

NUCLIO

NÚCLEO INTERATIVO DE ASTRONOMIA
E INOVAÇÃO EM EDUCAÇÃO



SUMMER SCHOOL – July 3rd-8th 2022
Heraklion, Crete, Greece

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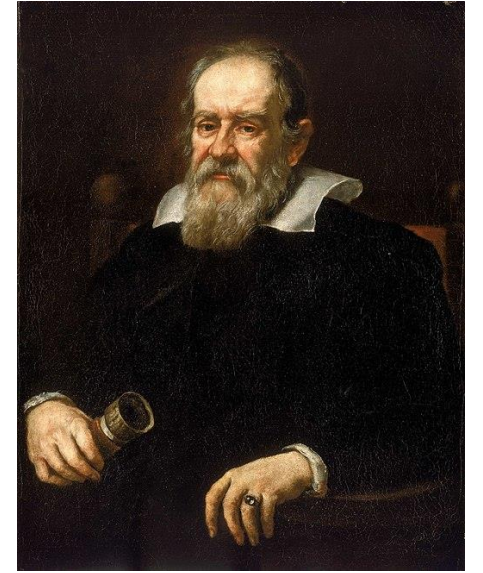
ESCOLA D. AFONSO III – FARO

PORTUGAL

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TITLE

- Ser Galileu Galilei por um dia ... ou mais...
- Γίνε Galileu Galilei για μια μέρα... ή περισσότερες...
- Be Galileu Galilei for one day... or more...



Galileu Galilei, por [Justus Sustermans](#) 1636.

...mas nos outros dias todos sê tu mesmo!
... αλλά την άλλη μέρα είσαι ο εαυτός σου!
...but in the other day's be yourself!

Short description:

- com este exercício os alunos vão construir a luneta de Galileu Galilei. Para fazer este exercício eles têm que investigar o que acontece quando a luz passa por uma lente. Através da investigação, os alunos familiarizam-se com fenómenos ópticos, como a refração, com os diferentes tipos de imagens que os diferentes tipos de lentes fornecem, com algumas aplicações de fenómenos ópticos e também com os desenhos geométricos.
- με αυτή την άσκηση οι μαθητές πάνε να φτιάξουν το spyglass του Galileu Galilei. Για να κάνουν αυτή την άσκηση πρέπει να διερευνήσουν τι συμβαίνει όταν το φως περνά μέσα από έναν φακό. Μέσα από τη διερεύνηση, οι μαθητές εξοικειώνονται με οπτικά φαινόμενα, όπως η διάθλαση, με τα διαφορετικά είδη εικόνων που δίνουν οι διαφορετικοί τύποι φακών, με ορισμένες εφαρμογές οπτικών φαινομένων και επίσης εξασκούνται στη δημιουργία γεωμετρικών στρωμάτων.
- with this exercise the students go built the spyglass of Galileu Galilei. For make this exercise they have to investigate what happens when the light pass through a lens. Through the investigation, students become acquainted with optical phenomena, like refraction, with the different kind of images that the different types of lens give, with the some applications of optical fenomenas and also with the geometric draw.

Keywords

- lentes, distância focal, potência da lente, luz, ótica, refração, Galileu Galilei.
- φακοί, εστιακή απόσταση, ισχύς φακού, φως, οπτική, διάθλαση, Galileo Galilei.
- lenses, focal length, lens power, light, optics, refraction, Galileo Galilei.

Age

- 12 - 14 years

Prerequisites

- basic information about the light and geometric drow

Duration

- 50+50+50+50 min but can be extended

Educational Objective Cognitive

- **Domain** light

- **Subject Domain** Optical Phenomena

Objectives

- Concluir, através de atividades experimentais, que a luz pode sofrer refração.
- Conclude, through experimental activities, that light can be refracted.
- Καταλήξτε, μέσω πειραματικών δραστηριοτήτων, ότι το φως μπορεί να διαθλαστεί.

- Representar, geometricamente, a refração da luz e interpretar representações desses fenômenos.
- Geometrically represent the refraction of light and interpret representations of these phenomena.
- Αναπαριστούν γεωμετρικά τη διάθλαση του φωτός και ερμηνεύουν αναπαραστάσεις αυτών των φαινομένων

Concluir, através de atividades experimentais, sobre as características das imagens em lentes convergentes e divergentes, analisando os procedimentos e comunicando as conclusões.

Conclude, through experimental activities, on the characteristics of images in converging and diverging lenses, analyzing the procedures and communicating the conclusions

Συμπερασματικά, μέσα από πειραματικές δραστηριότητες, σχετικά με τα χαρακτηριστικά των εικόνων σε συγκλίνοντες και αποκλίνοντες φακούς, αναλύοντας τις διαδικασίες και κοινοποιώντας τα συμπεράσματα.

- Explicar algumas das aplicações dos fenómenos óticos, nomeadamente objetos e instrumentos que incluam lentes.

Explain some of the applications of optical phenomena, namely objects and instruments that include lenses.

Εξηγήστε μερικές από τις εφαρμογές των οπτικών φαινομένων, δηλαδή αντικειμένων και οργάνων που περιλαμβάνουν φακούς.

