

DIVERSITY IN STEM EDUCATION

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Astronomy

a way to Learn Science with DIY apparatus and smartphones

The central theme of this project is Astronomy, seen as a lever for Science Teaching, due to its enormous interdisciplinary potential and the fascination it arouses in students. To this end, I present a set of hands-on and mind-on activities that range from the construction and didactic exploration of small devices, by students, using school supplies (and/or from their day-to-day), for the carrying out experiments of great scientific and interdisciplinary value, even using smartphones with apps with high scientific and didactic potential, for experiments and data collection.

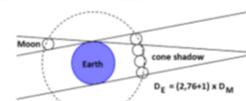
And what about light and colors?



what is the Size of the Moon?

- From an image of a partial eclipse of the moon, we can estimate the proportion of their actual sizes.
- From the measurements: $D_{Earth}=13,8$ cm and $D_{Moon}=5,0$ cm

$$\frac{D_{Earth}}{D_{Moon}} = \frac{13,8}{5,0} = 2,76 \text{ but}$$

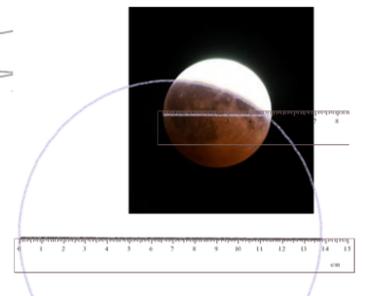


So, the Earth is 3,76 "larger" than the Moon

$$D_{Moon} = \frac{1}{3,76} \times D_{Earth} = 0,266 \times 12800 \text{ km} = 3404 \text{ km}$$

$$\text{Percent error} = \frac{|\text{measured} - \text{real}|}{\text{real}} \times 100\%$$

$$\text{Percent error} = \frac{|3404 - 3474|}{3474} \times 100\% = 2,0\%$$



What is the Diameter of the Sun?

Sun Diameter: 1392 700 km

...and what about the distance to the moon?

From the image: $D_{image}=7$ mm and $d_{object}=800$ mm, we may draw the triangle...

$$\alpha = \tan^{-1}\left(\frac{D}{d}\right) = \tan^{-1}\left(\frac{7}{800}\right) = 0,5^\circ$$

The apparent angular size of the Sun is $0,5^\circ$

In a total solar eclipse, the Moon completely fills the Sun, so its apparent angular size is the same ($0,5^\circ$)

So, we can make the approach (very small angle) using our previous results:

$$\tan 0,5^\circ \cong \frac{\text{Diameter}_{Moon}}{\text{distance}_{Moon}} = \frac{3404 \text{ km}}{x} \leftrightarrow x \cong 390\,060 \text{ km}$$

384 400 km

Localize planetas. Veja os satélites passarem por cima de si.

Aproxime o zoom em planetas, luas, galáxias e nebulosas.

Aceda a imagens detalhadas de todo o céu.

Mude para o modo noturna para as estrelas ao

Stellarium Mobile

Mercury identified!

Dreaming is the first step to embrace the Universe