1. Objective & Introduction

Today's lesson objective is: **Students will propose answers to scientific questions using inference and prediction.**

People are very curious by nature. We ask a lot of questions because we are looking for answers. Sometimes we are able to answer those questions based on something we observed that happened in the past or by testing what we think might happen in the future. In this lesson, we are going to talk about answering questions using inferences and predictions.
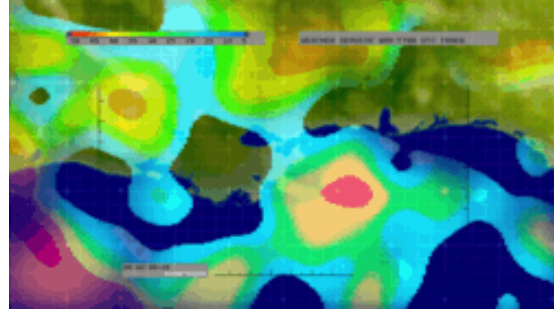
Take a moment and think about this objective. What strategies will you use to *answer* scientific questions? Are they different than the strategies you used to ask the questions?

Open your digital notebook and describe any strategies that you might use in this lesson. Think about how you ask and develop scientific questions. What will you do differently when you predict and infer answers to those same types of questions? What do you think you will do the same way? Make yourself a chart in your digital notebook to compare the ways you ask and predict and infer answers to scientific questions. Comparing and contrasting is an important learning skill that can help you understand more about questions and the inquiry process.

2. What is an Inference?

Have you ever looked outside in the morning and noticed that the sidewalk looked dark and the grass looked moist? Maybe there was water on the cars parked in the driveway or street.

What did you think had happened? Surely, no one had walked down your street with a hose and sprayed water on your yard or car! What did your prior experience tell you must have occurred? When you answer a question using your prior experience and knowledge, you are making an inference.

Making an inference is using your prior knowledge to answer a question based on observations and data. What can you infer about the wet ground and cars? Maybe it rained last night. This would be an acceptable inference because you know the ground becomes wet when it rains. You've experienced this before. Another possibility is that the sprinkler was on overnight watering the ground. Either possibility could be correct and both would be acceptable inferences.

Let's try another example.

You walk into the kitchen after school to get a snack and you smell onions, but you don't see them anywhere. You ask the question "Why do I smell onions?" What can you infer? You know that if you smell an onion, someone

must have cut one open. A possible inference is that someone was cutting or cooking with onions for lunch in the kitchen.

Now it's your turn to pick out some inferences.

Decide if each statement is an inference or just an observation.

The ground is wet. A water balloon must have just burst here.	○ Inference	○ Observation
The ball bounces when you drop it on the floor.	○ Inference	○ Observation
The water in the pot is hot. It must have been on the stove.	○ Inference	○ Observation
That shirt has several holes in it, so it must be pretty old.	○ Inference	○ Observation
That bird has very bright, large feathers around its face.	○ Inference	○ Observation

3. Making Inferences about the Future

Inferring is helpful when you are looking at data or observations about past events, but what about those questions on things that *may* happen in the future? To answer those questions, we can use predictions. When we make a prediction, we are making a statement about what we think will happen in the future. We can use our prior knowledge of things that have happened in the past or current data to suggest what may happen.

For example, what if you see gloomy, gray clouds in the sky during the daytime? You ask the question "What is the weather going to be like today?" What can you predict about that? You probably would not say that it would be a good day to get a suntan, because you know that you need sun for that. However, you might predict that it is going to storm sometime soon. You are able to predict this because the last few times the sky looked gloomy and gray, it stormed.

Here's another example.

You are studying dinosaurs and you ask "Will all mammals on earth eventually become extinct as the dinosaurs did?" Based on what you were studying in class, you know that there have been several extinctions over the last several millions of years, so you predict that at some point in the distant future, all mammals will eventually become extinct.

Now you try a few on your own.

Match the question to the correct prediction.

Statement	
Students are not washing their hands before lunch.	—o———o
The sugars in the candy will react with the soda and cause an eruption.	—o———o
Placing rock salt on the sidewalk will make the ice melt faster than just letting the sun melt it.	—o———o
Plants need water once a day, or they will wilt.	—o———o
Plants exposed to classical music will grow faster than plants with no music.	—o———o

:: What happens when you drop candy into diet soda?   :: Why does everyone at school keep getting sick?

:: Does it matter how much water houseplants get?   :: What is the best way to get rid of ice on the sidewalk?

:: What is the effect of music on plant growth?

4. Choosing between an Inference and Prediction

Inferences and predictions are very important to scientists and we will use both inferences and predictions in our science experiments, but it is important to remember when it is appropriate to use them. If the question you are trying to answer deals with a topic in the future, it is appropriate to make a prediction. However, if a question is relying on data that has already been measured, then it is appropriate to make an inference.

Let's practice choosing between an inference and a prediction.

You notice that the caterpillar on the windowsill isn't eating the moth flying by it and you wonder why. Would you make an inference or a prediction in this case?

Since you are not talking about the future, you could use your knowledge of caterpillars to make the inference that it isn't eating the moth because caterpillars aren't carnivores, or animals that eat meat.

You are doing an experiment in class and the teacher asks you what you think will happen before you start. Would your answer to the question be a prediction or an inference? Since the teacher is asking you about something that "will" happen, your answer will be a prediction.

Your turn to try a few!

Decide if the statement is an inference or a prediction by placing it in the correct column.

Prediction	Inference

The new medicine will be able to cure the symptoms of the flu faster.

There was a brown stain on my bedroom ceiling after it rained, so the roof must be leaking.

Adding salt to the water will make it boil faster.

Before I left for vacation, my garden was green and healthy. Now it is dead, so it didn't rain while I was away.

Putting rock salt on the ground before it snows will prevent the sidewalk from getting icy.

5. Summary

You did great work! Now that you know how to answer questions by using inferences and predictions, you are on your way to designing the perfect experiment. Look back at your digital notebook and see if what you predicted would happen actually did happen. Did you use the strategies you said you would?

If you need to review, you can click the Reteach Icon. If you are ready for the assessment, you can click on the Assessment Icon. Do your best and good luck!