power of the Sun, using an oil spot photometer. In a first video you learn how to use it, comparing the lighting that reaches the spot from two bulbs of different wattage, to check the square law of distance. Then the

Fig. 13. Difference between transparency and opacity.

illumination of a light bulb is compared with that coming from the Sun.

It can also be done with the cheek of the face, as seen in this other video.

The course talks about the opacity of the interior of the Sun, and the transparency of its photosphere, and the video of Activity 5 shows, with the flame of a candle, the difference between transparency and opacity.

Finally, Activity 6 shows the greater ease of scattering of blue photons, which makes the daytime sky blue, and red sunsets. In this video it is shown with a mobile flashlight, a glass of water and a few drops of milk.

We hope that these videos will help you and give you ideas for teaching Astronomy.

Fig. 14. Blue photons in white light from a mobile phone are easily scattered.

Fig. 15. The light coming from the sides is bluish. That is why the daytime sky is blue.

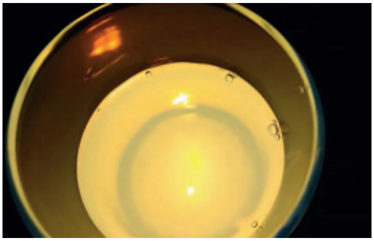


Fig. 16. In the absence of blue photons, white light turns yellowish, as in sunsets.

References

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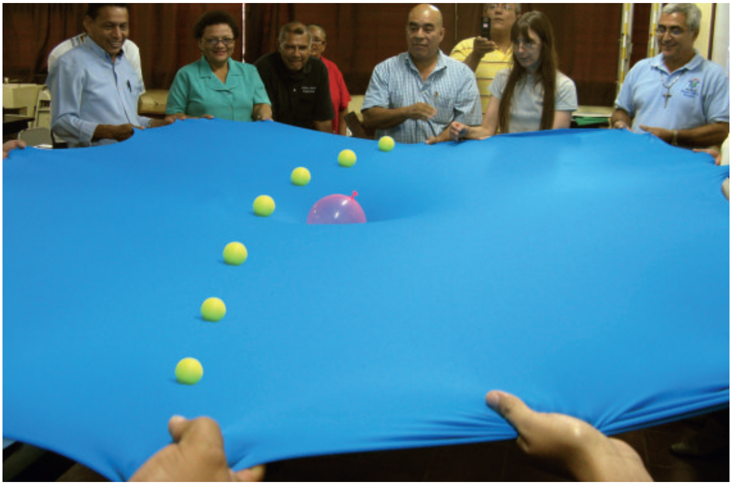
Workshop 6
LIFE OF THE STARS



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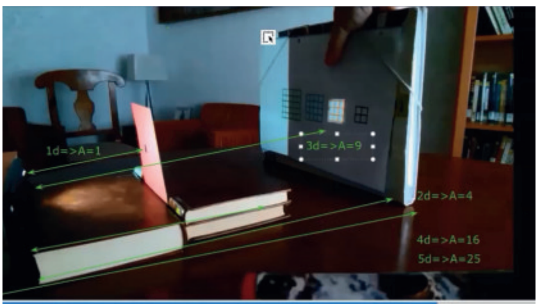
Workshop Nº 6 of the NASE course for teachers deals with the life and evolution of stars: what types are there, how they are born, evolve and die, what characteristics do they have, etc.

The first model, seen in this video, is about parallax, with our hand extended and alternately closing one of our two eyes.

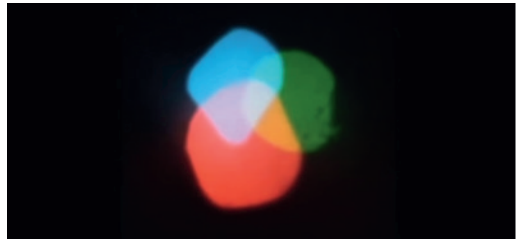
Modelo de paralaje.



La intensidad de la luz disminuye con el cuadrado de la distancia.

In the second model (in this video) we can see how the intensity of the light decreases with the square of the distance.

Preparando el modelo de los colores de las estrellas.



Colores de las estrellas, con tres linternas y filtros.

