In-class activity 8

This assignment is worth a maximum of 3.0 points, and is due in class today. No in-class assignment is accepted after the end of class.

Work cooperatively and collaboratively as a team on this in-class assignment. Each person in your group will be awarded the same points as the entire assignment. *Turn in this sheet at the end of class, and attach another page if necessary.*

Assemble Your Group

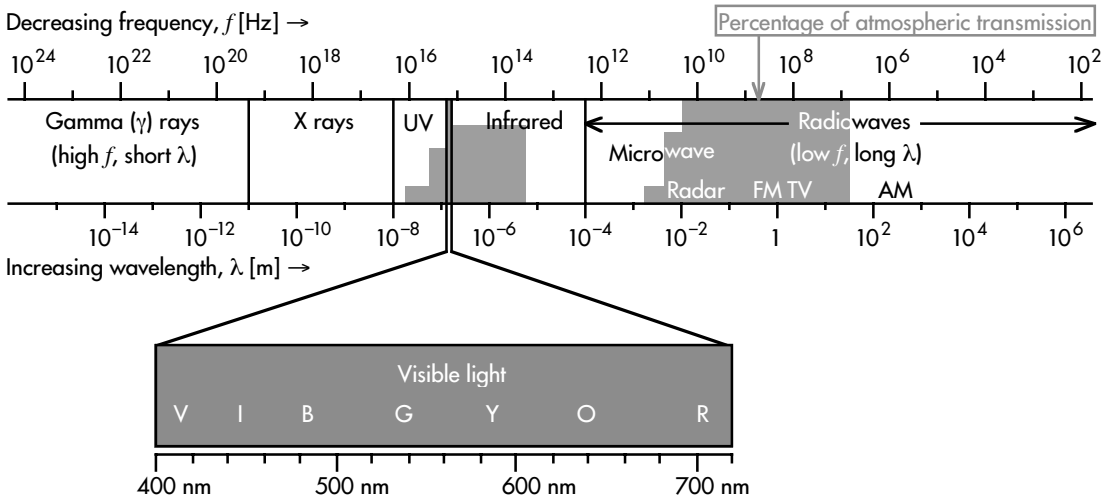
1. [0.5 points.] Find your assigned group members, and sign in below.

Team member: _____ Team member: _____

Team member: _____ Team member: _____

Wavelength "Windows"

2. [1.0 point.] The chart shown below combines Figures 6.5 and 6.28 from Fix, *Astronomy: Journey to the Cosmic Frontier, 4/e*, pages 105 and 117, and shows the electromagnetic spectrum (plotted left-to-right in terms of increasing wavelength instead of increasing frequency), along with the approximate amount of electromagnetic radiation that is transmitted through the Earth's atmosphere (note partial ultraviolet transmittance is included as well). (This chart will be provided for reference in Midterm 1.) (*Cf. Lecture-Tutorials for Introductory Astronomy*, pages 43-45 for more details.)



(a) Which, if any, of the different wavelengths of electromagnetic radiation are not able to penetrate the Earth's atmosphere at all? (You may circle more than one answer.)

[γ rays.
X rays.
UV.
Visible light.
IR.
Radio waves.
(None.)]

(b) Which, if any, of the different wavelengths of electromagnetic radiation are able to penetrate into the atmosphere, to at least reach high altitudes of the Earth's surface? (You may circle more than one answer.)

[γ rays.
X rays.
UV.
Visible light.
IR.
Radio waves.
(None.)]

(c) Which, if any, of the different wavelengths of electromagnetic radiation are most able to penetrate completely through the entire atmosphere and reach the Earth's surface? (You may circle more than one answer.)

[γ rays.
X rays.
UV.
Visible light.
IR.
Radio waves.
(None.)]

Telescope Funding

3. [1.5 points.] Federal funding agencies must form committees to decide which telescope projects will receive funds for construction. When deciding which projects will be funded, these committees must consider:

I. The wavelengths of electromagnetic radiation to be detected (blocked versus transmitted through).
II. The cost of site construction (space versus remotely/locally placed land sites).

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

(a) Project Delta is a gamma ray wavelength telescope located in Antarctica. Project Theta is a visible wavelength telescope, based in a rural university campus.

Based on the effectiveness/cost criteria above, $\begin{bmatrix}\text{Project Delta}\\ \text{Project Theta}\end{bmatrix}$ should be funded.

(b) Project Beta is an x-ray wavelength telescope located in northern Canada. Project Alpha is an infrared wavelength telescope, placed on a satellite in orbit around the Earth.

Based on the effectiveness/cost criteria above, $\begin{bmatrix}\text{Project Beta}\\ \text{Project Alpha}\end{bmatrix}$ should be funded.

(c) Project Zeta is a radio wavelength telescope located in the Mojave Desert. Project Epsilon is an infrared wavelength telescope, located in the high-elevation mountains of Chile.

Based on the effectiveness/cost criteria above, $\begin{bmatrix}\text{Project Zeta}\\ \text{Project Epsilon}\end{bmatrix}$ should be funded.

(d) Consider the three projects that you have decided should be funded. Out of those three projects, decide which one should receive the highest priority, and briefly explain why.

Priority project: _____

Explanation: