# STEM Education for a sustainable world

## Solar tracker panels

Teachers Teaching with Technology™

**April 22, 2021**

Alexandre Técher

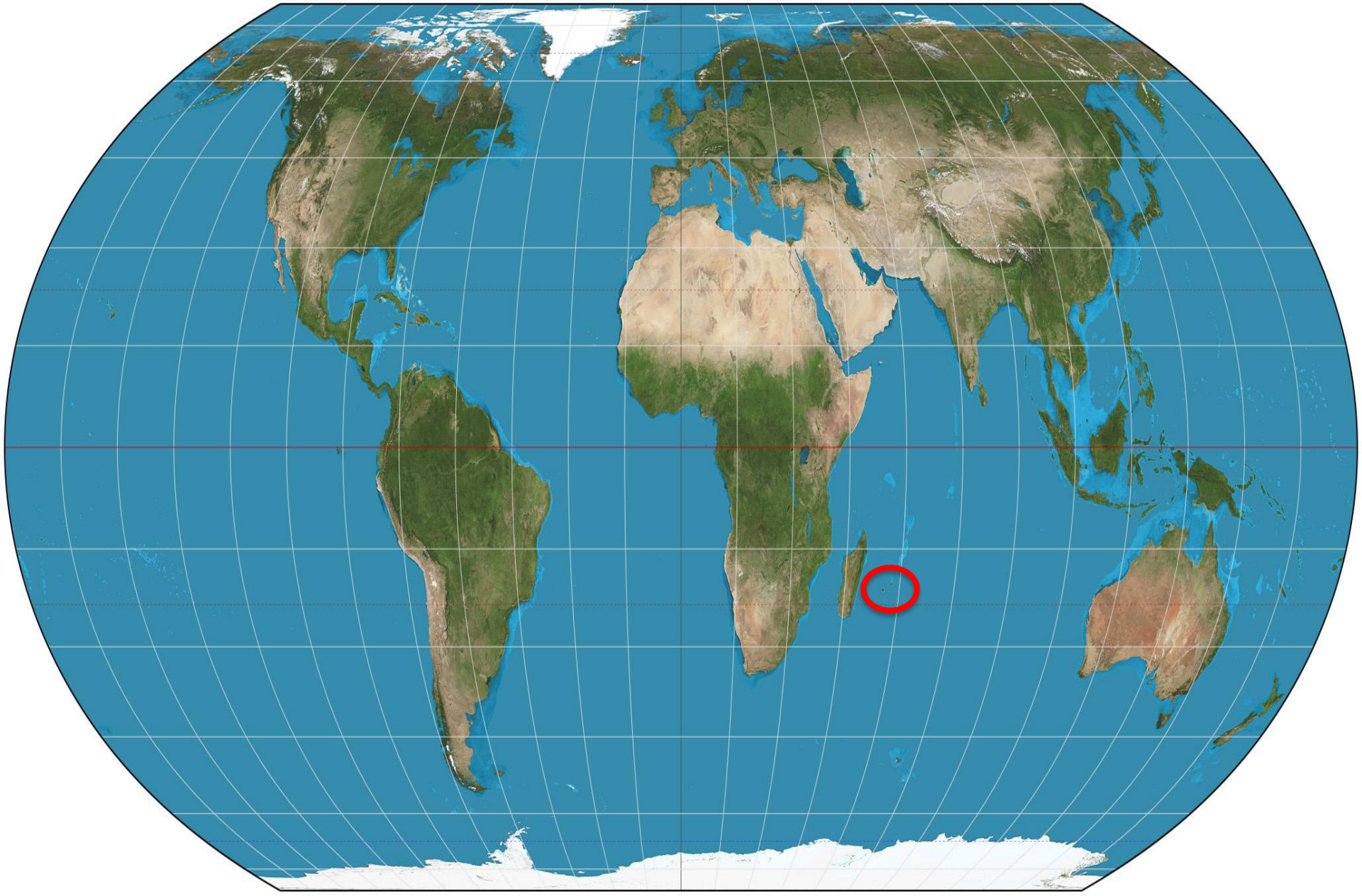
Alexandre.Techer@ac-reunion.fr

