

MYSTERIES

ROCK!

Welcome To The Museum of
Piedras y Guijas

Igneous

Metamorphic

Sedimentary

We are happy to have you. Today we will be looking at the three rock types!

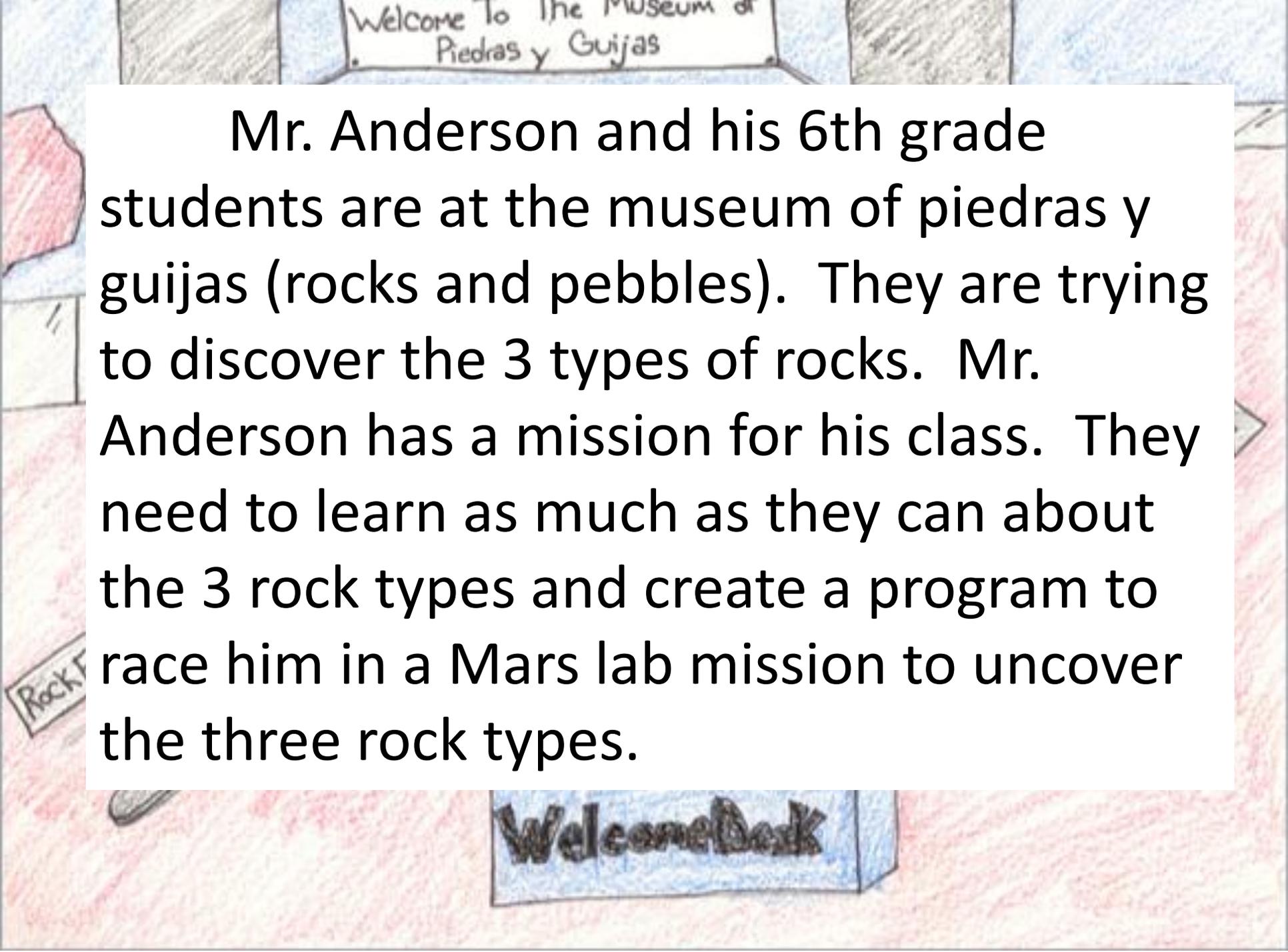
Moon Rocks →

Bye Class!

