

# Station Card: Angular Size

How big something looks depends on size and distance

Dr. Anna Rosen

Name: \_\_\_\_\_ Section: \_\_\_\_\_

Date: \_\_\_\_\_

Station: \_\_\_\_\_ Group members: \_\_\_\_\_

*Goal:* Use the demo to make a claim supported by (1) at least one number/readout and (2) at least one sanity check.

**Demo:** /demos/angular-size/

**Demo setup:** Compare **Sun** and **Moon (Today)**; then toggle Moon orbit mode.

**Tip:** Click **Station Mode** to add rows and print/copy your table.

**Your station artifact (fill in):** 1) **Control(s):** diameter  $d$ , distance  $D$

2) **Observable(s):** angular diameter  $\theta$  ( $^\circ$  / / )

3) **Governing relationship:** write this equation in words:

$$\theta = 2 \arctan\left(\frac{d}{2D}\right)$$

4) **Sanity check:** what happens to  $\theta$  if  $D$  doubles?

5) **Connection sentence:** "This matters for eclipses because..."

 Word bank + sanity checks

**Word bank:** - **Angular size  $\theta$  (degrees/arcmin/arcsec):** how big an object looks on the sky (an angle). - **Physical diameter  $d$  (km in this demo):** the object's actual size. - **Distance  $D$  (km in this demo):** how far the object is from the observer. - **Small-angle idea:** larger  $d \rightarrow$  larger  $\theta$ ; larger  $D \rightarrow$  smaller  $\theta$ . - **Unit ladder:**  $1^\circ = 60'$  and  $1' = 60''$ . **Sanity checks:** - If  $D$  doubles,  $\theta$  should get about half as big (for small angles). - The Sun and Moon have similar angular sizes today, which is why total solar eclipses are possible sometimes. - Perigee vs apogee: the Moon's angular size is slightly larger at perigee than at apogee.