Texas Instruments

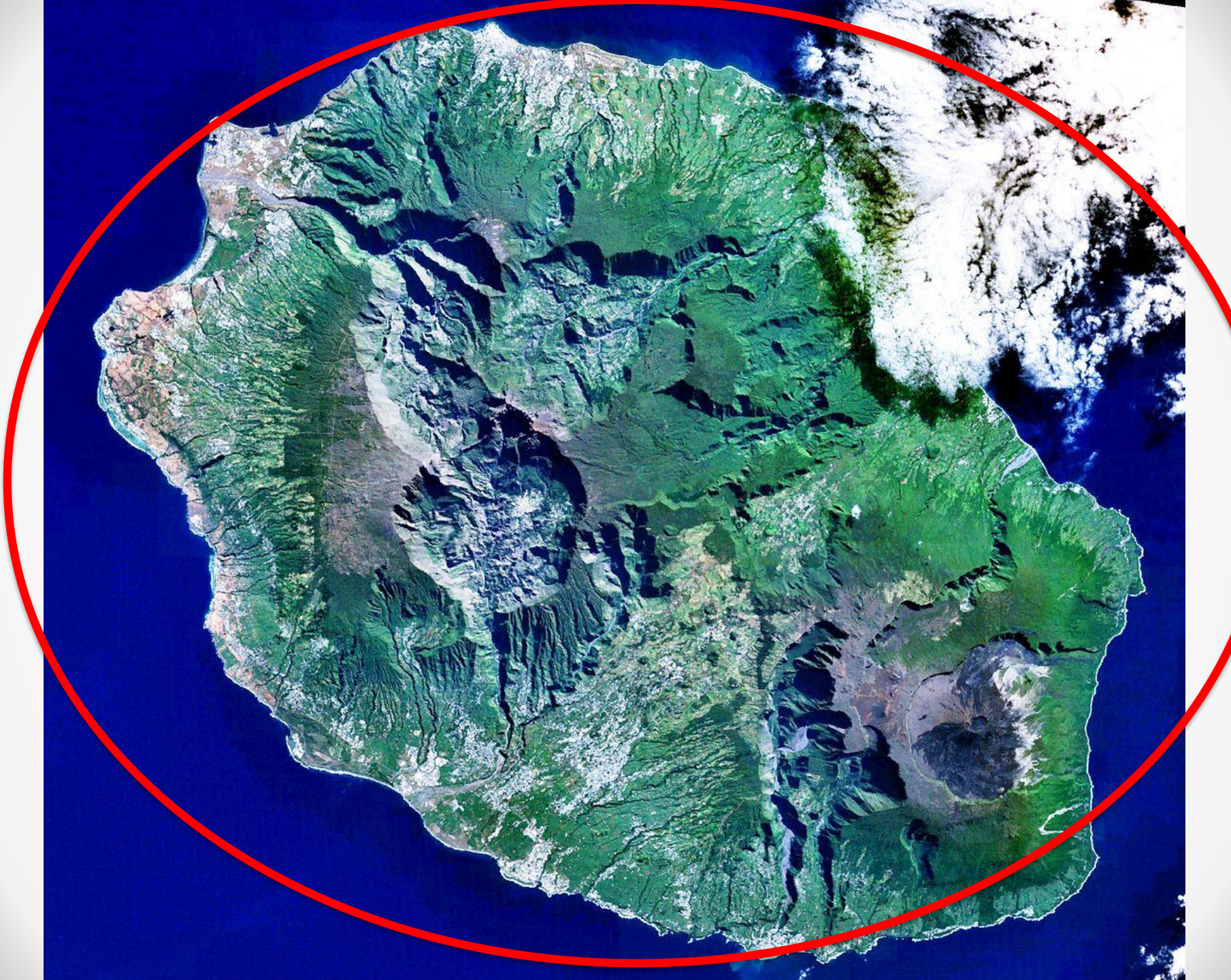
# Starting point

# Starting point

# Starting point



# Starting point



# Starting point

# Starting point

# Starting point

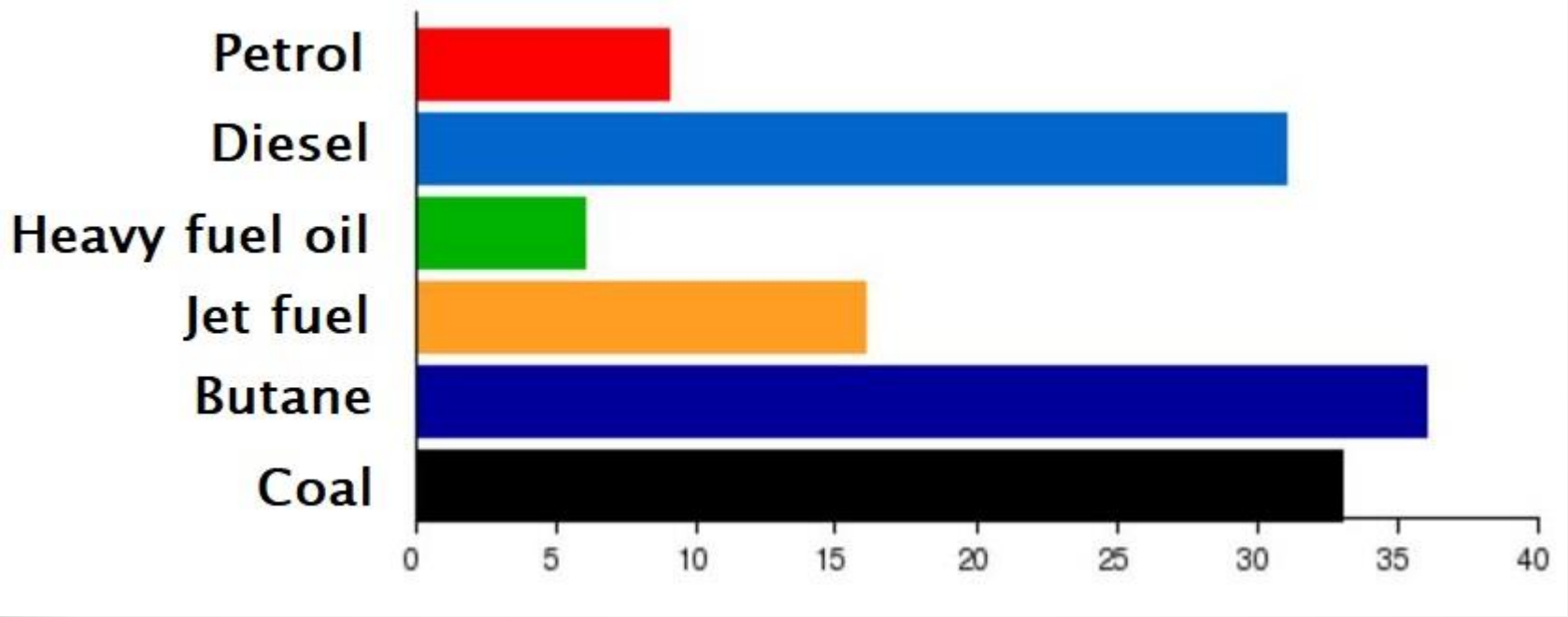
