In-class activity 8

Assemble Your Group

1.   Find your assigned group members, and sign in below.

Team member: _____   Team member: _____
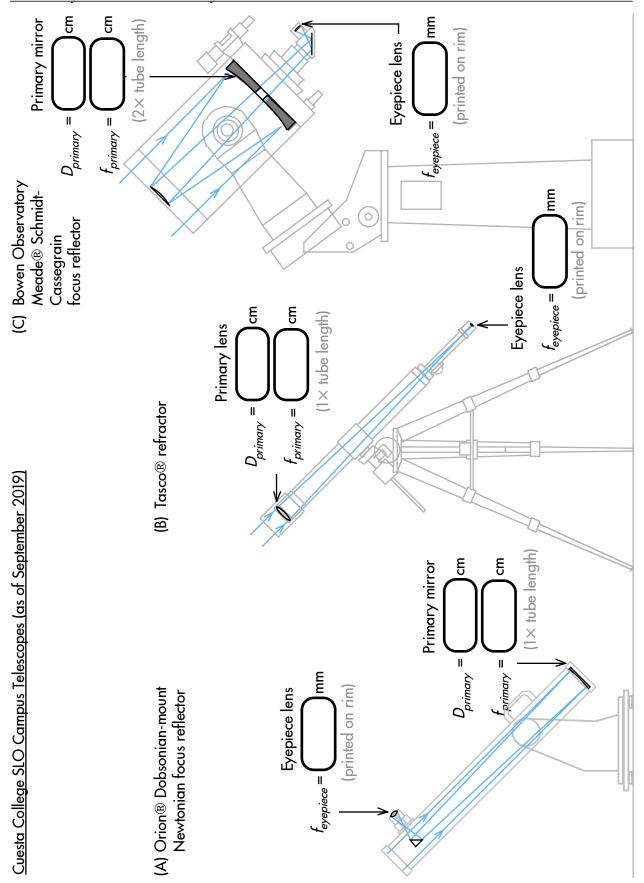
Team member: _____   Team member: _____

Telescope Measurements

2.   (Cf. Seeds and Backman, *ASTRO3*, Brooks/Cole Cengage Learning (2018), p. 64, Fig. 4.4, and p. 70, Fig. 1a and Fig. 1b.) The following page schematically shows the different types of telescopes[1] used at Cuesta College San Luis Obispo campus. For each telescope, use a ruler to measure the following parameters:

   (a)   Primary mirror/lens diameter = $D_{primary}$
          (measure the width of the primary mirror or lens)

   (b)   Primary mirror/lens focal length = $f_{primary}$
          (approximately 1× or 2× the tube length)

   (c)   Eyepiece lens focal length = $f_{eyepiece}$
          (printed in mm on the eyepiece)

You will use these data later to compare the light-gathering, resolving, and magnifying powers of these telescopes.

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[1]Simplification: the Meade™ Schmidt-Cassegrain focus reflector at the Bowen Observatory is shown without a "corrector plate" lens on the front.

Cuesta College SLO Campus Telescopes (as of September 2019)

(C) Bowen Observatory Meade® Schmidt-Cassegrain focus reflector

Primary mirror

$D_{primary}$ = ___ cm

$f_{primary}$ = ___ cm

(2× tube length)

Eyepiece lens

$f_{eyepiece}$ = ___ mm

(printed on rim)

(B) Tasco® refractor

Primary lens

$D_{primary}$ = ___ cm

$f_{primary}$ = ___ cm

(1× tube length)

Eyepiece lens

$f_{eyepiece}$ = ___ mm

(printed on rim)

(A) Orion® Dobsonian-mount Newtonian focus reflector

Primary mirror

$D_{primary}$ = ___ cm

$f_{primary}$ = ___ cm

(1× tube length)

Eyepiece lens

$f_{eyepiece}$ = ___ mm

(printed on rim)

Telescope Powers

3. Answer the following questions regarding the light-gathering, resolving, and magnifying powers of telescopes used at Cuesta College San Luis Obispo campus (cf. Seeds and Backman, *ASTRO3*, Brooks/Cole Cengage Learning (2018), pp. 65-68).

    (A)   Orion® Dobsonion-mount Newtonian focus reflector.
    (B)   Tasco® refractor.
    (C)   Meade® Schmidt-Cassegrain focus reflector, at the Bowen Observatory.

(a) The *light-gathering power* of a telescope is the ability to collect light to produce bright images. Rank these telescopes from least to most light-gathering power; clearly indicate ties (if any). Briefly explain which measurements were used to make your ranking.

_____   _____   _____
(least LGP)   (most LGP)

Explanation:

(b) The *resolving power* of a telescope is the ability to reveal fine detail. Rank these telescopes from least to most resolving power; clearly indicate ties (if any). Briefly explain which measurements were used to make your ranking.

_____   _____   _____
(least RP)   (most RP)

Explanation:

(c) The *magnifying power* of a telescope is the ability to produce a large image. Since eyepieces are interchangeable, determine specifically which eyepiece should be used with which telescope to produce the greatest magnification, and then briefly explain your answer.

Using the $f_{eyepiece}$ = _____ mm with telescope $\begin{bmatrix} (A) \\ (B) \\ (C) \end{bmatrix}$ produces the greatest magnification.

Explanation: