Infer or Not To Infer
By Trista L. Pollard

[1] Everyday we make judgments based on our observations. Your friend's dog may not like you because every time you go to pet the dog it growls. When your teacher hands back your geography test, he smiles which makes you think that you did very well. When you step outside in the morning, you notice it is very cloudy. You have a feeling it will rain, so you decide to carry your umbrella in your backpack. You have used two very important science process skills used by all scientists. These skills are called inferring and predicting.

[2] When scientists infer, they draw conclusions, interpret, and try to explain their observations. For example, if a scientist observes that Plant A has a higher rate of growth when it is placed on the counter than when it is on the window sill, the scientist might infer that this plant grows better in the shade than in the sun. Inferences can also be made from recorded data. One example would be when students examine results from an experiment on bounce height of three different types of balls. Students would examine the bounce height of ping-pong balls, marbles, and rubber balls. Based on the data, students could explain whether the height at which the balls were dropped would affect the height the ball would bounce. Scientists also make inferences from data that is received indirectly. There are many places scientists cannot visit due to safety or lack of access. When scientists study volcanoes, they use evidence from the area surrounding the volcano to make inferences about the qualities of materials inside the volcano. This type of inferential thinking also leads to another science process skill called prediction.

[3] Inferring about scientific data also leads to predicting. Scientists use current observations about events to help forecast or make generalizations about future events. These predictions usually follow after numerous testing situations and observations based on these situations. An example would be when scientists study the migration habits of Canadian geese. After observing year after year how gaggles of geese invade your town's beautiful park, scientists may be able to predict the time of year the gaggles arrive and when they will depart. They may also predict if the numbers of geese within these gaggles will increase or decrease based on environmental conditions. Two other parts of predicting are interpolating and extrapolating. When scientists interpolate, they take observation data and make predictions within the range of the present data. For example, if you collected data on the growth rate of plants in five inch, eight inch, and ten inch wide pots, you could use this data to make a prediction about plant growth in a seven inch pot. If you wanted to extrapolate this data, you might try to predict the growth rate of plants in twenty or thirty inch pots. When you extrapolate data, you use current collected data to make predictions about amounts outside of that range of data. Remember, predicting is not absolute or the answer to scientific questions. It is one of the processes, along with inferring, that helps scientists to make sense of scientific mysteries.

1. When scientists infer _____.

(A) They retest their hypothesis

(B) They rewrite their experimental questions

(C) They draw conclusions, interpret, and explain their observations

(D) None of the above

2. When scientists use prediction, they try to forecast future events based on observations of past events.

(A) No, scientists don't use the past to predict the future.

(B) Yes, predicting is based on numerous observations of events and this information is used to forecast future similar events.

3. Interpolating data means to _____.

(A) Make predictions within a given range of observation data

(B) Make predications about observation data

(C) Make predictions without observation data

(D) Make predictions outside of a given range of observation data

4. When you come home from school, you observe that your mother's favorite vase is broken on the floor. You also observe that your dog Fluffy is lying on the floor with a piece of the vase under his paw. What can you infer from this scene?

_____

_____

5. Your best friend has a cat named Friendly. When you go to visit your friend, you attempt to pet their cat. However, every time you try to pet the cat, it hisses and runs away. Based on your observations, what do you predict will happen when you attempt to pet the cat after you have visited your friend ten more times?

_____

_____

6. Scientists cannot make inferences about data that is received indirectly.

(A) False

(B) True

7. When scientists extrapolate data, they _____. (A) Make predictions inside a given range of observation data (B) Make predictions without observation data (C) Make general observations about events and objects (D) Make predictions outside of a given range of observation data	8. Explain how observations are different from inferences. _____

observations	increase	lack	arrive	well	invade
testing	experiment	absolute	scientist	observation	leads
test	depart	sill	interpret	evidence	scientists
better					

Directions: Fill in each blank with the word that best completes the reading comprehension.

Everyday we make judgments based on our observations. Your friend's dog may not like you because every time you go to pet the dog it growls. When your teacher hands back your geography *(1)* _____ , he smiles which makes you think that you did very *(2)* _____ . When you step outside in the morning, you notice it is very cloudy. You have a feeling it will rain, so you decide to carry your umbrella in your backpack. You have used two very important science process skills used by all scientists. These skills are called **inferring** and **predicting**.

When scientists infer, they draw conclusions, *(3)* _____ , and try to explain their *(4)* _____ . For example, if a scientist observes that Plant A has a higher rate of growth when it is placed on the counter than when it is on the window *(5)* _____ , the *(6)* _____ might infer that this plant grows *(7)* _____ in the shade than in the sun. Inferences can also be made from recorded data. One example would be when students examine results from an *(8)* _____ on bounce height of three different types of balls. Students would examine the bounce height of ping-pong balls, marbles, and rubber balls. Based on the data, students could explain whether the height at which the balls were dropped would affect the height the ball would bounce. *(9)* _____ also make inferences from data that is received indirectly. There are many places scientists cannot visit due to safety or *(10)* _____ of access. When scientists study volcanoes, they use *(11)* _____ from the area surrounding the volcano to make inferences about the qualities of materials inside the volcano. This type of inferential thinking also leads to another science process skill called **prediction**.

Inferring about scientific data also *(12)* _____ to predicting. Scientists use current observations about events to help **forecast** or make **generalizations** about future events. These predictions usually follow after numerous *(13)* _____ situations and observations based on these situations. An example would be when scientists study the migration habits of Canadian geese. After observing year after year how gaggles of geese *(14)* _____ your town's beautiful park, scientists may be able to predict the time of year the gaggles *(15)* _____ and when they will *(16)* _____ . They may also predict if the numbers of geese within these gaggles will *(17)* _____ or decrease based on environmental conditions. Two other parts of predicting are **interpolating** and **extrapolating**. When scientists interpolate, they take *(18)* _____ data and make predictions within the range of the present data. For example, if you collected data on the growth rate of plants in five inch, eight inch, and ten inch wide pots, you could use this data to make a prediction about plant growth in a seven inch pot. If you wanted to extrapolate this data, you might try to predict the growth rate of plants in twenty or thirty inch pots. When you extrapolate data, you use current collected data to make predictions about amounts outside of that range of data. Remember, predicting is not *(19)* _____ or the answer to scientific questions. It is one of the processes, along with inferring, that helps scientists to make sense of scientific mysteries.

Essay:

Explain: Lopartex, the alien, has landed on your planet in search of information. She wants to find out about how scientists on your planet make predictions about future events. Write a letter that explains how scientists make predictions. Make sure you provide detailed examples.

Explorer: You have just landed on the planet Htam. As you and your crew look around, you notice empty structures, various tools on the ground, and overgrown vegetation. Write a diary entry that describes your observations and what you think may have occurred on this planet before you landed.