# Starting point

# Some statistics

Sunshine rate (hours per year) : $T \in [2250; 2750]$

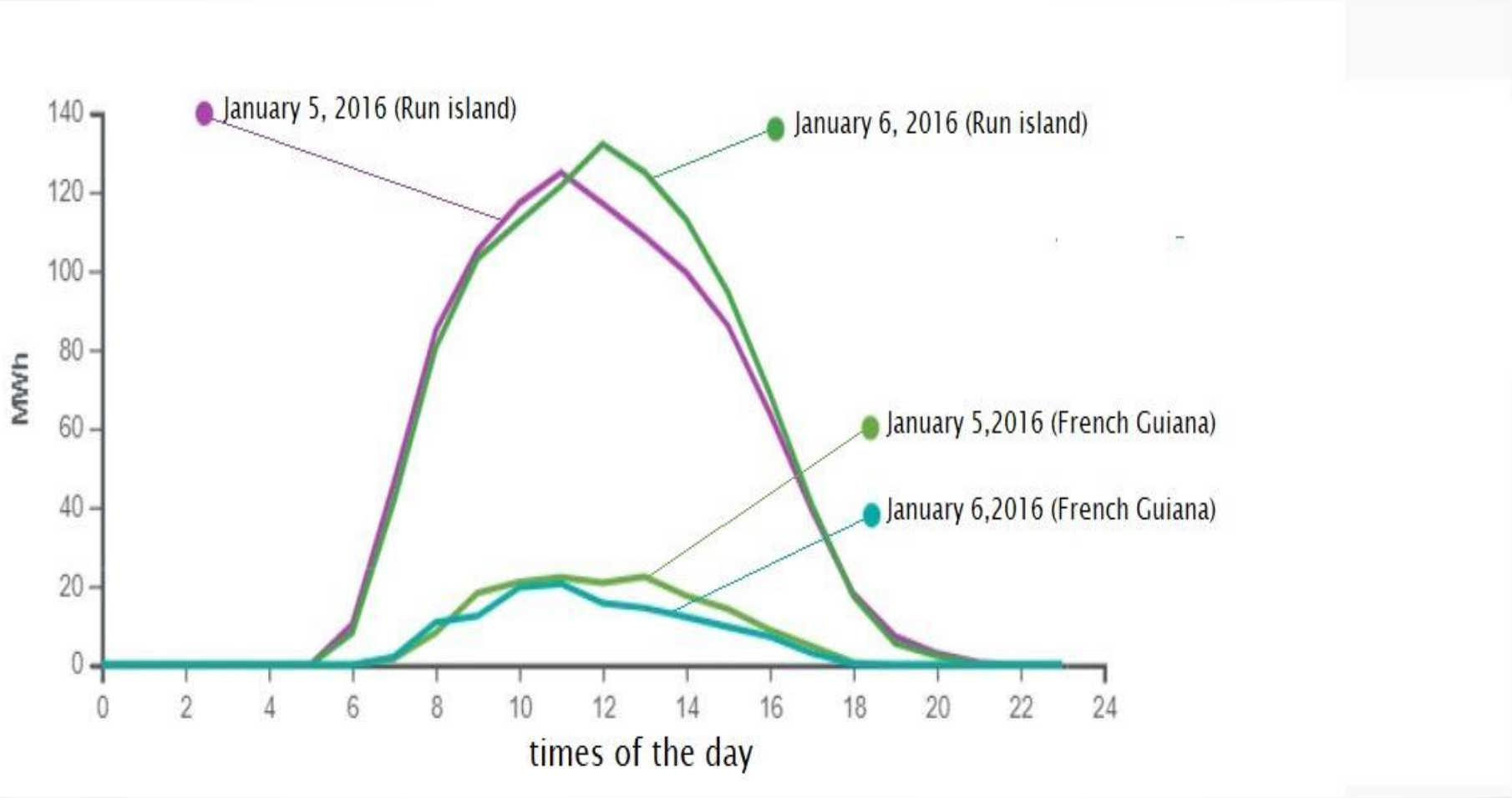
Fossil fuels for electricity production: $65\%$

