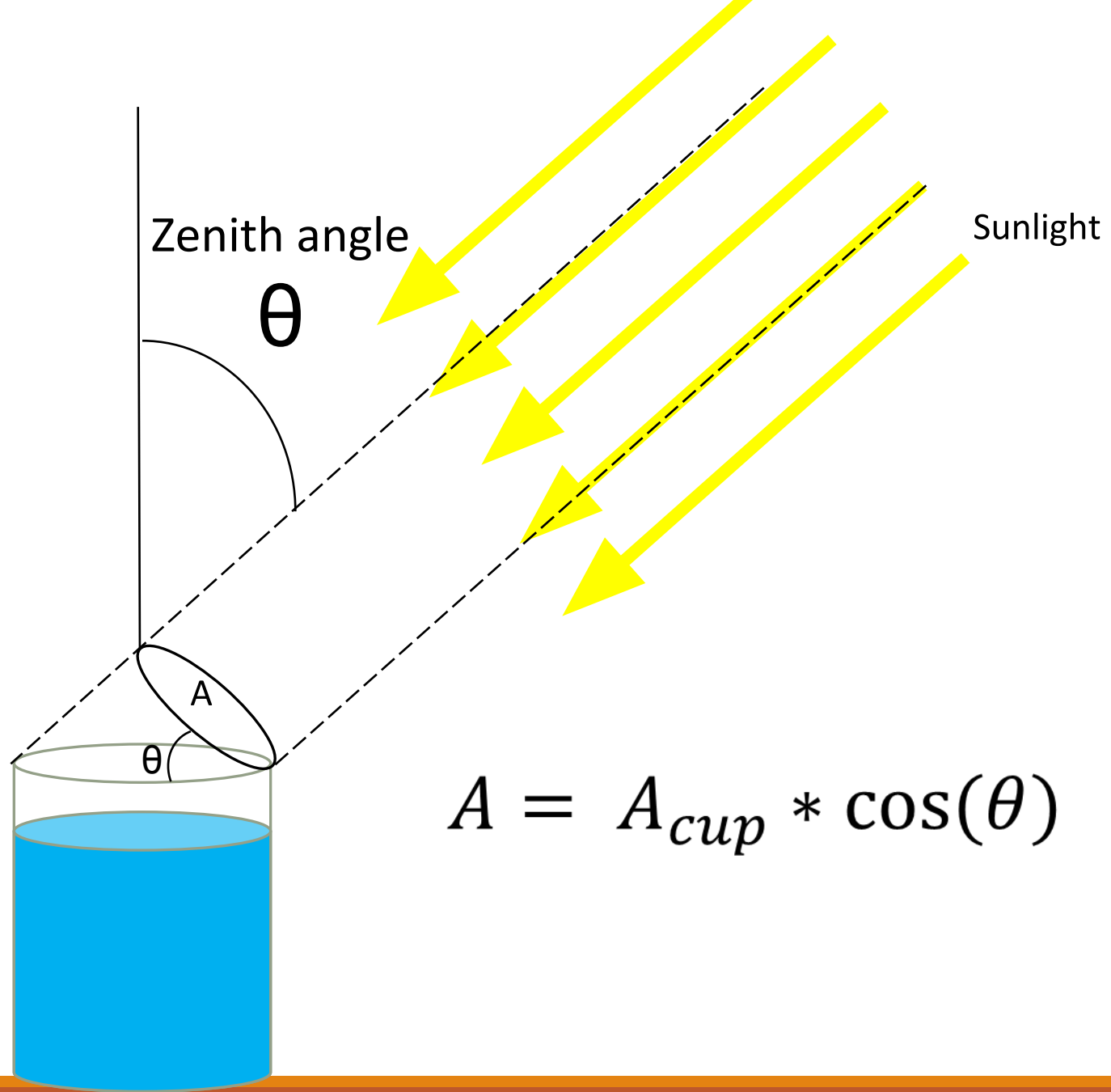


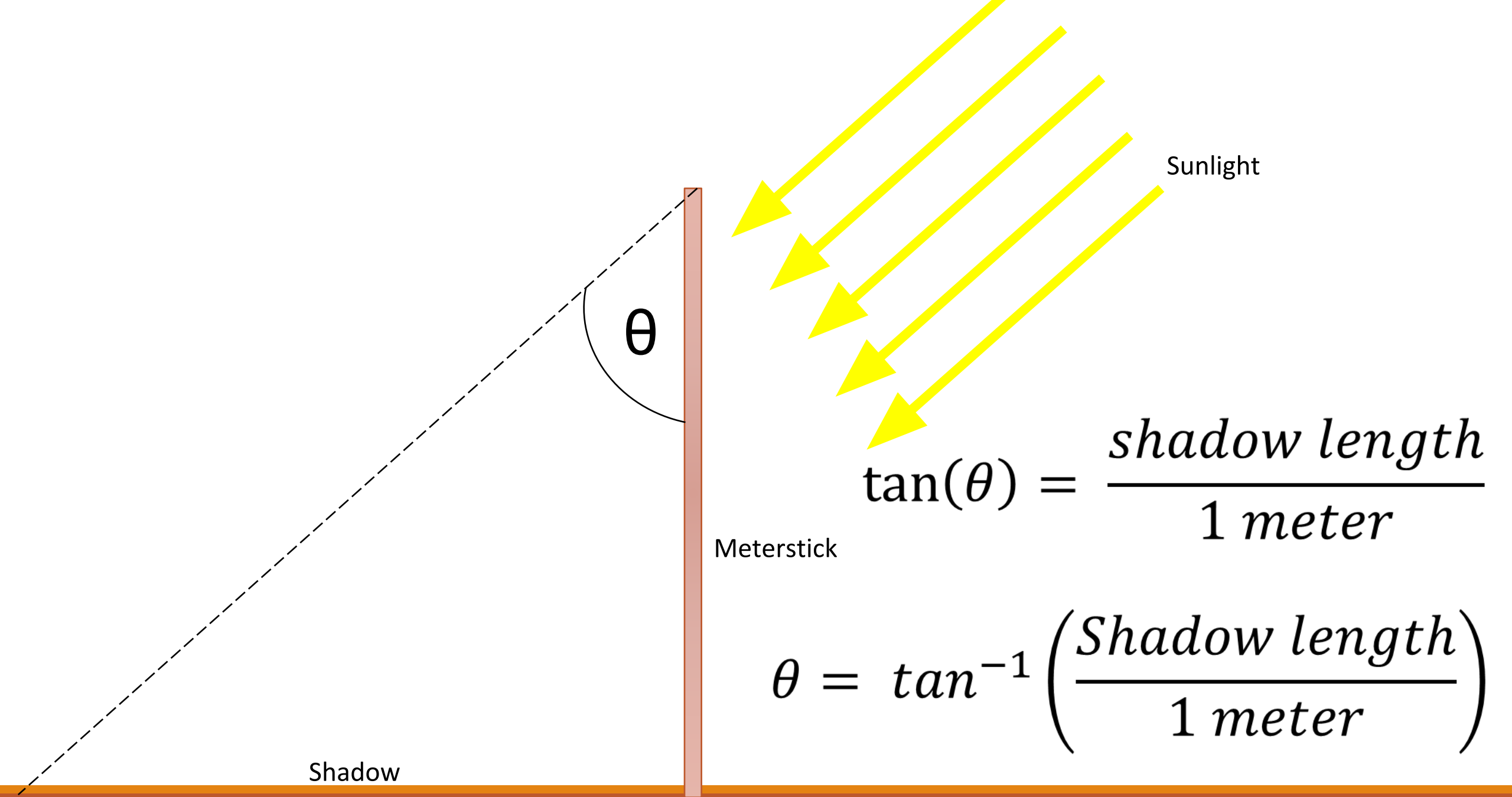
# Measuring the Surface Temperature of the Sun

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LABORATORY EXERCISE

Created by Kenric Davies, PTR  
Adapted from “Temperature of the Sun” by APS Laboratory



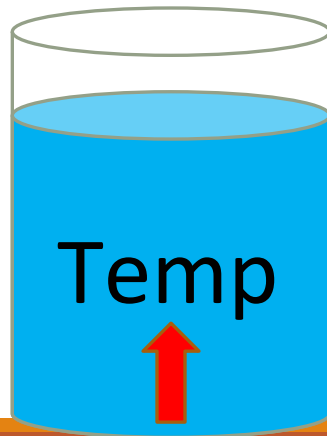


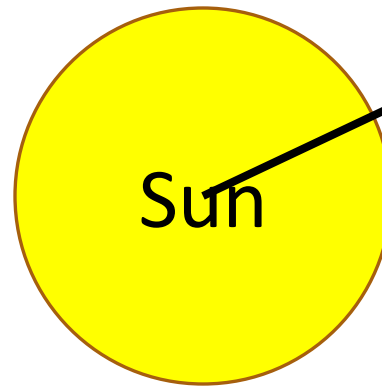
*Energy given by sun = Energy absorbed by water*