The third model is seen in this video, in which the colours of the stars are reproduced with three flashlights. Among other things, you can see the reason why there are no green stars.

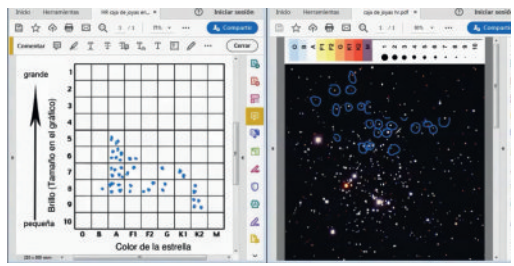
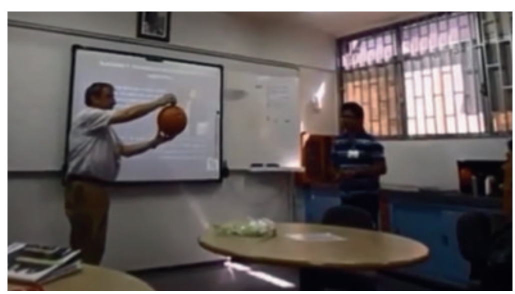


Diagrama HR del cúmulo abierto El Joyero.

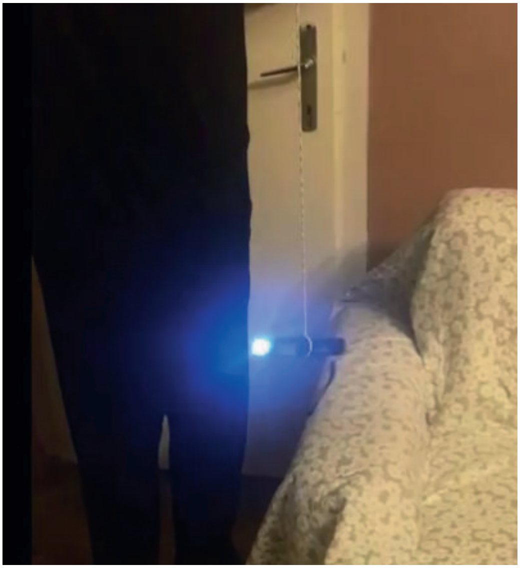
In the fourth video, the HR diagram of the open cluster "The Jewel Box" is made visually. From it, the age of the cluster is deduced.



Modelo de explosión de supernova, con un balón de basket y una pelota de tenis.

Very massive stars end their lives as supernovae. The following video shows an explosion model of this type of star.

And the result of a supernova explosion is often a neutron star, spinning and emitting radiation. The axis of rotation does not coincide with the emission jet, so if the orientation is correct, what we detect on Earth is a pulsating emission, a pulsar. In this video you can see how to make a simple model of this type of object.



Modelo de púlsar.

If the mass is large enough, what remains after the supernova explosion is a black hole. This video visualizes the curvature of space near a mass and even the gravitational well in the case of a black hole.

Modelando la curvatura del espacio-tiempo.

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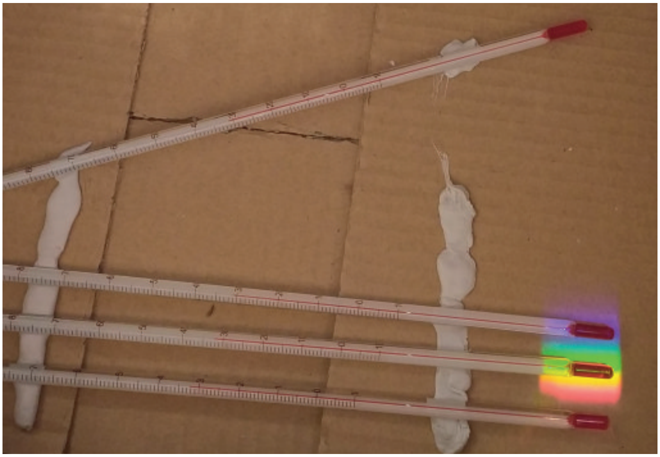
Workshop 7
ASTRONOMY OUT OF THE VISIBLE



The complete content of the Workshop is in the book 14 Steps to the Universe, available on the NASE website. In explaining the concepts, several simple models are proposed. This article presents the short videos (1 to 3 minutes) in which the models are shown, which can be used for teaching Astronomy in other areas. They are made without audio, so that whoever presents it in the online course can make the explanations they see fit in the language in which the course is taught, more than twelve currently.

