

## **ASTRO AT HOME**



We will start in a few minutes!



## HOW TO MEASURE THE EARTH

Presented by Julie Bolduc-Duval March 19, 2020



#### Eratosthenes



Credit: ASTROLab du Mont-Mégantic

## Eratosthenes' result: 40,000 km

## **Circumference of the Earth: 40,075 km**



## Here's how you can repeat Eratosthenes' experiment and measure the Earth!

# On the day of the equinox, measure the shadow of a stick at about 1pm

Today, or in the next few days (need a sunny day!)

When the Sun is at its highest point in the sky (local solar noon)



Credit: Eratosthenes Experiment

## Why at the equinox?



## Find the distance between you and the equator

#### www.distance.to/



### You now have:

- the length of the shadow
- the height of the stick
- the distance between you and the equator

Now we need to do the math! ③

## Use the Excel spreadsheet available on the Astro at Home webpage

Eratost	henes E	xperiment								
Instructio	ns									
You need t	o enter you	r data in the ye	The calcula	ated values	will appear	automatic	ally in the b	lue boxes.		
To calculate angle										
	_									
Height of stick:		cm							/	
Length of shadow:		cm								
	Angle:	#DIV/0!	degrees							/
To calculate circumference with data from equator										
Angle (as calculated above): #DIV/0!			#DIV/0!	degrees						
Distance between your school and equator:				km						
		Circumference:	#DIV/0!	km						
Error percentage with scientific value of 40,075 km:			75 km:		#DIV/0!					

You can also join the international campaign <u>eratosthenes.ea.gr</u>



f

THE EXPERIMENT GALLERY LESSON PLANS LINKS CONTESTS

WELCOME TO

### ERATOSTHENES EXPERIMENT 20.03.2020

REGISTRATION NOW IS OPEN

**REGISTER NOW!** 

In the framework of



INTERNATIONAL ASTRONOMICAL UNION 1919 - 2019

## **Eratosthenes Experiment**

At about 1pm\*, measure the shadow of a stick.
Find the distance between you and the equator.
Use the Excel file to do the math.

 Compare your result with the Earth's circumference : 40,075 km

5. You have just measured the Earth! 🙂

## \* Find the precise time of your local solar noon

http://www.esrl.noaa.gov/gmd/grad/solcalc/



#### Move the red marker

#### solar noon: not exactly 1pm