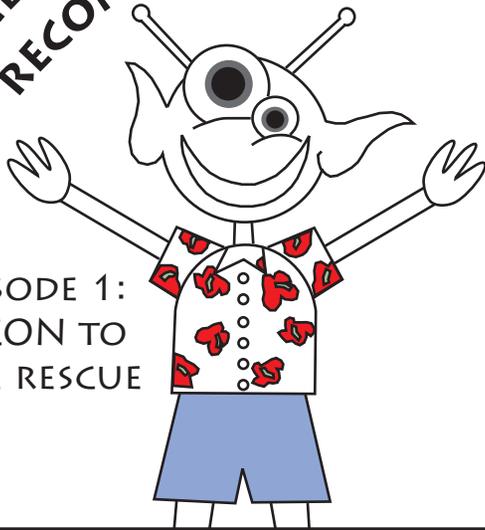




THE ADVENTURES OF RECON THE MARTIAN

EPISODE 1:
RECON TO
THE RESCUE



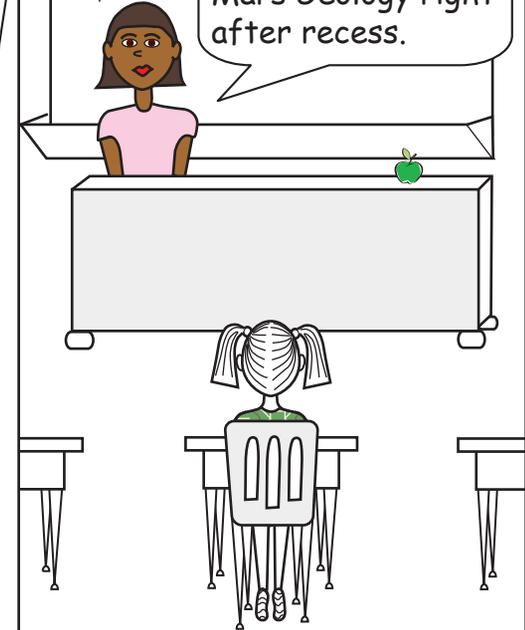
Let's meet Anna. She is in 7th grade. She loves to play soccer and softball. Although she is good at math and history, her favorite class is science class. Anna loves doing the experiments and her favorite field trip each year is when they go to the local science museum. Recently, they have been studying the solar system. She thinks she might want to be a scientist or engineer when she is older, and now she is thinking she might want to be an astronaut.

What a great day! The sun is shining, we are going swimming in gym class and we don't have any tests in school today!



Reading for today
Chapter 6

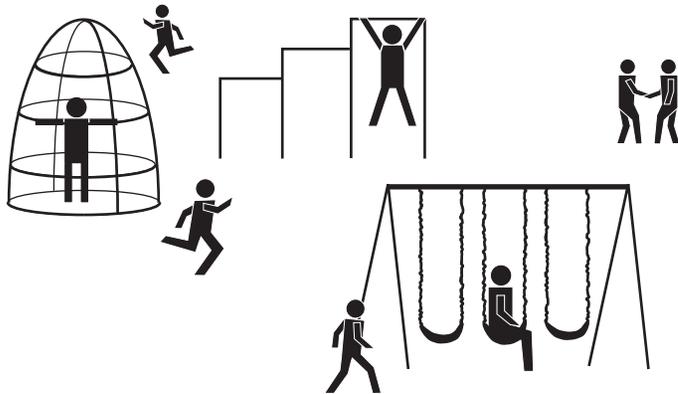
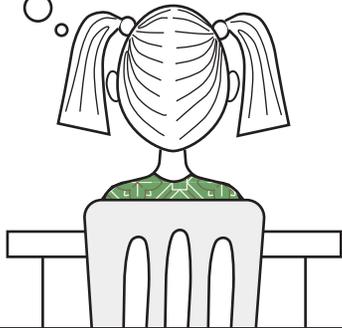
Don't forget class, we have the test on Mars Geology right after recess.



