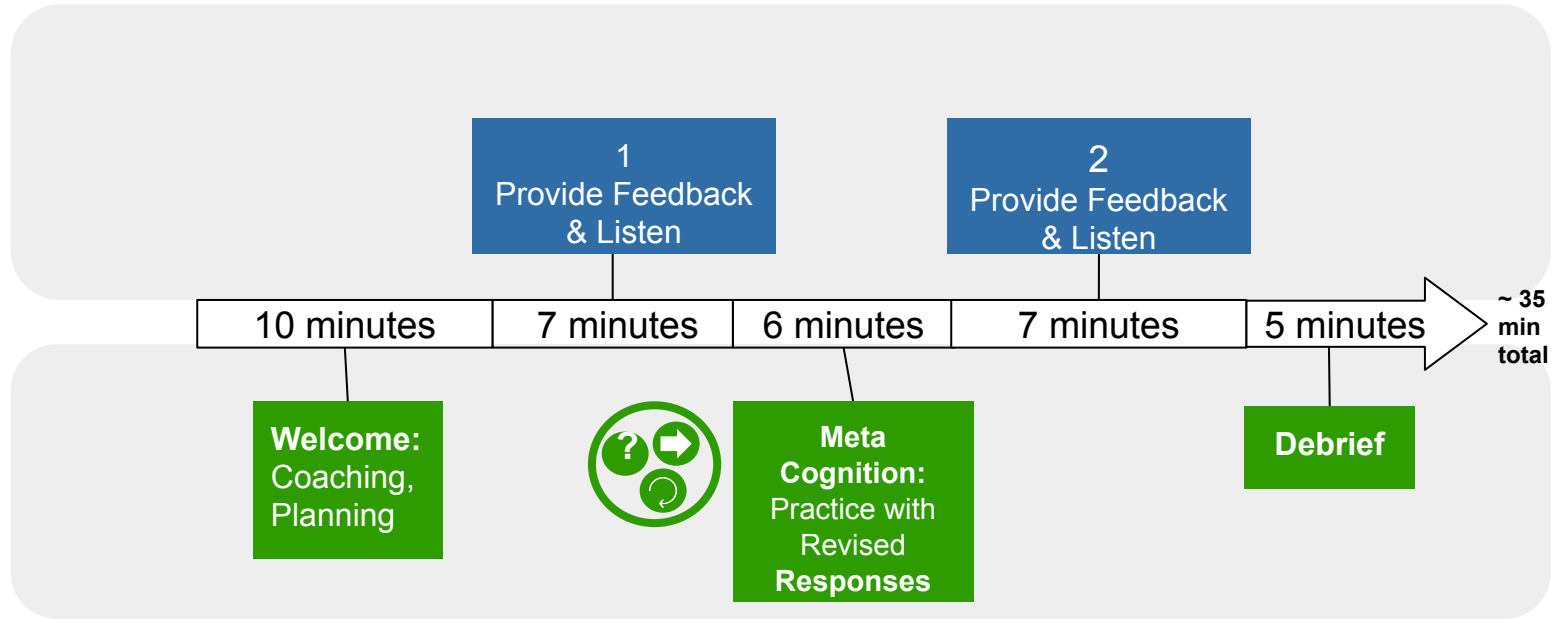
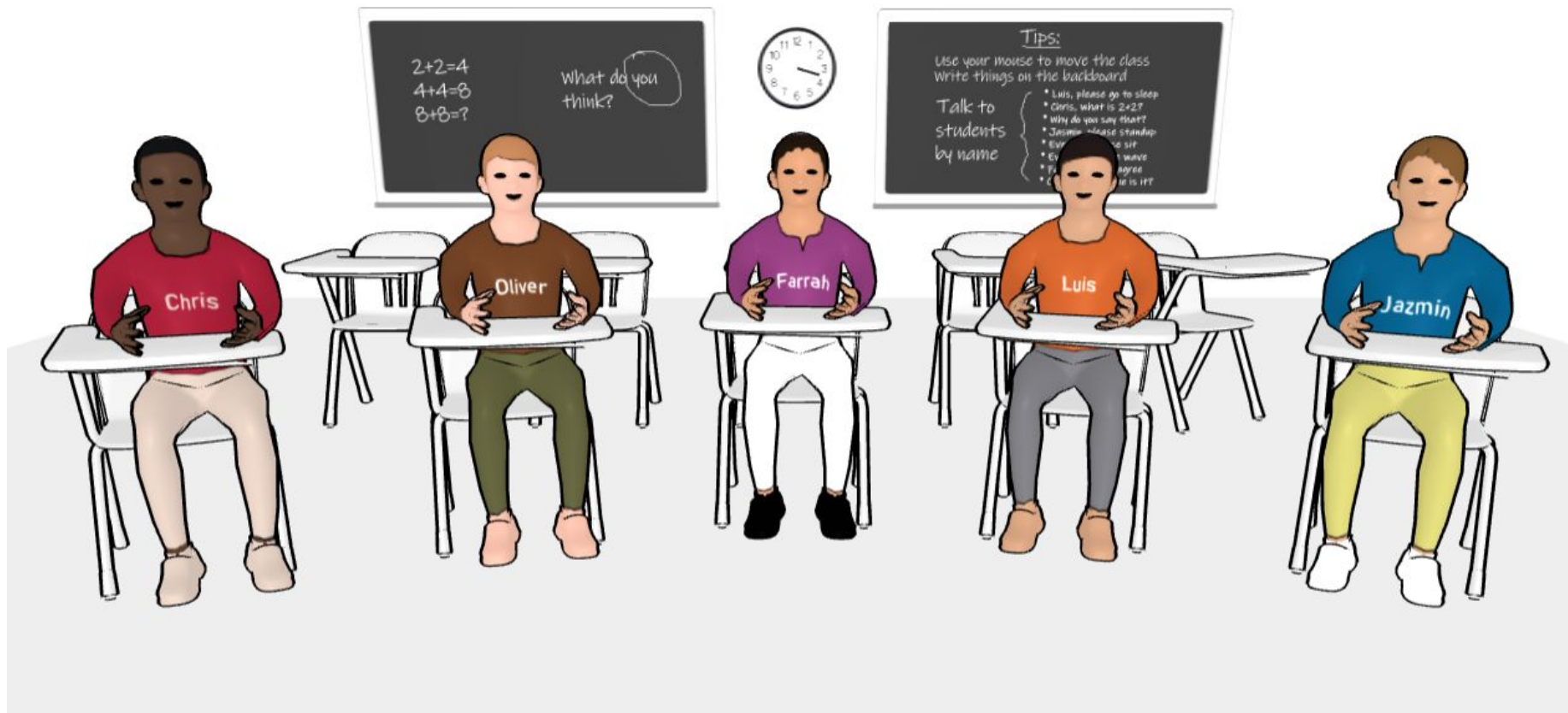