***Fossil energy imports (in %) :***



# Some statistics

***A day of photoelectric products:***



# Triggering challenge:

**How to simulate a Sun tracker in order to optimize solar panels orientation**

# Triggering challenge:

**How to simulate a Sun tracker in order to optimize solar panels orientation**

Connection with Sustainability Development Goals:

**Goal 7**: Ensure access to affordable, reliable, sustainable and modern energy for all( how to deal with brightness).

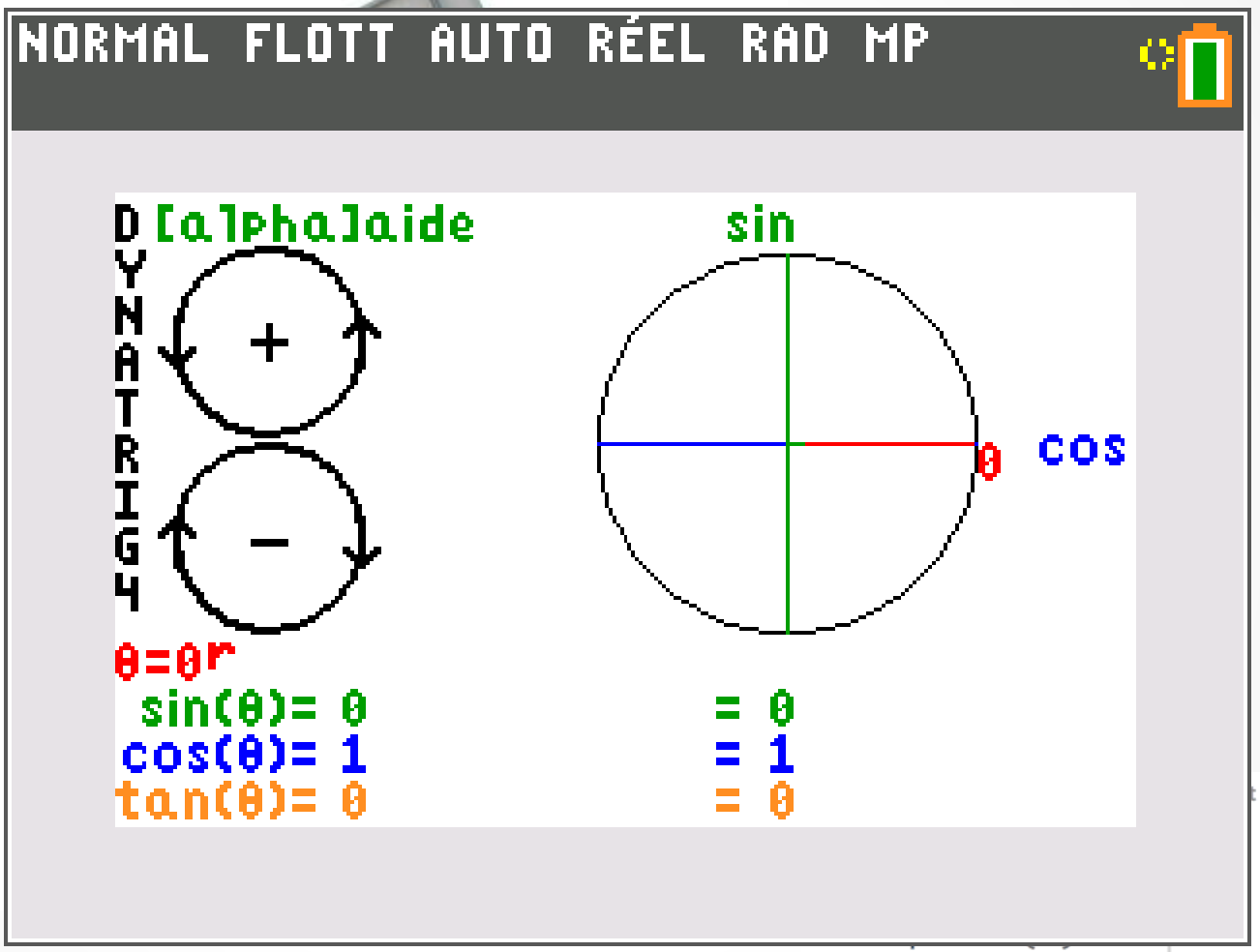
**Goal 9**: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (how to connect multiple elements and make them work in synergy through Python coding, using a physical quantity to drive a technology structure)