Workshop Nº 7 of the NASE course for teachers deals with astronomy outside the visible: how the entire electromagnetic spectrum (infrared, radio, ultraviolet, etc.) is used to study celestial objects. Some of these radiations are generated and used in simple models, which can be useful in teaching astronomy and other subjects.

The first video explains how to make a spectroscope with which to measure the wavelengths of light. A CD is used as a diffraction grating.

For younger students, this other video shows how to decompose sunlight (it forms a rainbow) with a water hose with a diffuser at the outlet.

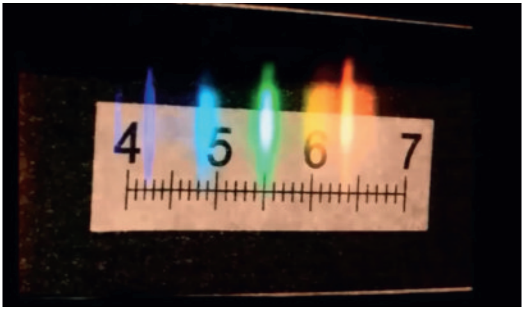


Fig. 1. Measuring the emission of light from a mercury bulb with the spectroscope.

Fig. 2. Build your own spectroscope.

Fig. 3. Light can be decomposed into a rainbow with the help of a water hose.

In the following video and in this other video, the experiment with which Herschel discovered infrared radiation is performed.

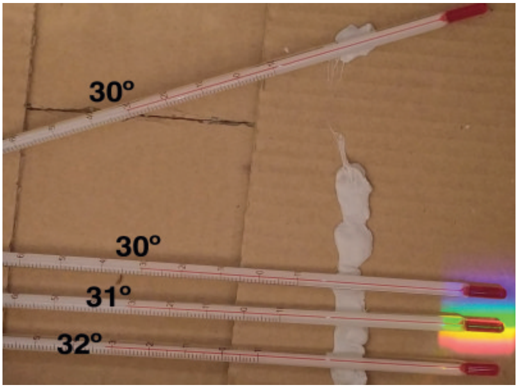


Fig. 4. Herschel's experiment to detect infrared radiation.

Fig. 5. A prism separates the sunlight into its colours.

This infrared radiation is emitted by most TV remote controls that we have at home. It can be detected with the cameras in our phones, as seen in this video.

Fig. 6. Infrared radiation from a remote control.

Infrared radiation has a greater penetrating power than visible light, and is used to study dusty areas, for example the centre of our galaxy. That power of penetration is shown in this video with some bulbs and a cloth.

Fig. 7. An incandescent filament bulb emits much more infrared radiation than an LED one. It goes through a canvas, and we detect it with the camera of our mobile phone.

A constellation can be made with infrared LEDs or with several remote-control controls, as seen in this video.

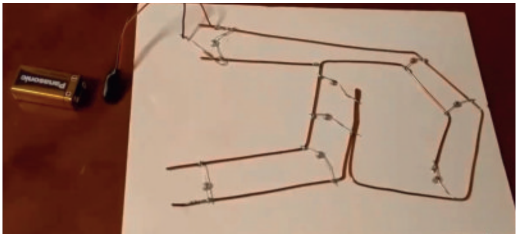


Fig. 8. The model of the constellation Orion made with infrared LEDs.

Fig. 9. This constellation is visualized with the camera of the mobile phone.

Fig. 10. Southern Cross constellation made with remote controls. In the dark, it can only be seen with our camera's infrared detector.

Radio astronomy is fundamental today. This video explains how to generate and detect radio waves.