Oh, no! What am I going to do? I forgot all about the test! I won't have enough time to study during recess! I'm going to fail the test, and then I'll never be an astronaut!

RINGGG!

Yay!
Recess!



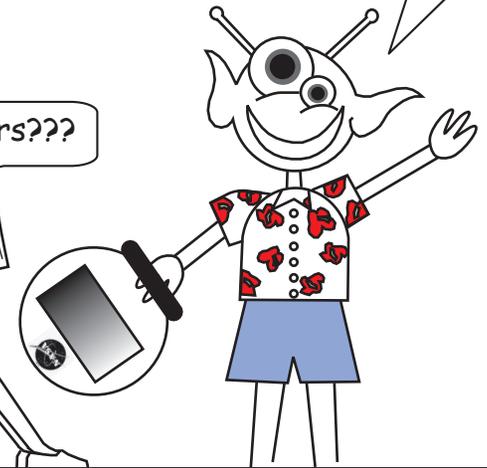
Pssst! Anna! I can help you get ready for the test!



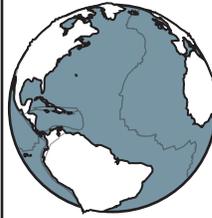
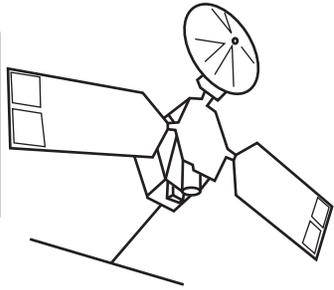
Huh? Who, or should I say, what are you?

I'm RECON the Martian! C'mon, we have to hurry if we are going to get to Mars and back before your test. Be sure to put this on before we go...

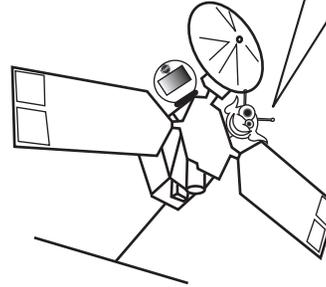
Mars???



Yes, Mars. We are going to take a ride on my spacecraft, Mars Reconnaissance Orbiter, or MRO for short. Then we will use my fancy high resolution camera, called HiRISE, to take pictures of different geologic landforms on Mars. I will tell you all about them and then you will be ready for your test!

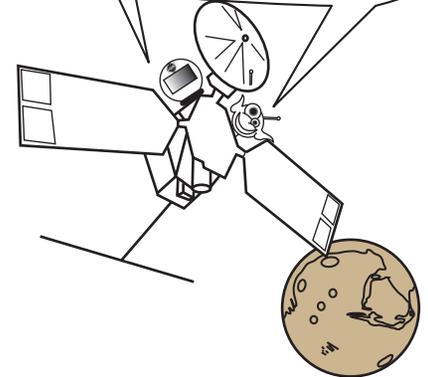


Hold on tight!
There is Mars!



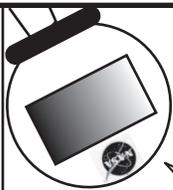
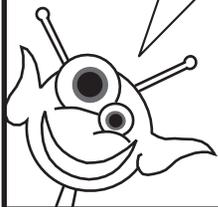
Wow! It doesn't look anything like the Earth. Why aren't there any oceans or lakes on Mars?

Mars may have had water on the surface in the past. This is one of the important questions scientists are studying.

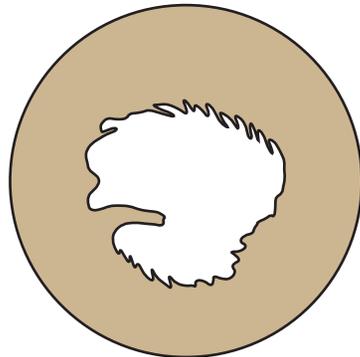


HiRISE stands for High Resolution Imaging Science Experiment. It will let us see objects on Mars that are as small as your desk!
Now lets go!