S

T

E

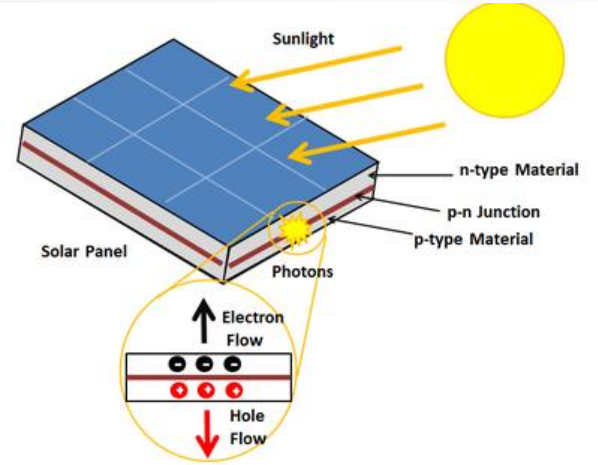
M

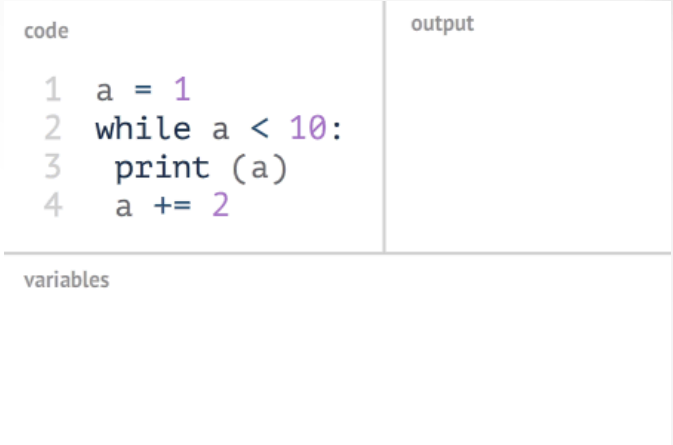



4 a += 2

variables

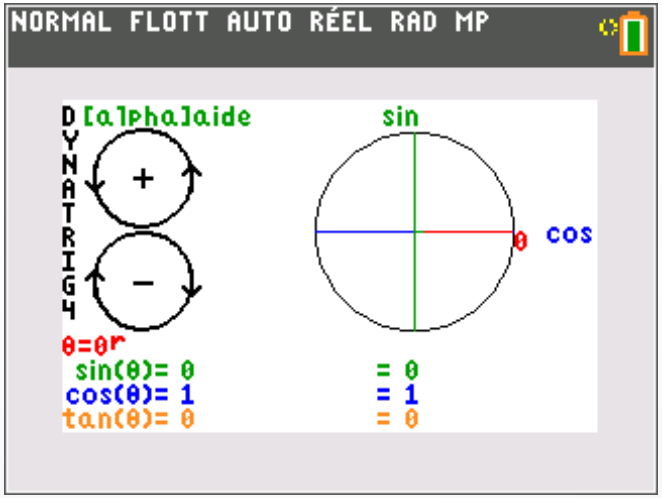
S


Sunlight
n-type Material
p-n Junction
p-type Material
Solar Panel
Photons
Electron Flow
Hole Flow


code
output
a = 1
while a < 10:
print (a)
a += 2
variables

T

E


NORMAL FLOTT AUTO RÉEL RAD MP
D[alpha]aide
DYNATRIG4
sin
cos
θ=0r
sin(θ)= 0 = 0
cos(θ)= 1 = 1
tan(θ)= 0 = 0