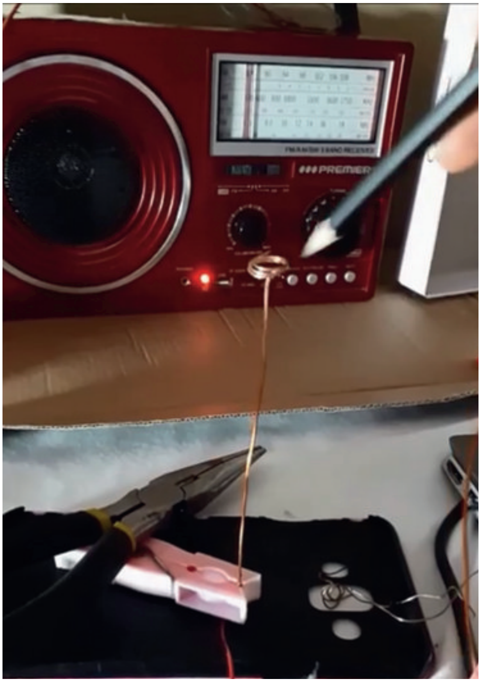


Fig. 11. Producing and detecting radio waves.

With ultraviolet radiation, many high-energy phenomena can be studied, although it has the disadvantage of being absorbed by the atmosphere. But there are telescopes in orbit with detectors of this radiation, with which the sky can be observed at these wavelengths. In this video the UV radiation from a counterfeit banknote detector is used (there are also UV bulbs in gardening and discos, called black light), to make objects fluoresce in a way they don't in visible light.

It remains to show other radiation, such as X-rays or gamma rays, which are used in medicine.

We hope that these videos will help you and give you ideas for teaching Astronomy.

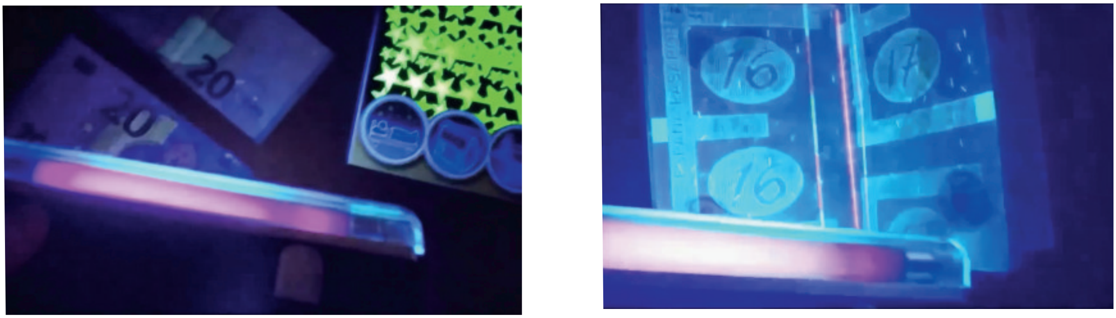
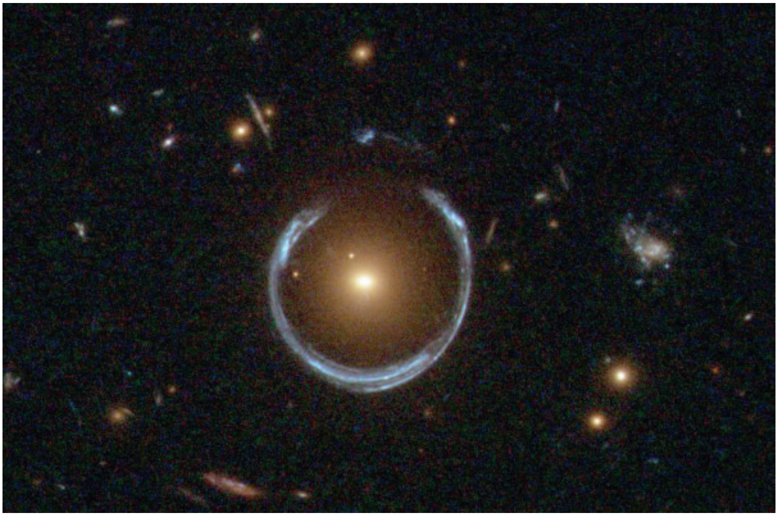


Fig. 12. The UV light from a counterfeit banknote detector shows things that are not normally seen.

References

NASE website: http://sac.csic.es/astrosecundaria/en/Presentacion.php
NASE YouTube channel: https://www.youtube.com/channel/UClhE_31rV-895n_fm069PgA/

Workshop 8
THE EXPANSION OF THE UNIVERSE



The complete content of the Workshop is in the book 14 Steps to the Universe, available on the NASE website. In explaining the concepts, several simple models are proposed. This article presents the short videos (1 to 3 minutes) in which the models are shown, which can be used for teaching Astronomy in other areas. They are made without audio, so that whoever presents it in the online course can make the explanations they see fit in the language in which the course is taught, more than twelve currently.