- Será aplicado o método Inquire

- The Inquire method will be applied

- Θα εφαρμοστεί η μέθοδος
διερεύνησης

- 1º - Através da aplicação “mentimeter” irá perceber-se se os alunos conhecem Galileu Galilei, através da seguinte tarefa:
- “Indica uma palavra que associes a Galileu Galilei”
- 1st - Through the “mentimeter” application you will see if the students know Galileo Galilei, through the following task:
- “Indicate a word that you associate with Galileo Galilei”
- 1ον - Μέσα από την εφαρμογή «mentimeter» θα δείτε εάν οι μαθητές γνωρίζουν το Galileo Galilei, μέσα από την παρακάτω εργασία:
- «Υποδείξτε μια λέξη που συνδέετε με τον Galileo Galilei»

- 2º visionamento do filme “Galileu Galilei – Grandes Heróis da História” – à medida que o filme vai passando vão surgindo umas questões, feitas com a aplicação “**edpuzzle**”, que os alunos terão de responder
- 2nd viewing of the movie “Galileo Galilei – Great Heroes of History” – as the movie goes on, some questions arise, made with the “edpuzzle” application, which the students will have to answer
- 2η προβολή της ταινίας «Galileo Galilei – Great Heroes of History» – καθώς προχωρά η ταινία, προκύπτουν κάποιες ερωτήσεις, που έγιναν με την εφαρμογή «edpuzzle», στις οποίες θα πρέπει να απαντήσουν οι μαθητές

- 3^o Através de uma visita virtual ao Museu Galileu (<https://sites.google.com/site/ndcm2014grupo01mat/simulador-do-telescopio>), os alunos vão observar aquilo que o Galileu viu através do seu **telescópio**
- 3rd Through a virtual visit to the Galileo Museum (<https://sites.google.com/site/ndcm2014grupo01mat/simulador-do-telescopio>), students will observe what Galileo saw through his telescope
- 3^η Μέσω μιας εικονικής επίσκεψης στο Μουσείο Galileo (<https://sites.google.com/site/ndcm2014grupo01mat/simulador-do-telescopio>), οι μαθητές θα παρατηρήσουν τι είδε ο Galileo μέσω του τηλεσκοπίου του

- 4º Atividade Hand's on: investigar que tipo de lentes usou galileu na sua luneta e que princípios físicos estavam associados ao uso das lentes.
- Investigate what type of lenses you used Galileo in your telescope and what physical principles were associated with the use of lenses.
- Ερευνήστε τι είδους φακούς χρησιμοποιήσατε το Galileo στο τηλεσκόπιό σας και ποιες φυσικές αρχές συνδέθηκαν με τη χρήση των φακών.

- 5^o- através da aplicação do simulador de telescópio (<https://astro.unl.edu/classaction/animations/telescopes/telescope10.html>)
- os alunos vão investigar o funcionamento dos telescópios e qual a influência da ocular, da distância entre as lentes e da distância focal, nas características das imagens obtidas com as diferentes lentes.
- 5th- through the telescope simulator application (<https://astro.unl.edu/classaction/animations/telescopes/telescope10.html>)
- students will investigate how telescopes work and what is the influence of the eyepiece, the distance between the lenses and the focal length, on the characteristics of the images obtained with the different lenses.
- 5ο- μέσω της εφαρμογής προσομοιωτή τηλεσκοπίου (<https://astro.unl.edu/classaction/animations/telescopes/telescope10.html>)
- Οι μαθητές θα διερευνήσουν πώς λειτουργούν τα τηλεσκόπια και ποια είναι η επίδραση του προσοφθάλμιου φακού, η απόσταση μεταξύ των φακών και η εστιακή απόσταση, στα χαρακτηριστικά των εικόνων που λαμβάνονται με τους διαφορετικούς φακούς.

- 6º os alunos constroem a luneta de galileu e fazem observações
- 6th students build Galileo's telescope and make observations
- 6ος μαθητές κατασκευάζουν το τηλεσκόπιο του Galileo και κάνουν παρατηρήσεις

- 7º - no “my observatorium” os alunos vão pedir imagens de jupiter, de saturno, da lua, ..., consoante o grupo
- στο "my Observatorium" οι μαθητές θα ζητήσουν εικόνες του Δία, του Κρόνου, της Σελήνης, ..., ανάλογα με την ομάδα
- at “my observatorium” students will ask for images of jupiter, saturn, moon, ..., depending on the group

- 8º - Os alunos vão investigar no stellarium (<https://stellarium.org/pt/>) em que dias podem ver as luas de Júpiter, vénus,...
- Students will investigate in the stellarium (<https://stellarium.org/pt/>) on which days they can see the moons of Jupiter, venus,...
- Οι μαθητές θα ερευνήσουν στο stellarium (<https://stellarium.org/pt/>) ποιες ημέρες μπορούν να δουν τα φεγγάρια του Δία, της Αφροδίτης,...

- 9º Cada grupo apresentará o seu trabalho.
- Κάθε ομάδα θα παρουσιάσει τη δουλειά της.
- Each group will present its work.

Thank you for your atencion!!!

- ... e nunca se esqueçam de um ditado oriental muito antigo:
- ...and never forget a very old oriental saying :
- ...και μην ξεχνάτε ποτέ ένα πολύ παλιό ανατολίτικο ρητό :

- “Se me contarem esquecer-me-ei, se me mostrarem lembrar-me-ei, se eu fizer compreenderei!!!”

- “If they tell me I'll forget, if they show me I'll remember, if i do i will understand!!!”

- “Αν μου πουν ότι θα ξεχάσω, αν μου δείξουν θα θυμάμαι, αν το κάνω θα καταλάβω!!!”