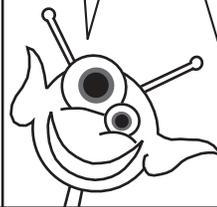
There are lots of ideas about where the water went. Some people think Mars used to have an atmosphere, and as the atmosphere got thinner, the water evaporated. It is a good thing you have an atmosphere on Earth-otherwise you could never survive! Now most of the water on Mars is frozen underground or in the Polar ice caps.



Wow, there is one of the ice caps now! Isn't it made up of carbon dioxide?

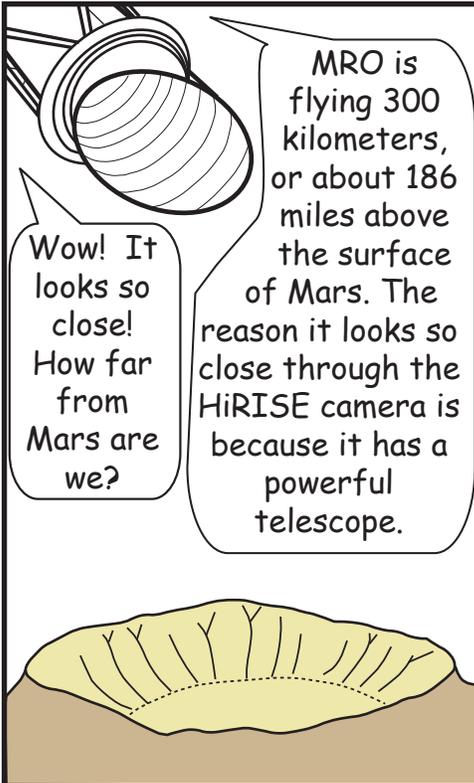


Yes and no. The north polar cap, that you see here is the "residual cap" made up of water ice. During the winter it so cold on Mars that the "seasonal cap" is made up of carbon dioxide ice too. Then the ice cap is much larger! Aha! I see a gully. Let's take a picture of it. Gullies are one of the features on Mars that suggests there may have been water in the past. They are little dry stream beds. Many of them are along the rims of impact craters.



CLICK





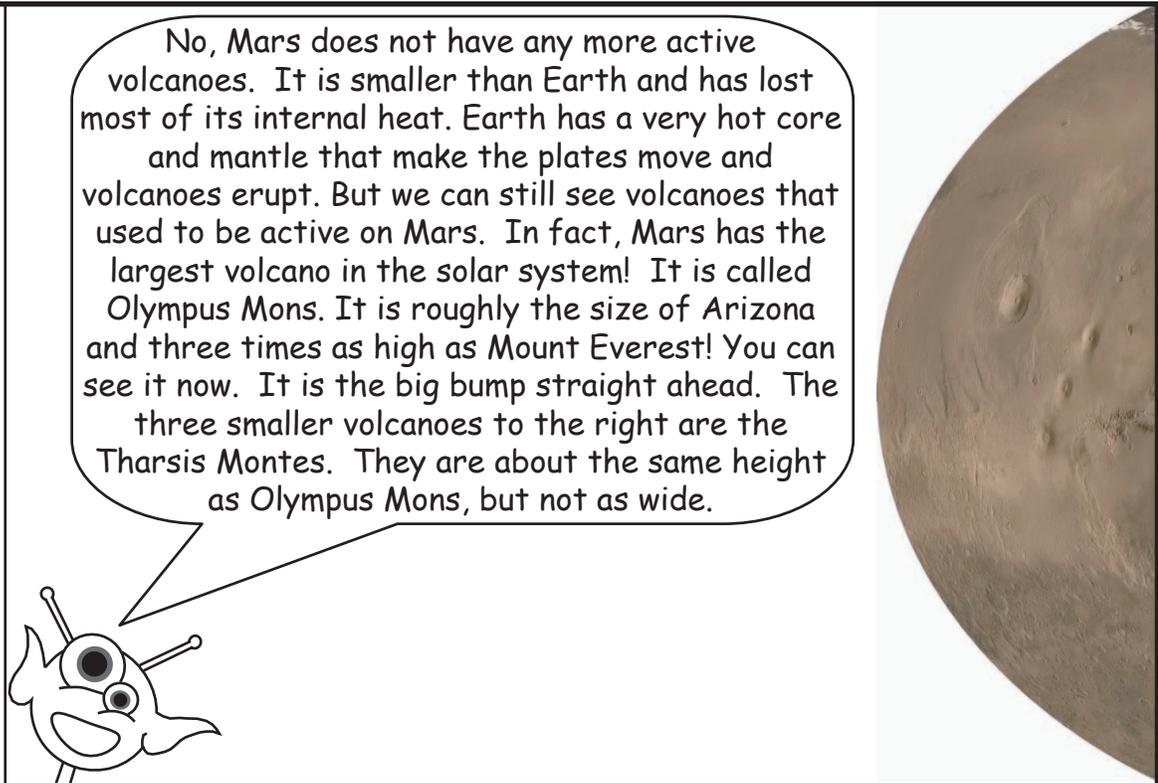
Wow! It looks so close! How far from Mars are we?

