

**GP 2 (Berkeley Grant Game): Probe build phase**

Your group has been awarded one of the coveted hyperdrive-driven **probes** to be sent to the newly-discovered planetary system orbiting the star □ Bigun. The image captured from the ancient Terrestrial Planet Finder shows a Sun-type (G class) star called □ Bigun with six planets of Mars-size or greater. For convenience, the planets are lettered in order of distance from the star, so the nearest planet is called □ Bigun A, the second planet out is called □ Bigun B, and so forth, all the way to the furthest planet □ Bigun F. **Nothing else is known about these planets:** that is your group's job.

You can place any of the **instruments** in the list below onto the probe. Note that there are certain conditions associated with using individual instruments; they can do no more and no less than what is stated. For the discovery phase, each instrument also requires the outlay of funds in order to use it; this pays for the technicians' time as well as part of the development costs of constructing the instrument. Remember that your group has \$100,000 to spend using the instruments for the duration of the game.

Instrument name	Mass (kg)	Field of view and resolution of instrument	Limits and cost per use
High-resolution visible wavelength camera	20	1000 by 1000 km; 10 km	One image per proposal at \$5,000/image
Low-resolution visible wavelength camera	10	Whole planet; 1000 km	One image per proposal at \$1,000/image
Radar (radio-wavelength) mapper	20	1000 by 1000 km; 100 km	One image per proposal at \$3,000/image
Thermal emission (infrared-wavelength) spectrometer	10	1000 by 1000 km; 100 km	One image per proposal at \$2,000/image
Surface material infrared absorption spectrometer	20	1000 by 1000 km; 100 km	One image per proposal at \$3,000/image
Atmospheric infrared absorption spectrometer	20	1000 by 1000 km; 100 km	One image per proposal at \$3,000/image
Mossbauer absorption spectrometer	10	1000 by 1000 km; 100 km	One image per proposal at \$2,000/image
Ground/ice coring device	20	Useless without either a surface material or a Mossbauer spectrometer	One surface sample per proposal at \$3,000/sample
Gas chromatograph mass spectrometer	20	irrelevant	One atmospheric sample per proposal at \$7,000/sample

Astronomy 101

**Group roster and probe design for exploring the □ Bigun planetary system**

Name of university (group name) \_\_\_\_\_

List of group members' names:

Probe instrument inventory:

Instrument name	Mass (kg)
Radio transceiver to receive instructions/send data	10
<b>Total mass</b> (must not exceed 60 kg)	