# Growing Student Understanding Simulation Process





Students have independently read the text,  
*Water on the Moon*

# Question 1 relates to this text that students have read

## **Water on the Moon**

*Adapted from the New York Times, by Kenneth Chang*

### **The Moon is a Desert**

(1) Scientists have known for a long time that the moon is a desert, because it has no atmosphere like we have on Earth. However, they used to believe that there was no **water** on the moon. Now they know this is not true. Scientists have found evidence that water can be found deep within the moon's polar craters. These craters are dark places where the sun never shines.

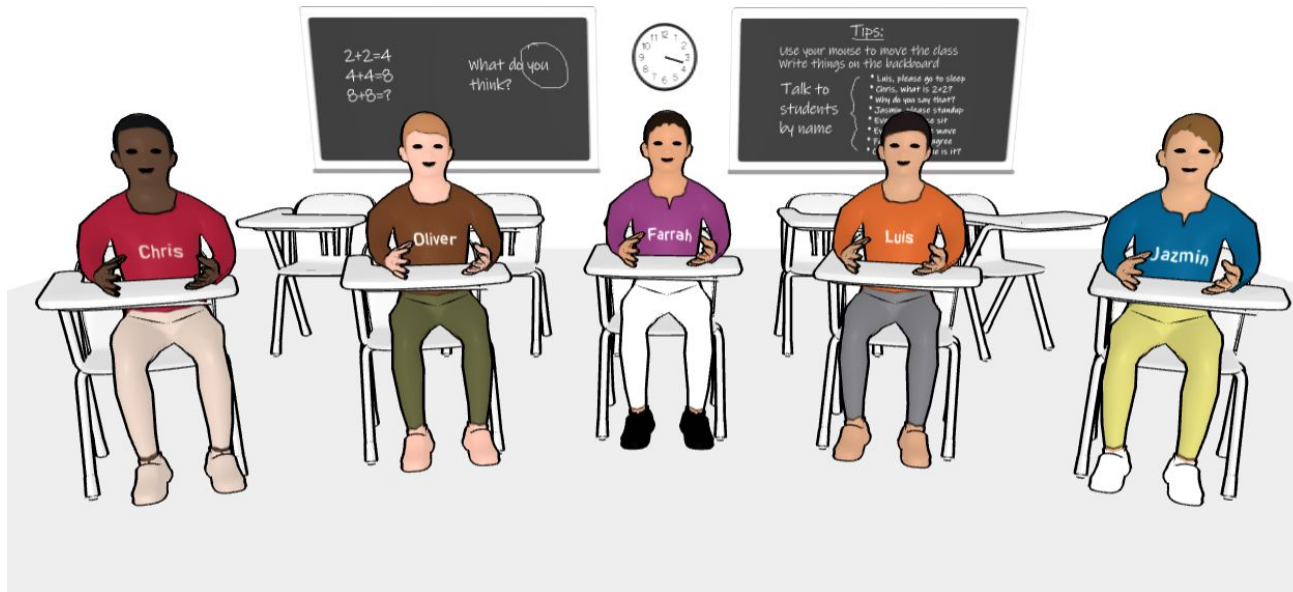
(2) NASA sent a small machine called a lunar orbiter to investigate. This lunar orbiter will land at the moon's South Pole and look for ice deposits in a large polar crater. These ice deposits are very small. Scientists said that one ton of the top layer of the moon's surface would hold in total about 32 ounces of water. That's just like four glasses of water – about what one person might drink in a day!