MRO is flying 300 kilometers, or about 186 miles above the surface of Mars. The reason it looks so close through the HiRISE camera is because it has a powerful telescope.

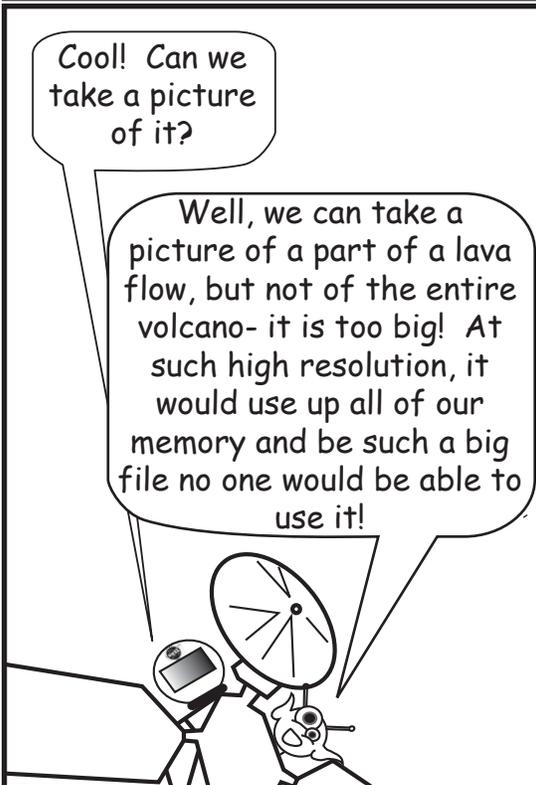


Where do you want to go next?

Can we see an erupting volcano shooting out lava?



No, Mars does not have any more active volcanoes. It is smaller than Earth and has lost most of its internal heat. Earth has a very hot core and mantle that make the plates move and volcanoes erupt. But we can still see volcanoes that used to be active on Mars. In fact, Mars has the largest volcano in the solar system! It is called Olympus Mons. It is roughly the size of Arizona and three times as high as Mount Everest! You can see it now. It is the big bump straight ahead. The three smaller volcanoes to the right are the Tharsis Montes. They are about the same height as Olympus Mons, but not as wide.



