

**PBIS**

# Planetary Forecaster

**AS A STUDENT SCIENTIST, YOU WILL...**

**Ask  
QUESTIONS**

**APPLY  
MEANING**

*Pursue*  
**ANSWERS**

**Make  
MEANING**

*Share*  
**ANSWERS**

# What's the Big Challenge?

*Which regions of a newly discovered planet have appropriate surface temperatures for a human colony?*

Weather is an important part of your daily life. What you wear and do outside depends on the weather. Weather describes what the atmosphere is like at a given time and place. It includes things like temperature, precipitation, wind, air pressure, and humidity. Over a long period of time, these factors determine the **climate** of an area. Though humans have figured how to survive in a variety of climates, some climates require more energy to survive

**climate:**  
the average condition of the weather of a place.



**TO:** All Potential Research Scientists  
**FROM:** The Cooperative Space Agency  
**SUBJECT:** Request for researchers

The Cooperative Space Agency (CSA) has been searching outside the solar system for new planets. CSA is looking for planets that could support human life. The goal of CSA is to some day establish human colonies on other planets. CSA has found a new planet very similar to Earth that revolves around a star very similar to our Sun. For now, it is called *Planet X*. This planet is the same distance from its star as Earth is from the Sun. There appears to be water on the planet. It also has an atmosphere with enough oxygen to support humans.

However, CSA has not yet found the temperature ranges on *Planet X*. This information is needed to know if the planet is appropriate for a colony. CSA is putting together a team of research scientists to find out this information. You have been selected as a possible member of this team.

Please expect another bulletin with more details at a later date.



*Advances in technology have helped scientists find several Earth-like planets. These planets are outside our solar system.*

in than others. How do people who live in the Arctic stay warm in the winter? How do people in Texas stay cool? A group of human colonists traveling to a newly discovered planet would want to find a place to live where the temperatures never get too hot or cold.

Scientists have recently discovered several planets that they think may

*Welcome to Planetary Forecaster. Enjoy the challenge of being a student research scientist.*

be a lot like Earth. These planets are outside our solar system, so it is not possible for humans to travel to them, but imagine if they could travel to one... Scientists would want to know where the best place for people to live on that planet would be. Scientists understand a lot about the weather and climate of Earth and the advantages and disadvantages of living in these different climates. They could use what they know about Earth to predict what the climate of this other planet would be like. This is what you will be doing. Read the bulletin on the previous page.

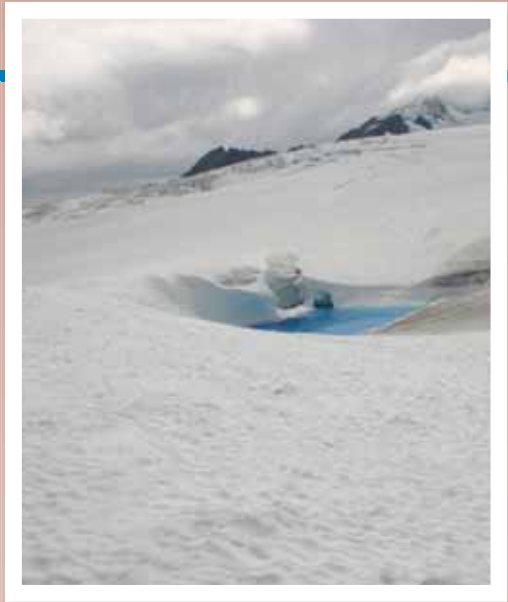
## Think about the *Big Challenge*

Your challenge for this Unit is to research one climate factor on *Planet X*. That factor is temperature. The temperature ranges on the planet will determine if it is suitable for a human colony.

Before you get started on any challenge, it is a good idea to organize your thinking. You will start this Unit by thinking about what areas here on Earth are habitable for humans and what makes them that way.

## Get Started

1. What would make a place suitable for a human colony? Make a list of what you think is needed and why you think it is needed to sustain a colony.
2. As you know, people live all over the world. Carefully observe the pictures on the right. They show different regions of the world. As you look at the pictures, think about the following questions:
  - What factors do you think affect the temperatures of the different regions?
  - How much do you think the temperatures change in the different regions at different times of year?
  - Which areas do you think would be best suited for a human colony? Why?



*Tundra in the Arctic.*



*Desert in Africa.*



*Deciduous forest in New York State.*



*Tropical rainforest in Costa Rica.*



*Grassland in Wyoming.*

## Conference

Share your ideas with the rest of your group. Discuss the factors you thought affected the temperature of each region. Also, make sure that you understand why each group member thought an area was suitable for a human colony. You may disagree, but listen carefully to each group member’s ideas.

Decide as a group what are the most important things you’ll need to know about the temperature of a planet to figure out which areas are suitable for a human colony. What questions are important to investigate in order to successfully complete your challenge?

## Create a *Project Board*

It is useful, when you are working on a challenge, to keep track of your progress. It is also useful to keep track of what you still need to do. Throughout this Unit, you will be using a *Project Board* to do that. During classroom discussions, your teacher or one of the students will record the class’s ideas on a class *Project Board*. At the same time, you will keep track of what has been discussed on your own *Project Board* page.

Which regions of a newly discovered planet have appropriate surface temperatures for a human colony?				
What do we think we know?	What do we need to investigate?	What are we learning?	What is our evidence?	What does it mean for the challenge or question?

Recall that a *Project Board* has space for answering five guiding questions:

- What do we think we know?
- What do we need to investigate?
- What are we learning?
- What is our evidence?
- What does it mean for the challenge or question?

To get started on this *Project Board*, you need to identify and record the important science challenge you need to address: ***Which regions of a newly discovered planet have appropriate surface temperatures for a human colony?***

### ***What do we think we know?***

In this column of the *Project Board*, you will record what you think you know about surface temperature and temperatures suitable for a colony. Discuss and post the things you and your classmates think you know. Have you studied these concepts before? What did you learn then? Even if it is a small fact or idea, talk about it. Discuss any factors that you might think affect the temperature of a region.

### ***What do we need to investigate?***

In this column, you will record the things you need to investigate. During your group conference, you may have found that you and others in your group disagreed with some of your ideas. You may not know exactly what determines the temperature of a region. This second column is designed to help you keep track of things that are debatable, unknown, and need to be investigated.

Later in this Unit, you will return to the *Project Board*. For now, work with your classmates as you begin filling in the first two columns.