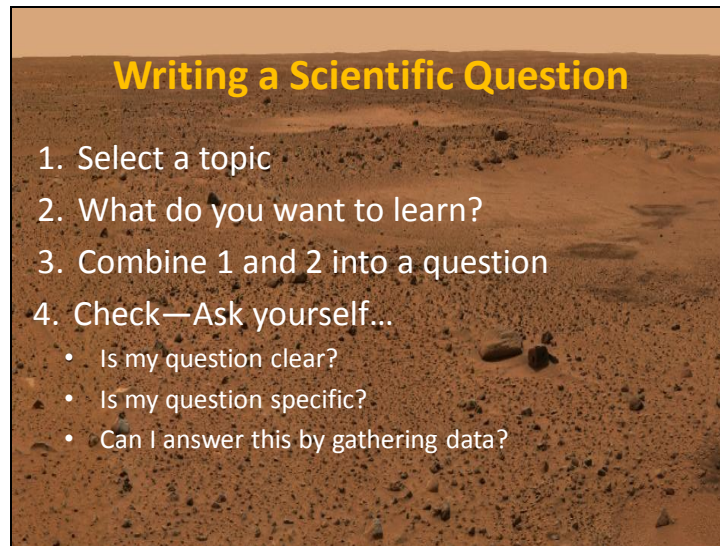


Over the past two weeks, you have learned a lot about Mars. Despite this, you probably have many more questions about Mars now than when we started studying this planet. It is likely that even the scientists who study Mars don't know the answers to some of the questions you have!

When scientists want to know something, they develop a hypothesis (a hypothesis is a good guess about something we don't yet know). From this hypothesis, they write a scientific question to test their idea. The scientific question becomes the scientist's mission. It is important for a scientific question to be clear, specific and must be something that can be answered by gathering data. Today I am going to show you how to write a clear, specific and testable scientific question.



Writing a Scientific Question

1. Select a topic
2. What do you want to learn?
3. Combine 1 and 2 into a question
4. Check—Ask yourself...
 - Is my question clear?
 - Is my question specific?
 - Can I answer this by gathering data?

Since you are working with Mars, I am going to give you an example with a different planet, Saturn. As you know, Saturn has spectacular rings. I wondered why Saturn has rings and why the rings are so flat. So, I researched this question. I found out that scientists think this is because of Saturn's gravity. The rings are not solid, but are made up of billions of little pieces of rock and ice. Scientists think that if any of this material was above or below the rings, Saturn's gravity would pull it into the planet. I want to test this idea to see if it is true. I agree with the scientists who have researched this question, so my hypothesis is that "Objects that orbit Saturn must be in the rings." Now I will use this hypothesis to help formulate my Scientific Question.

In order to write my scientific question, I need to follow these steps (read the steps to your class). Now I will show you how I might write my scientific question about Saturn. Pay close attention as you will be following these same steps to write your question about Mars. (Advance the PowerPoint to Slide 3)

Writing a Scientific Question		
STEP		WORK
1.	My topic:	The rings of Saturn.
2.	What I want to know:	Where objects can orbit Saturn
3.	Question:	Can an object stay in orbit around Saturn somewhere else besides the rings?

This slide has 3 CLICKS of animation. (Click as indicated below to bring up the text.)

STEP 1

The first step is to **“Select a topic”**—I have already selected my topic. My topic is “The Rings of Saturn”. (CLICK) I am ready to move to step 2.

STEP 2

The next step is to **“Decide what I want to learn”**. My hypothesis is that “Objects that orbit Saturn must be in the rings.” How can I change the hypothesis into a statement about what I want to know.. Hmmmm. How can I say this? (PAUSE) I know, what I really want to know is whether object can orbit Saturn only in the rings or anywhere around the planet. Maybe I can shorten this. (PAUSE) I’ve got it...I want to know...“Where objects can orbit Saturn” (CLICK).

STEP 3

Now I move on to the next step. I have to combine what I wrote in steps 1 and 2 into a single question. My question has to be clear and specific. I also want to make sure I can answer the question during my mission. Let’s try this **“Can an object stay in orbit around Saturn somewhere else besides the rings?”** (CLICK)

Advance the power point to the next slide.

Can an object stay in orbit around Saturn somewhere else besides the rings?

STEP	WORK
4. Check:	
Is my question clear?	✓
Is my question specific?	✓
Can I answer this by gathering data?	✓

This slide has 3 CLICKS of animation.

Click after each question is answered, which will bring up the check marks.)

The last step is to make sure my question is a good scientific question. Remember, there are 3 parts to a good scientific question (Refer to chart 1). Let's check each in turn:

1. Is my question CLEAR? The best way to check this is to ask a friend if they understand my question. So I will ask one of you. *(Ask a student. If they say your question is clear, move on to question 2. If they say it is not clear, ask them how they might rephrase the question.)*(CLICK)

2. Is my question SPECIFIC? Let's look at this. I want to see if an object can orbit Saturn outside the rings. Does my question say this? YES it does. (CLICK)

3. Can I answer this question by gathering data? Yes. (CLICK) I already have a couple of ideas of how I might be able to design my mission to answer my question. In the next lesson, you will be learning how to design your Mars Rover mission.