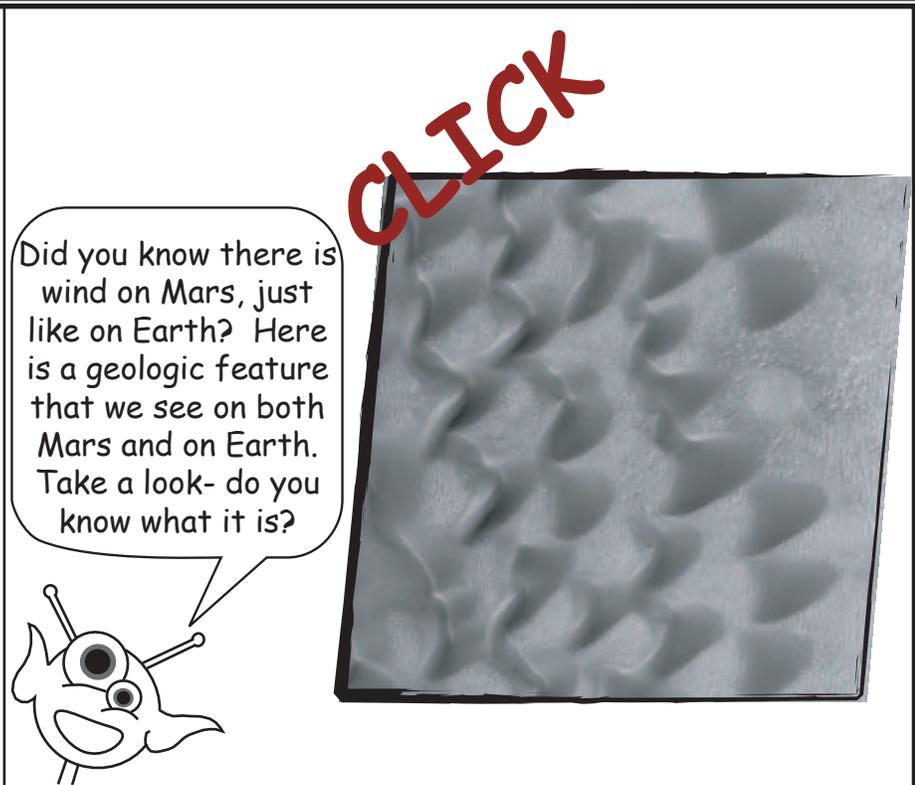
Cool! Can we take a picture of it?

Well, we can take a picture of a part of a lava flow, but not of the entire volcano- it is too big! At such high resolution, it would use up all of our memory and be such a big file no one would be able to use it!



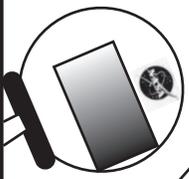
CLICK

"Wow! The lava looks so cool!"



CLICK

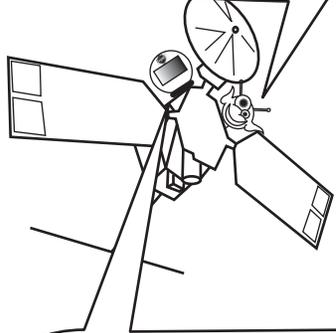
Did you know there is wind on Mars, just like on Earth? Here is a geologic feature that we see on both Mars and on Earth. Take a look- do you know what it is?



Those are barchan dunes! I saw those when I went to Great Sand Dunes National Park! They form when the wind travels in one direction. Here the wind must have been blowing from the right to the left.



That's right! Now, do you have any other questions before we head back?



Yes... Why are there so many craters all over Mars? I only have ever heard of a few on Earth.

Earth has also been hit by many asteroids and meteors during its lifetime, but because of plate tectonics, the surface of the Earth is much younger. Craters have been covered over or subducted on Earth. In fact, we can use crater counts to figure out the age of different regions of Mars. The more craters there are, the older it is. Okay, we had better head back so you can take that test!



Bye Anna! See you later! Good luck on the test!

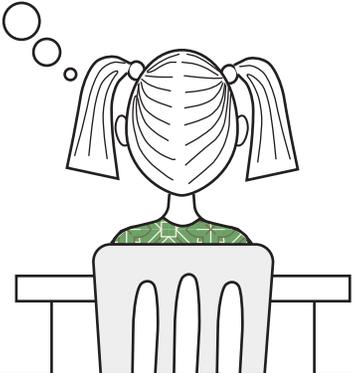
RINGGG!



Hey Anna! Where've you been? You missed seeing Maria break the jump rope record!

