

# EXOPLANET EXPLORATION

## MISSION SHEET

TEAM NAME:

CREW MEMBERS:

>> Teams of three are being sent out from Earth to explore previously detected extrasolar planets to determine how suitable each planet is for humans to inhabit. Each team's mission is to gather information about their assigned planet and send a report back to mission control. What mission control has requested from each team is (1) a report, including a picture, detailing what has been learned about the planet, (2) a three dimensional model of the planet and its moons, and (3) an example model of any life forms that have developed on the planet.

>> The biggest influence on the characteristics of your team's planet is the color and brightness of the star that it orbits around. Your team's assigned star will be a BLUE / RED star.

### mission log

Considering the type of star that your assigned planet orbits and other factors mentioned during the group discussion, answer the questions below to describe your planet. Keep in mind that your assigned planet exists within the habitable zone of the star but that this does not guarantee that life as we know it can or will exist on the planet.

1. On average, is the planet temperature warmer, the same, or cooler than Earth?
2. What is the length of a day? The length of a year?
3. Is the force of gravity more or less than what you experience on Earth, thinking about the radius and density of your planet?
4. What features exist on the surface (e.g. mountain ranges, oceans, hurricane-like storms)?
5. Is the planet in a nearly circular orbit or does its distance from the star change significantly during the course of a year?
6. Is the tilt of the axis more or less than Earth's? How does this affect the seasons?
7. How many moons, considering the effect on the tides? (limit three)
8. Roughly how old is the planet (consider the potential age of the star)?
9. What makes your planet unique?

# CREW MEMBER JOB DESCRIPTIONS

## communicator

In charge of describing the planet, including any ecosystems that already exist. Be sure to include any details about your planet that were not already discussed in the report questions.

- >> On one side of the postcard provided, design and draw a picture of a specific location on the planet, including any life forms.
- >> On the reverse side of the postcard, write up a description of the planet and if you think it would be suitable for humans to inhabit.

## surveyor

In charge of designing a three dimensional model representation of the planet.

- >> Consider as many of the aspects of the planet described in the report questions as possible.
- >> Be sure that any additional characteristics described in the Communicator's report that are relevant to the model are also included.
- >> Think of the job as kind of a planetary topographer, in charge of giving mission control a better idea of what the planet looks like.

## biologist

In charge of designing an alien life form (plant, animal, or intelligent being) that inhabits the planet. Some aspects to consider:

- >> How would the available light from the star impact the evolution of life?
- >> How would gravity effect evolution of life?
- >> Does the planet have a rocky surface, or is it completely covered with water, or is it a gaseous planet?

# REFERENCE SHEET

## INFORMATION ON STAR TYPES AND HABITABLE ZONES

### blue stars

- The largest and brightest stars
- Temperature around 35,000 oF (the Sun is only 10,000 degrees)
- Up to a million times brighter than the Sun
- Emit blue and ultraviolet light
- Stable for only 10 million years  
(Sun will be stable for 10 billion years)

### yellow stars

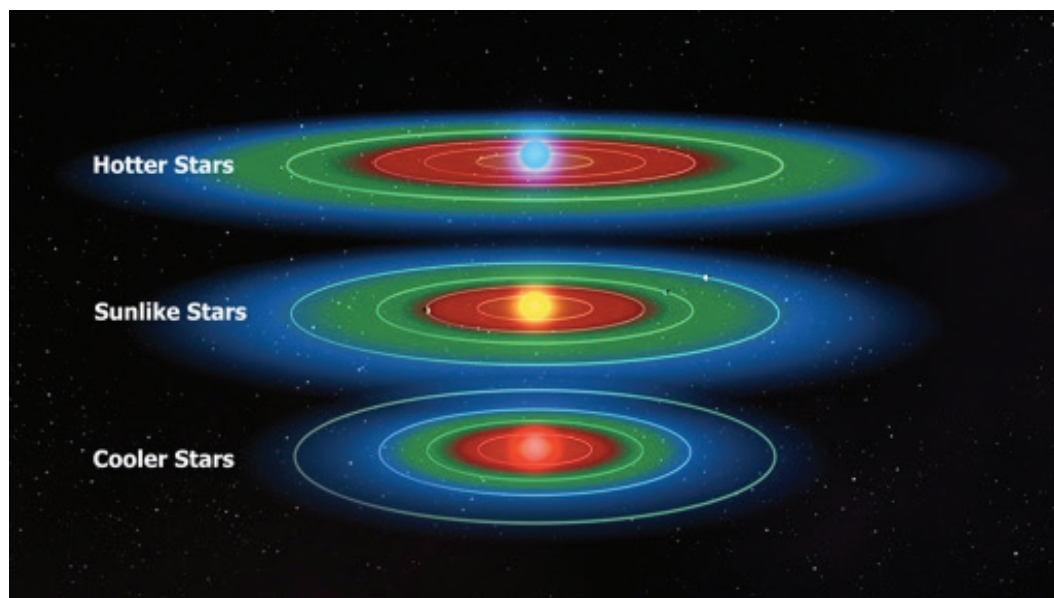
- Similar to our own sun!
- Temperature around 10,000 degrees
- Emits visible light, primarily yellow light
- Stable for about 10 billion years

### red stars

- The smallest and dimmest of the stars
- Temperatures around 5,000 degrees
- Emit primarily red and infrared light
- Can be stable for 100 billion years!

### habitable zone

Range of distances from star where liquid water can exist on surface of a planet.



red indicates temperatures too hot for liquid water

blue indicates temperatures too cold for liquid water