

In-class activity 9

Assemble Your Group

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

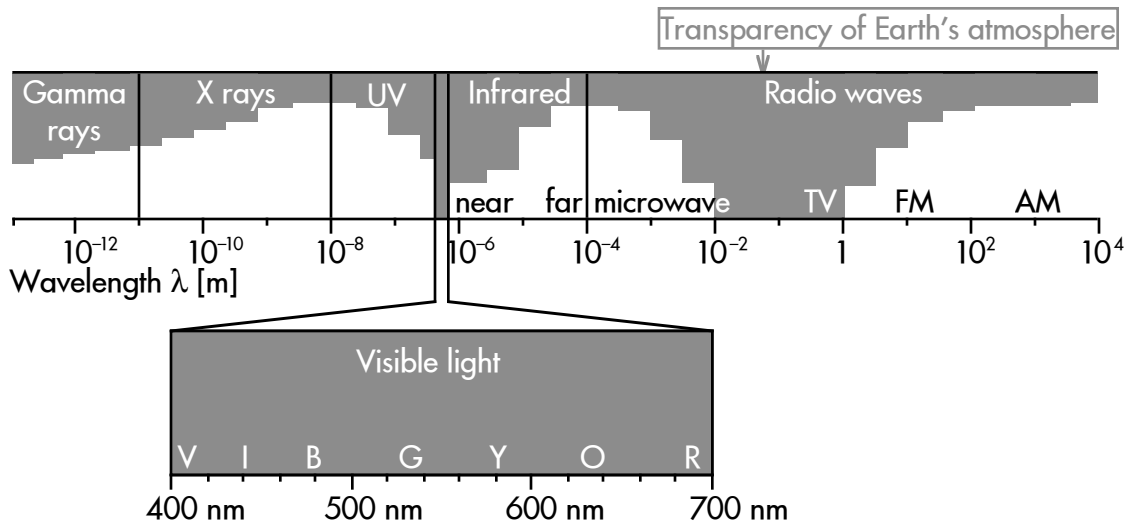
Team member: _____

Team member: _____

Team member: _____

Team member: _____

The chart shown below¹ shows the electromagnetic spectrum along with the approximate amount of electromagnetic radiation that is transmitted through Earth's atmosphere. This chart will be provided for reference in quizzes and exams.



¹Adapted from Seeds and Backman, *ASTRO3*, Brooks/Cole Cengage Learning (2018), p. 62, Fig. 4-2.

*Telescope Funding*²

2. Federal funding agencies form committees to decide which telescope projects receive funds for construction, taking these factors in consideration:
- I. The electromagnetic radiation wavelength to be detected (blocked by versus transmitted through Earth's atmosphere).
 - II. The cost-effectiveness of site placement (space/air versus less expensive ground-based alternatives).

Knowing this, consider each pairing of telescope proposals listed below and circle which proposal your committee would fund, using only the criteria above. Briefly explain your answer for each set of choices.

- (a) A near infrared telescope in the mountains of Chile (8,600' elevation), versus an x ray telescope in Antarctica (8,000' elevation).

Based on effectiveness/cost criteria, the $\left[\begin{array}{l} \text{near infrared} \\ \text{x ray} \end{array} \right]$ telescope should be funded.

Explanation:

- (b) A far infrared telescope on a high-altitude airplane (45,000' altitude), versus a (TV) radio telescope orbiting in space (above 500,000' altitude).

Based on effectiveness/cost criteria, the $\left[\begin{array}{l} \text{far infrared} \\ \text{radio} \end{array} \right]$ telescope should be funded.

Explanation:

- (c) A gamma ray telescope orbiting in space, versus an optical (visible light) telescope orbiting in space (both above 500,000' altitude).

Based on effectiveness/cost criteria, the $\left[\begin{array}{l} \text{gamma ray} \\ \text{optical} \end{array} \right]$ telescope should be funded.

Explanation:

²Adapted from Adams, Prather, and Slater, *Lecture-Tutorials for Introductory Astronomy, 1/e*, Addison-Wesley (2005), pp. 43-45.