Huh? What just happened?

Hmmm...I hope I can pass the test. Let's see...name three similarities and differences in the geology of Mars and Earth. That's easy! How does plate tectonics play a role in the differences between Earth and Mars geology. I know that one too!!!



Two days later...

Great job Anna. You would make a great astronaut. Maybe one day you will get to go to Mars!

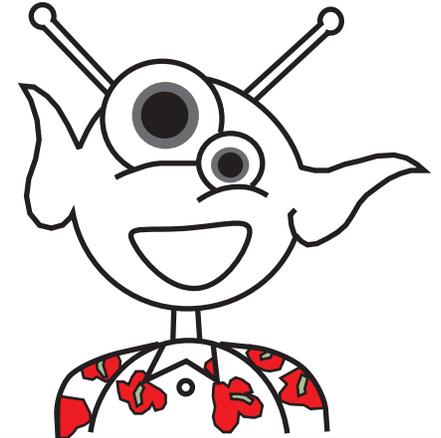


Maybe...



The End

Now it's your turn to make a comic. What will my next adventure be?



Appendix 1: National Science Standards

Grades K-8

STANDARD:

As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes:

1. Systems, order, and organization
2. Evidence, models, and explanation
3. Constancy, change, and measurement
4. Form and function



Grade 4 CONTENT STANDARD A:

As a result of activities in grades K-4, all students should develop:

1. Abilities necessary to do scientific inquiry
2. Understanding about scientific inquiry



Grade 4 CONTENT STANDARD D:

As a result of their activities in grades K-4, all students should develop an understanding of:

1. Properties of earth materials
2. Objects in the sky



Grade 4 CONTENT STANDARD G:

As a result of activities in grades K-4, all students should develop understanding of:

1. Science as a human endeavor



Grade 5-8 CONTENT STANDARD A:

As a result of activities in grades 5-8, all students should develop:

1. Abilities necessary to do scientific inquiry
2. Understanding about scientific inquiry



Appendix 1: National Science Standards

Grades 4-8

Grade 5-8 CONTENT STANDARD D:

As a result of their activities in grades 5-8, all students should develop an understanding of:

1. Earth in the solar system



Grade 5-8 CONTENT STANDARD G:

As a result of activities in grades 5-8, all students should develop understanding of:

1. Science as a human endeavor
2. Nature of science



TEACHING STANDARD A:

Teachers of science plan an inquiry-based science program for their students. In doing this, teachers:

1. Select science content and adapt and design curricula to meet the interests, knowledge, understanding, abilities, and experiences of students.
2. Select teaching and assessment strategies that support the development of student understanding and nurture a community of science learners.



TEACHING STANDARD B:

Teachers of science guide and facilitate learning. In doing this, teachers:

1. Focus and support inquiries while interacting with students.
2. Orchestrate discourse among students about scientific ideas.
3. Challenge students to accept and share responsibility for their own learning.
4. Encourage and model the skills of scientific inquiry, as well as the curiosity, openness to new ideas and data, and skepticism that characterize science.



TEACHING STANDARD C:

Teachers of science engage in ongoing assessment of their teaching and of student learning. In doing this, teachers:

1. Use multiple methods and systematically gather data about student understanding and ability.



Appendix 1: National Science Standards

Grades 4-8

TEACHING STANDARD D:

Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science. In doing this, teachers:

1. Make the available science tools, materials, media, and technological resources accessible to students. ✓
2. Identify and use resources outside the school. ✓
3. Engage students in designing the learning environment. ✓

TEACHING STANDARD E:

Teachers of science develop communities of science learners that reflect the intellectual rigor of scientific inquiry and the attitudes and social values conducive to science learning. In doing this, teachers:

1. Display and demand respect for the diverse ideas, skills, and experiences of all students. ✓
2. Structure and facilitate ongoing formal and informal discussion based on a shared understanding of rules of scientific discourse. ✓
3. Model and emphasize the skills, attitudes, and values of scientific inquiry. ✓