(3) That means the moon is still drier than the driest desert on earth. The water they found is microscopic, meaning you wouldn't be able to see it if you were looking straight at it! You'd need a scientific tool called a microscope to look really closely.

You have called together five students who seem to be having difficulty understanding the text. While the rest of the class is finishing their assignment, you plan to work with these students for about five minutes to ensure they understand the text before the whole class breaks for lunch.

The discussion questions you have posed to students are:

1. What equipment did scientists use to discover water on the moon?
2. Is there convincing evidence that water on the moon could be valuable?



# Question 1: “*What equipment did scientists use to discover water on the moon?*”

## Initial Responses

### Initial

You’d need a scientific tool called a microscope to look really closely.

### Initial

I got the same as Farrah

### Initial

Scientists found craters full of water on the moon.

### Initial

Scientists use a lot of equipment, like oxygen tanks.

### Initial

Yes! Astronauts can drink the water and stay hydrated. You can’t survive without water.



# Question 1: “*What equipment did scientists use to discover water on the moon?*”

## Initial Responses

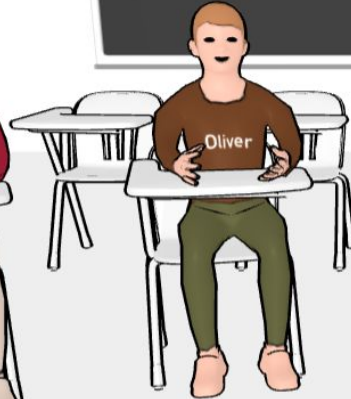
### Revised

Scientists used the Lunar Orbiter to discover tiny bits of frozen water in craters on the moon.



### Revised

NASA sent a small machine called the Lunar Orbiter to find water on the moon.



### Revised

The water scientists found on the moon was microscopic.



### Revised

Scientists found ice using small machine.



### Revised

NASA sent a small machine called the Lunar Orbiter to find water on the moon.



# Question 2 relates to this text that students have read

## **Water on the Moon**

*Adapted from the New York Times, by Kenneth Chang*

### **Water is a Valuable Resource**

(4) Water on the moon would be a valuable - or very important - resource. It could be useful in lots of ways. For example, future astronauts could drink this water. Water is heavy. It takes up a lot of room on a spacecraft. Having water available on the moon would mean more room on the spacecraft for people and things.

(5) Moon water could be useful in other ways. Water can be broken down into two parts: hydrogen and oxygen. Astronauts could breathe the oxygen. Oxygen and hydrogen could also be used as rocket fuel. Rocket fuel helps spacecrafts to move, just like gas helps cars to move. Imagine! The moon could serve as a stop for spacecrafts to refill their gas tanks before heading out into the solar system.

(6) To use the moon water, scientists need to come up with a plan for extracting – or getting it out of – the polar craters. Making this plan will take a lot of time and money. They would need to study the moon's surface and build new equipment. Do you think it would be a good investment? You decide!



# Student Responses to Question Two

**“Is there convincing evidence that water on the moon could be valuable?”**

No, not for a long time.

No. It's not ready yet!

Water is heavy so it's good they don't have to carry it in the spaceships anymore.

Water can be split into two parts: hydrogen and oxygen.

Yes! Astronauts can drink the water and stay hydrated. You can't survive without water.