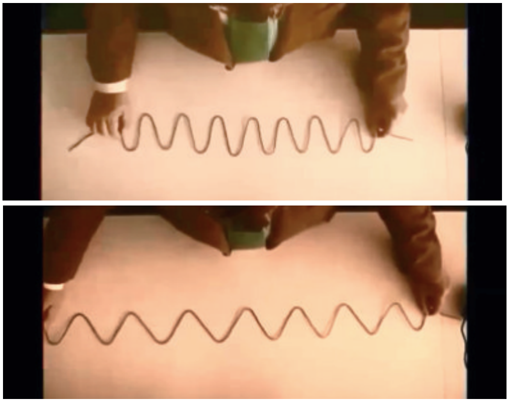
Workshop Nº 8 deals with some key aspects in Cosmology, such as the Expansion of the Universe and dark matter. When talking about the concepts, several models are built, where to see the expansion, the Hubble-Lemaître Law, the microwave background radiation and work with physical models that reproduce gravitational lenses.

The video of the first Activity serves to explain the Doppler effect that occurs with the movement of the emitter (Fig. 1). That is used in astronomy when studying double stars or exoplanets. This is not the Doppler effect observed in the distance of galaxies and in the expansion of the Universe, which is due to the stretching of photons (Fig. 2) as the space in which they travel expands. That is seen in the video of Activity 2.

Fig. 1. Doppler effect.

The video of Activity 3 shows the stretching of a rubber band, in which we have drawn galaxies separated by 1 cm (Fig. 3). It is clearly observed how the speed with which

Fig. 2. Stretching of photons.



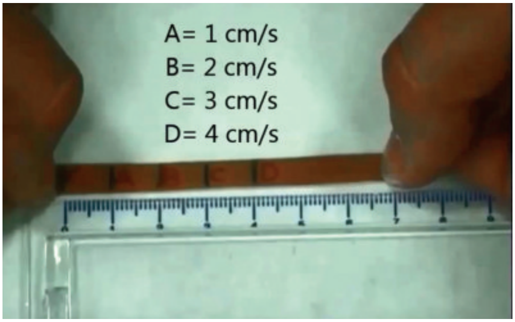


Fig. 3. Expansion in a rubber band.

galaxies are seen to move away from the origin is proportional to their initial separation. This is the so-called Hubble-Lemaître Law.

The video of Activity 4 is well known, but it is worth showing: the expansion of the surface of a balloon (Fig 4). In the audio notes that it is better not to draw the galaxies with a marker but to stick objects on the surface.

Fig. 4. Expansion of the surface of a balloon.

This is because in the real Universe, the galaxies themselves, the interior of stars and planets do not stretch, as they are strongly bound by gravity. Only the space between the galaxies expands.

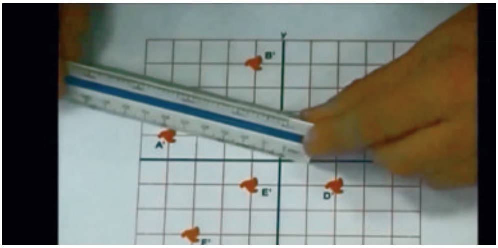


Fig. 5. Calculation of the Hubble-Lemaître constant.

In the video for Activity 5, the calculation of the Hubble-Lemaître constant (H) is made in a two-dimensional paper universe, which expands for 10 s. Distances are measured (Fig. 5), speeds are calculated and the quotient between these magnitudes is found, which gives us the constant H in that model of the Universe.

The video for Activity 6 shows a sheet of paper with a group of dots, which is superimposed on a slightly enlarged

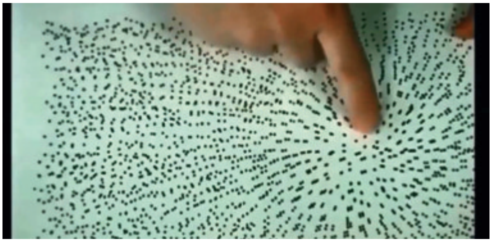


Fig. 6. We are not the centre of the Universe.

photocopy, 105% (Fig, 6). It is seen visually how any observer, wherever they are, sees that everything around them is moving away, the faster the point is from them. It serves to

Fig. 7. Detection of the microwave background with a TV.

show that we are not the centre of the Universe, although we observe that everything is moving away from us.