$$Flux * A_{cup} * \Delta t = m_{water} * C_{water} * \Delta Temp$$

$$Flux = \frac{m_{water} * C_{water} * \Delta Temp}{A_{cup} * \Delta t}$$

Take in to account atmospheric affects by looking at the table on page 6



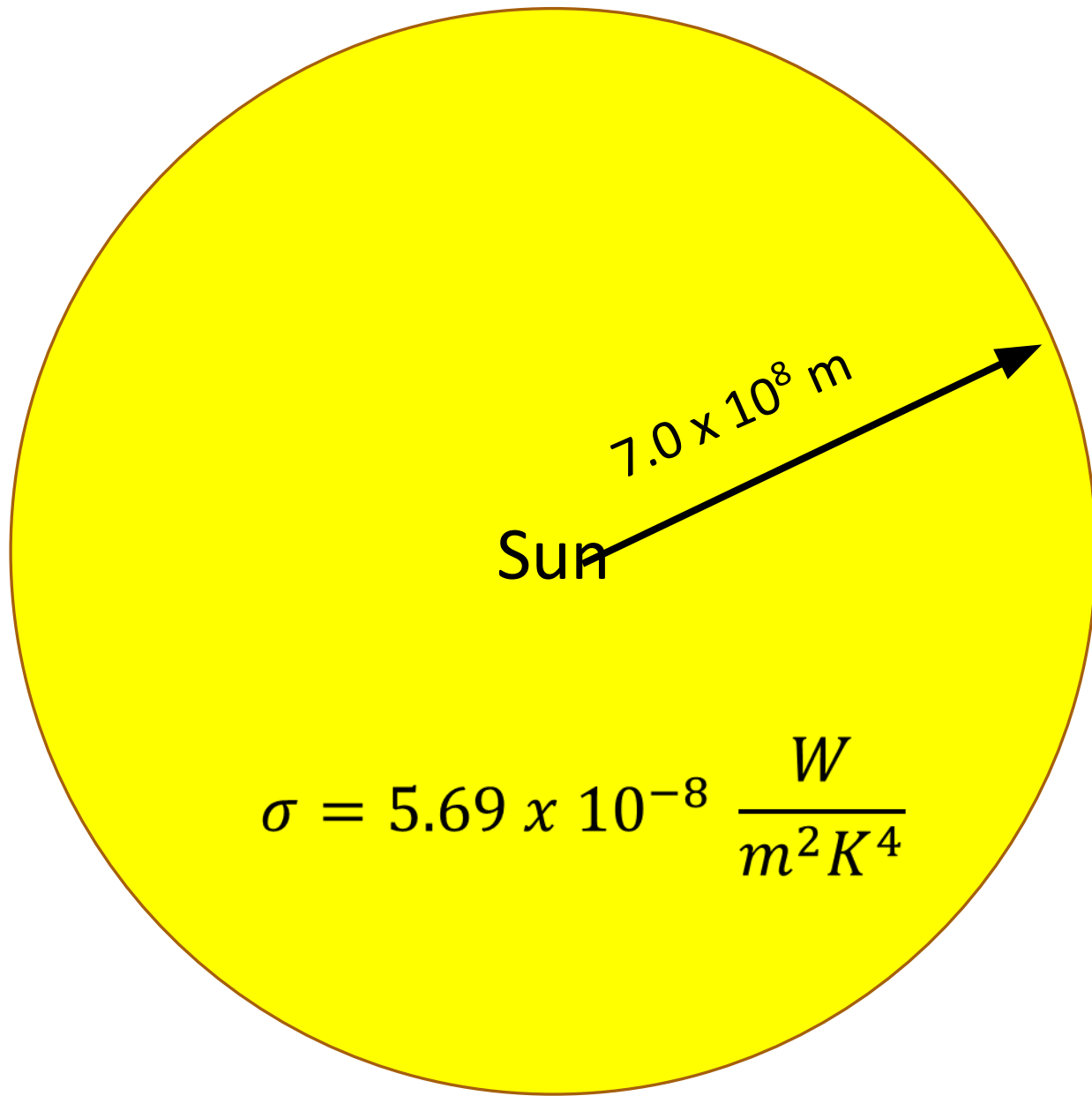


1 AU =  $1.5 \times 10^{11}$  m



*Luminosity = Solar Flux \* surface area at Earth's orbit*

$$Luminosity = Solar\ Flux * 4\pi(1.5 \times 10^{11} m)^2$$



$$E_{sun} = \frac{\text{Luminosity}}{4\pi(7.0 \times 10^8 \text{m})^2}$$

The flux at objects surface is related to the temperature of that object by the following relationship.

$$E_{sun} = \sigma T^4$$

$$T = \left( \frac{E_{sun}}{\sigma} \right)^{1/4}$$