M

# In classroom

**Part four : implementation of a suntracker**

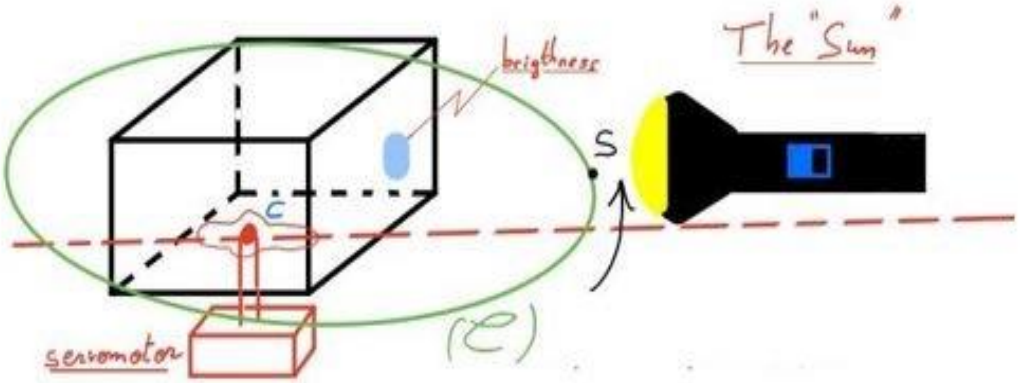
## List of equipment

Servomotor

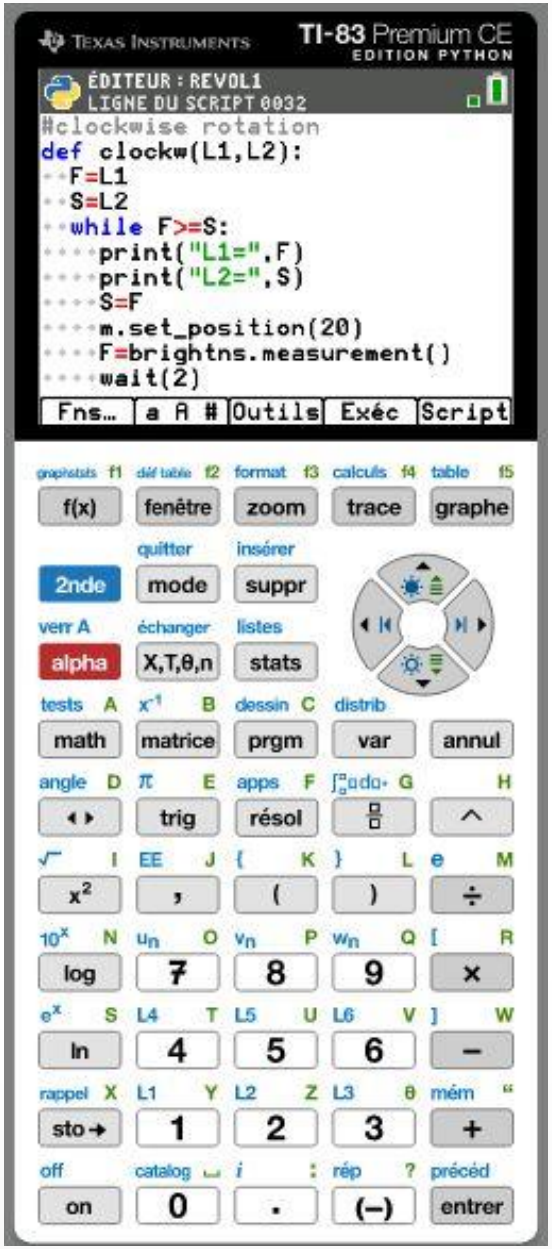
Ti-innovator Hub

External battery

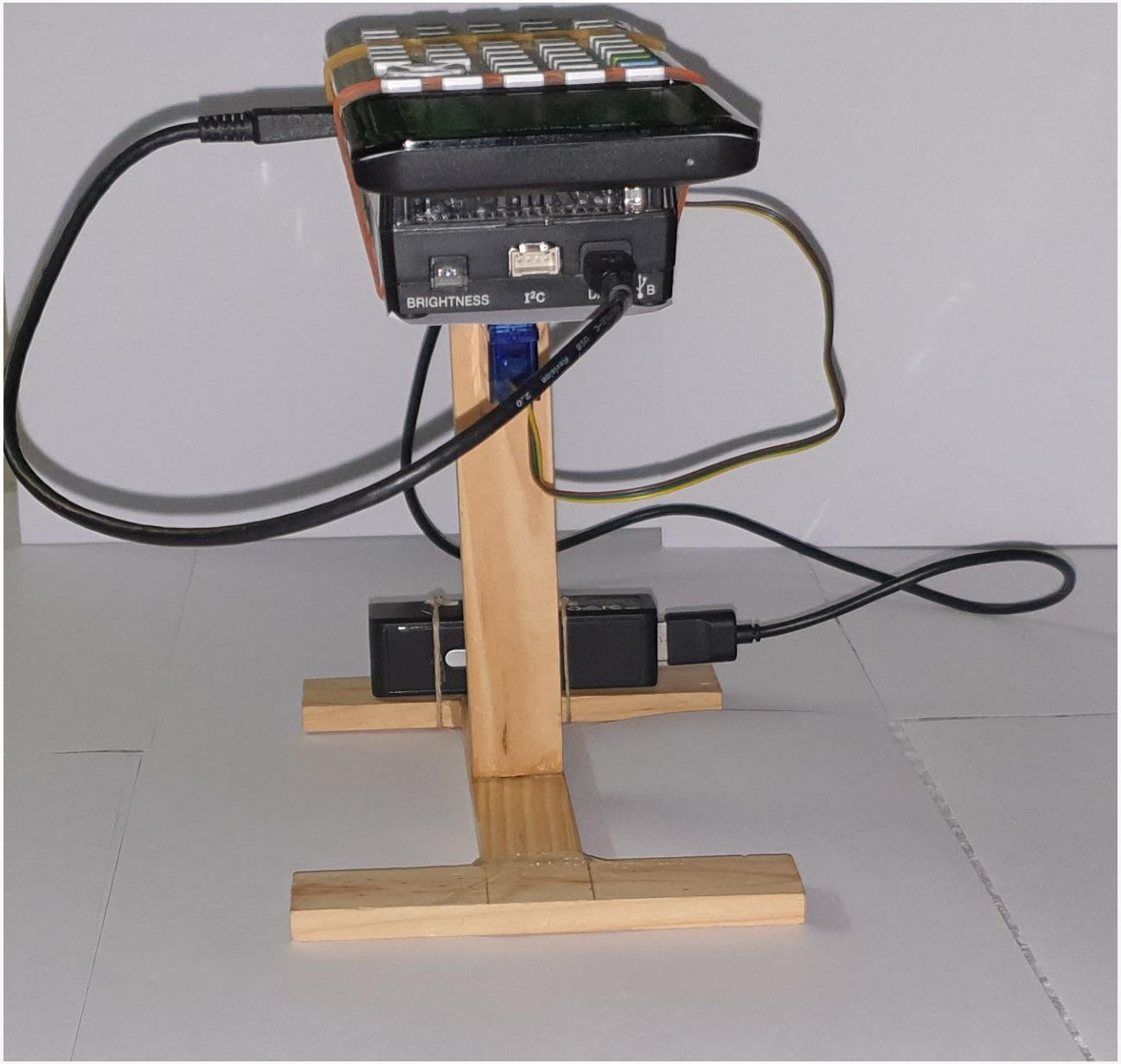
Ti-83 Python



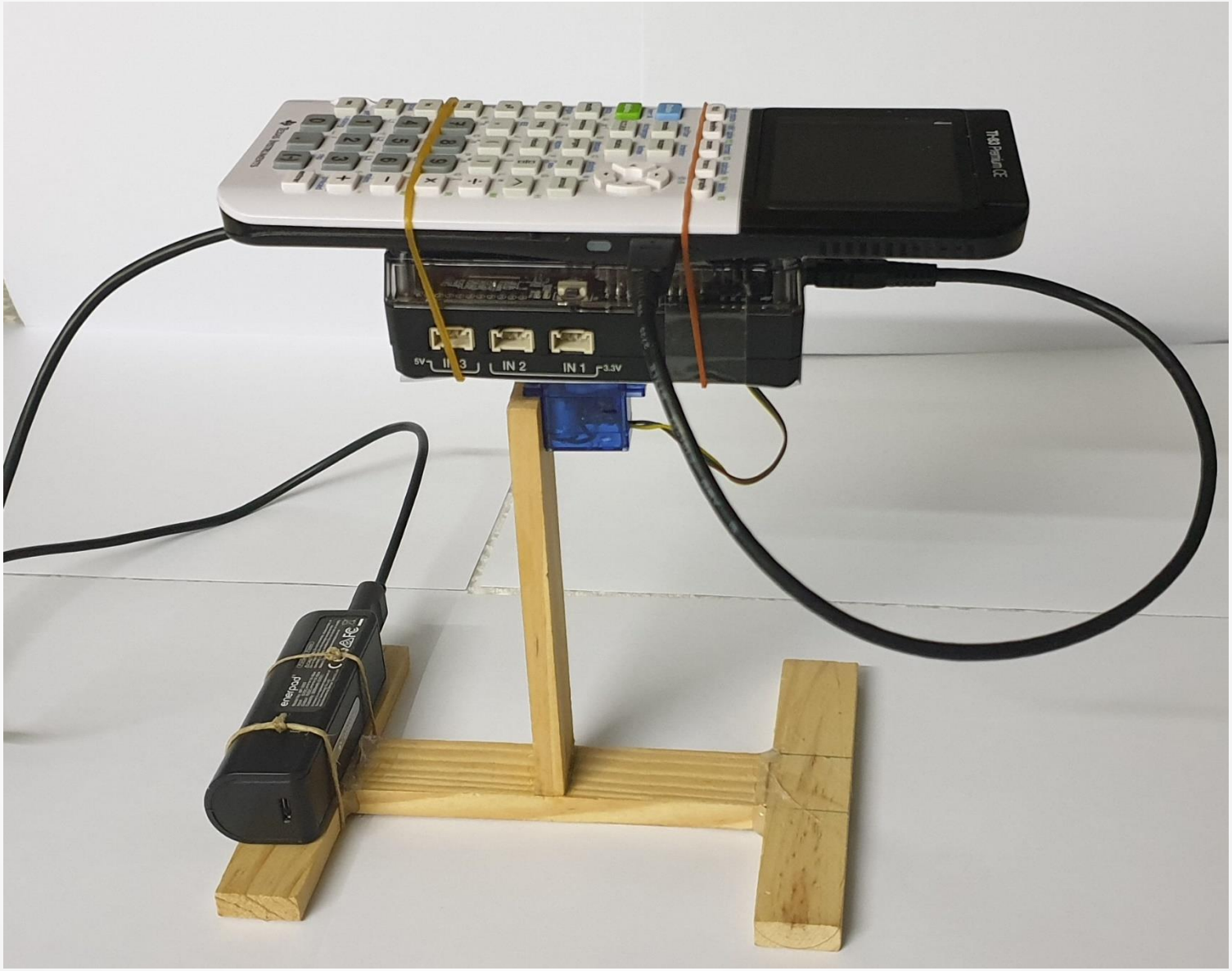