In the video in Activity 7, the microwave background radiation is "seen" in one in ten spots on an analogue TV screen (increasingly

Fig. 8. Simulation of a gravitational lens with the stem of a glass.

difficult to find such a TV) tuned to an unused channel (Fig. 7).

Finally, Activities 8 and 9 attempt to model gravitational lenses. In this video the stem of a crystal glass is used (Fig. 8), and in this other video, a wide wine glass, filled with some dark and transparent liquid (tea, non-carbonated coke, etc.). Look at a small sphere (Fig. 8) or a flashlight separated by the distance from the diameter of the cup (Fig. 9), and images similar to the Einstein cross (Fig. 10) can be visualized, to the arches of the lenses gravitational (Fig. 11) or multiple quasars that serve to study the dark matter of the Universe (Fig. 12).

We hope that these videos will help you and give you ideas for teaching Astronomy.

Fig. 9 Simulation of a gravitational lens with a cup. The distance from the flashlight should be similar to the diameter of the cup.

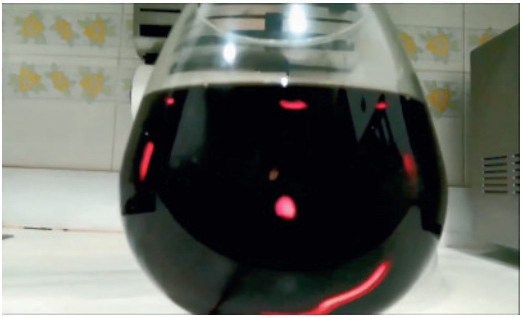


Fig. 10. Simulation of the Einstein Cross.

Fig. 11 It is also possible to simulate arches like the ones in the photo with which the article begins.

Fig. 12. Simulation of multiple images of a quasar.

References

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Workshop 9
PLANETS AND EXOPLANETS

The complete content of the Workshop is in the book 14 Steps to the Universe, available on the NASE website. In explaining the concepts, several simple models are proposed. This article presents the short videos (1 to 3 minutes) in which the models are shown, which can be used for teaching Astronomy in other areas. They are made without audio, so that whoever presents it in the online course can make the explanations they see fit in the language in which the course is taught, more than twelve currently.

Workshop Nº 9 of the NASE course for teachers deals with planets and exoplanets. And it includes quite a few simple models of sizes, distances, densities, gravities, etc., of the planets of our solar system, and even of some extrasolar systems. Knowing them can be helpful.

There are three videos on distance models. The first video is with a 5 m roll of cloth or paper tape. The second video is sheet of paper size, applying Bode's Law. The third video is with a roll of toilet paper, taking the distance between perforations as an Astronomical Unit.

Fig. 1. Distance model on cloth or paper tape.

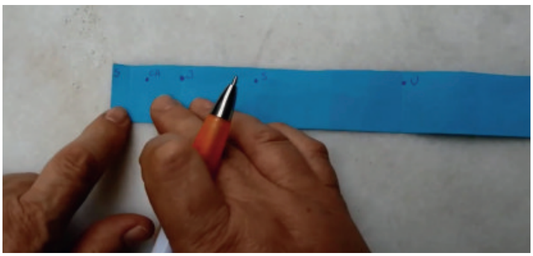

Fig. 2. Model of distances on a sheet of paper, taking advantage of Bode's Law.

Fig. 3. Distance model with toilet paper.

In the video in Activity 2, a 2 m Sun is made out of yellow cloth, and the scale planets are placed on it. It is used to compare the diameters.

Fig. 4. Size model.

In this other video another model of diameters is made, comparing the Sun with a basketball.

Fig. 5. Size model. The Sun is the basketball ball.

The next activity is to place the plans on the map of the city, to understand the distances. In this video is shown, with Google Earth, a solar system in which the Earth is 80 cm. At that scale, the Sun is the size of a soccer field, and the solar system the size of Spain.

Fig. 6. Size of the Solar System on a Google-Earth map.

Fig. 7. Size of the Sun seen from the planets.

In this other model, made with a drawing template, something not very often found in books is represented: the size of the Sun seen from the different planets (video).

Fig. 8. Feeling the densities of the planets.

The model of the densities of the planets is difficult to transmit in a video, because the interesting thing is to "feel" the densities. But the idea is in the video.

Fig. 9. Two models: flattening and spherical formation.

The rotation of the planets produces the flattening at the poles, very noticeable in Saturn. It is explained with this video. In this video, the spherical formation of the planets is modelled.

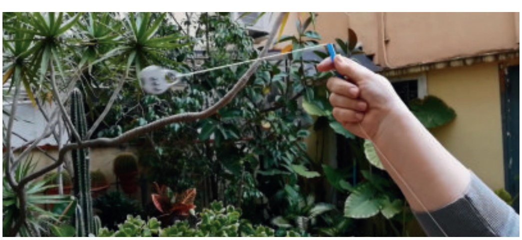

Fig. 10. The speed depends on the radius of the orbit.

Fig. 11. Weighing yourself in various planets.

The orbital speed of the planets, the greater the closer to the Sun, is reproduced in this video.

Analogue bathroom scales are not difficult to modify by sticking on a graduated disk proportional to the surface gravity of another planet. So you can experiment with your body weight on other planets. It is seen in this video.

Fig. 12. Model of impact craters.

The surface of the Moon and other bodies in the solar system are covered with impacts. This video shows a model of the impact craters with flour and cocoa powder. And this video too.

Planetary exploration is done with rockets, and this video shows how to make one with an effervescent pill.

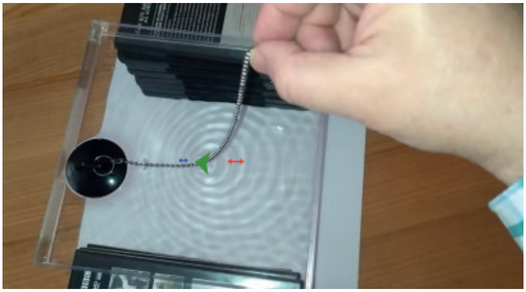

Fig. 13. Homemade water ripple tank to visualize the Doppler effect.

There are several methods to discover planets outside the solar system. One is to use the Doppler effect of the star's light, which is modelled in this video of a homemade water ripple tank. Another method is with

Fig. 14. Simulating gravitational micro lenses.

gravitational micro lenses, which is simulated in this other video.

Fig. 15. Models of extrasolar systems.

Many extrasolar planetary systems have already been discovered. In this video and also in another video, some models of different sizes and distances are shown, and the areas where life could exist are even represented.

We hope that these videos will help you and give you ideas for teaching Astronomy.

References

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Workshop 10
ASTROBIOLOGY

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Workshop Nº 10 of the NASE course for teachers deals with astrobiology. To explain the concepts, several simple models are proposed, which may be useful to know.

The first model of the Workshop is seen in a video that helps explain the chemical aspects of stellar evolution. The objective is to classify the objects according to how their atoms are produced at the Big-Bang or shortly after, inside the stars during their evolution and in the supernova explosion.

The second video is used to see why there is no liquid water on Mars: by lowering the pressure in a syringe, the hot water inside it begins to boil.

The third video shows an example of oxygen production by photosynthesis. Small portions of vegetables are placed in a sodium

Fig. 1. Materials classified according to their origin: in the Big Bang, in stars or in supernovae.

bicarbonate solution and light with a blue and / or red filter is applied, and the results are compared.

The fourth video shows a model which considers life in extreme situations. It is enough to show what happens with a solution where yeast is introduced and then different situations

Fig. 3. Yeast subjected to different external conditions: cold, UV radiation, acids, etc.

are added to see in which conditions the yeast micro-organism evolves the best.

The fifth video explains how to obtain the DNA from a tomato.

We hope that these videos will help you and give you ideas for teaching Astronomy.

Fig. 2. Extracting DNA from a tomato.

Fig. 4. Decreasing the pressure, the water boils.

References

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