

Team 1: What type of object should we study?

- Research basic information about different astrophysical objects

Moons

Planets

Stars

The Sun

Protostars

Low mass stars

Medium mass stars (like the Sun)

High mass stars

Red giant stars/Supergiant stars

White Dwarfs

Neutron stars

Pulsars

Black holes

Quasars

Supernovae

Nebulae

Galaxies

...or anything else you can think of that sounds interesting!

- In an infomercial, recommend to Team 2 a type of object to study with our telescope, including any challenges you foresee for studying that object. Report on what that type of object is and why that type of object is interesting, in addition to briefly describing other objects you considered and why you chose to study this object rather than those.

Team 2: Electromagnetic Spectrum

- Review the infomercial from Team 1
- Research all the different parts of the electromagnetic spectrum

Radio

Microwave

Infrared

Visible

Ultraviolet

X-Ray

Gamma ray

- Figure out which part of the spectrum will give you the most information about the type of object chosen for study by Team 1.
- In an infomercial, recommend to Team 3 which part of the electromagnetic spectrum you chose to use to study the object, and why you chose that part of the spectrum. Be sure to include any challenges you foresee that come with using that part of the spectrum. Also, report what each part of the spectrum is, and for the parts you are not choosing to use for the telescope, report why you chose not to use them.

Team 3: What will we learn about the objects by studying them in this part of the electromagnetic spectrum?

- Review the infomercials from Teams 1 & 2.
- Review what is known about these objects in general, not necessarily just in your part of the electromagnetic spectrum.
- Determine whether or not there have been previous studies of these objects in this part of the

electromagnetic spectrum. If there have been previous studies, what new information will your telescope reveal (will your measurements be more sensitive? cover a longer time period? see more of the sky in its field of view than previous instruments? be more focused on a small field of view, but in greater detail than previous instruments?)

- In an infomercial, report to Team 4 what information you will learn about the object by studying it in this part of the spectrum with your telescope, along with general background information that is already known about the object. Include background knowledge from all parts of the electromagnetic spectrum, but focus especially on the part you have chosen.

Team 4: Where should we locate the telescope?

- Review the infomercials from Teams 1, 2, & 3.
- Research existing telescopes in the part of the spectrum chosen by Team 2
- Determine whether or not your telescope needs to be ground-based or space-based, or could be either.
- Recommend a location for our telescope
  - If ground-based, are there any climate/population/geographic considerations?
  - If space-based, should it be in orbit around Earth? If so, at what altitude? Or would it be better located at a Lagrange point? Or would it be best with a planned flight path through the solar system? Or would it be best to send it to a destination? Or is there elsewhere in space it would best be located?
- In an infomercial, recommend a location for the telescope to Team 5. Explain why you recommended this location. Briefly mention some of the other locations you considered, and explain why you decided they were not suitable.

Team 5: What instruments and technical systems will be necessary for the telescope to function?

- Review the infomercials from Teams 1, 2, 3, & 4.
- Research existing telescopes similar to the one your class is proposing to build.
  - What instrument(s) are on board the telescopes for the collection of scientific data (cameras, spectroscopes, etc.)?
  - What other major systems are necessary for the telescopes to function (cooling systems, power systems, guidance systems, communication systems, etc.)?
- How do these systems work in existing telescopes? Find a BASIC description (does not have to be extremely technical)
- Considering the science goals outlined by Team 3, decide which instruments your telescope should have on board.
- In an infomercial, recommend to Team 6 the instruments and systems your telescope should have, including a basic description of how they work. Mention some of the other instruments or systems you considered including on board your telescope but decided weren't necessary, and explain why you decided not to include them.

Team 6: Final presentation summarizing the project

- Review the infomercials from Teams 1, 2, 3, 4, & 5.
- Prepare an infomercial for the whole class that summarizes the reports from each team
  - Emphasize the big picture (what new science do we hope to learn from this telescope? why will this telescope be different from previous telescopes?), and be sure to tie each team's efforts into this big picture.
  - Make it clear what each team recommended for your telescope, but also include *some* of the other options each team considered but decided not to use.
- Show the infomercial to the class, so that everyone is aware of the research process and

questions considered by the other teams that they weren't part of.