# In classroom



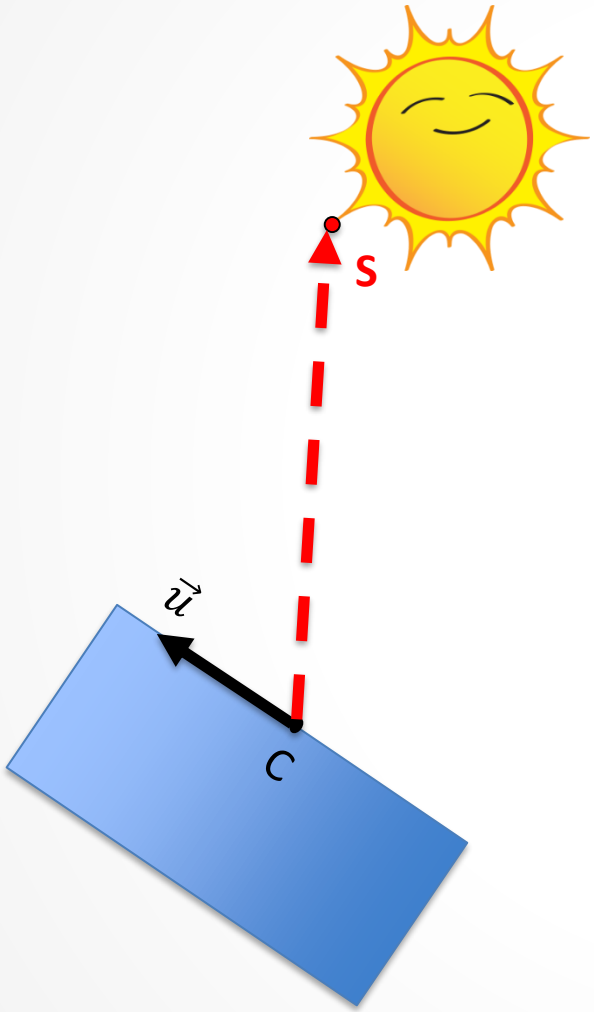
# In classroom



# In classroom



# To go further…




The brightness sensor is
in an optimal position when:

$$\vec{u}.\overrightarrow{CS} = 0$$

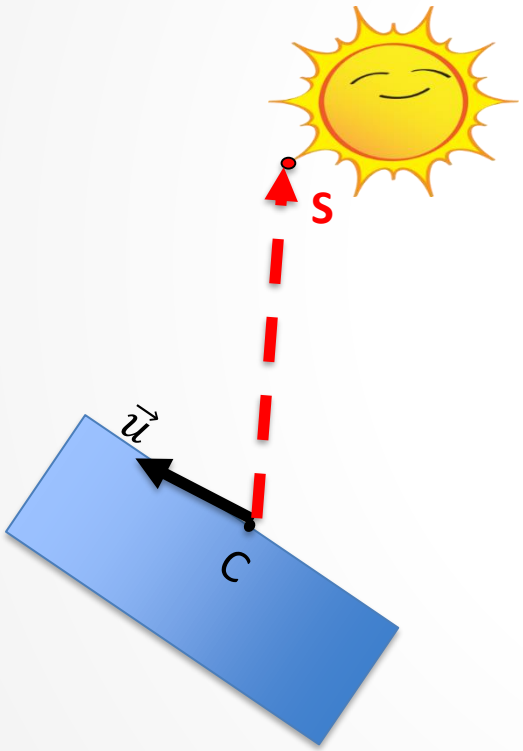
ÉDITEUR : SIMUSUN
LIGNE DU SCRIPT 0007

```
from math import *
import ti_plotlib as plt

def dotP(u,v):
  p=u[0]*v[0]+u[1]*v[1]
  return p
```

Fns… | a A # | Outils | Exéc | Script

# To go further…




"Science without conscience is nothing but ruin to the soul"

*-François Rabelais (1494-1553)-*

TEXAS INSTRUMENTS

# THANK YOU

Teachers Teaching with Technology™