Rock Exhibit →

Welcome Desk





Welcome To The Museum of
Piedras y Guijas

Mr. Anderson and his 6th grade students are at the museum of piedras y guijas (rocks and pebbles). They are trying to discover the 3 types of rocks. Mr. Anderson has a mission for his class. They need to learn as much as they can about the 3 rock types and create a program to race him in a Mars lab mission to uncover the three rock types.

WelcomeDesk

Igneous

Sedimentary

Who cares about eating!

Yeah, what are we going to do in a museum all day?

All this waiting around is making me really hungry!

Now what, Mr. Anderson already left!

What's that over there?

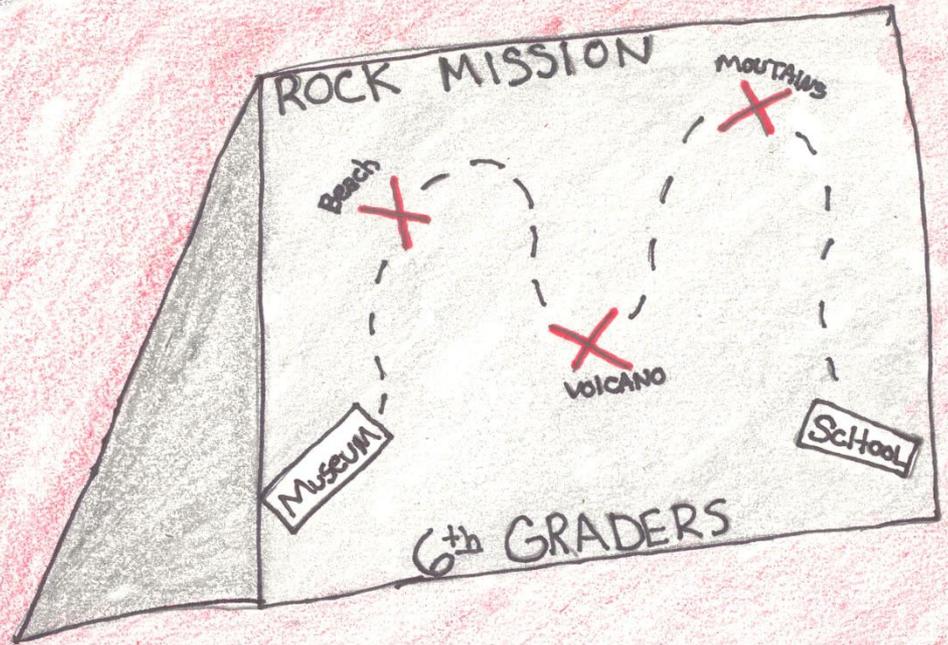
I don't know, I'll go check it out.



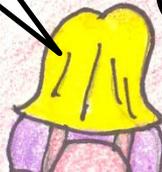
“Attention class,” said the tour guide, “the first rock type is over here. This rock is called.... Um... well... this rock is missing... so the next rock is called... Geez, that rock is missing to. Oh dear, so is the third.” The students looked at one another. Emily broke the silence, “Now what? Mr. Anderson already left us for the day.” The class stared blankly at the tour guide.

“Hey wait! What’s that over there?” questioned Rodriguez. The tour guide looked around and spotted a piece of paper. “I don’t know, I’ll go check it out” she replied. As the students waited for the tour guide to return, Marco complained about being hungry, and that made Selena mad. “Who cares about eating! I’m just so bored.” she said.

It is a map! We better get on the bus and follow it! I want my rocks back!



I hope this is okay with Mr. Anderson



Maybe it will lead me to a hamburger!



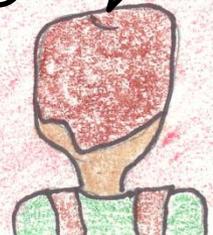
Finally, something to do!



Let's get out of here!

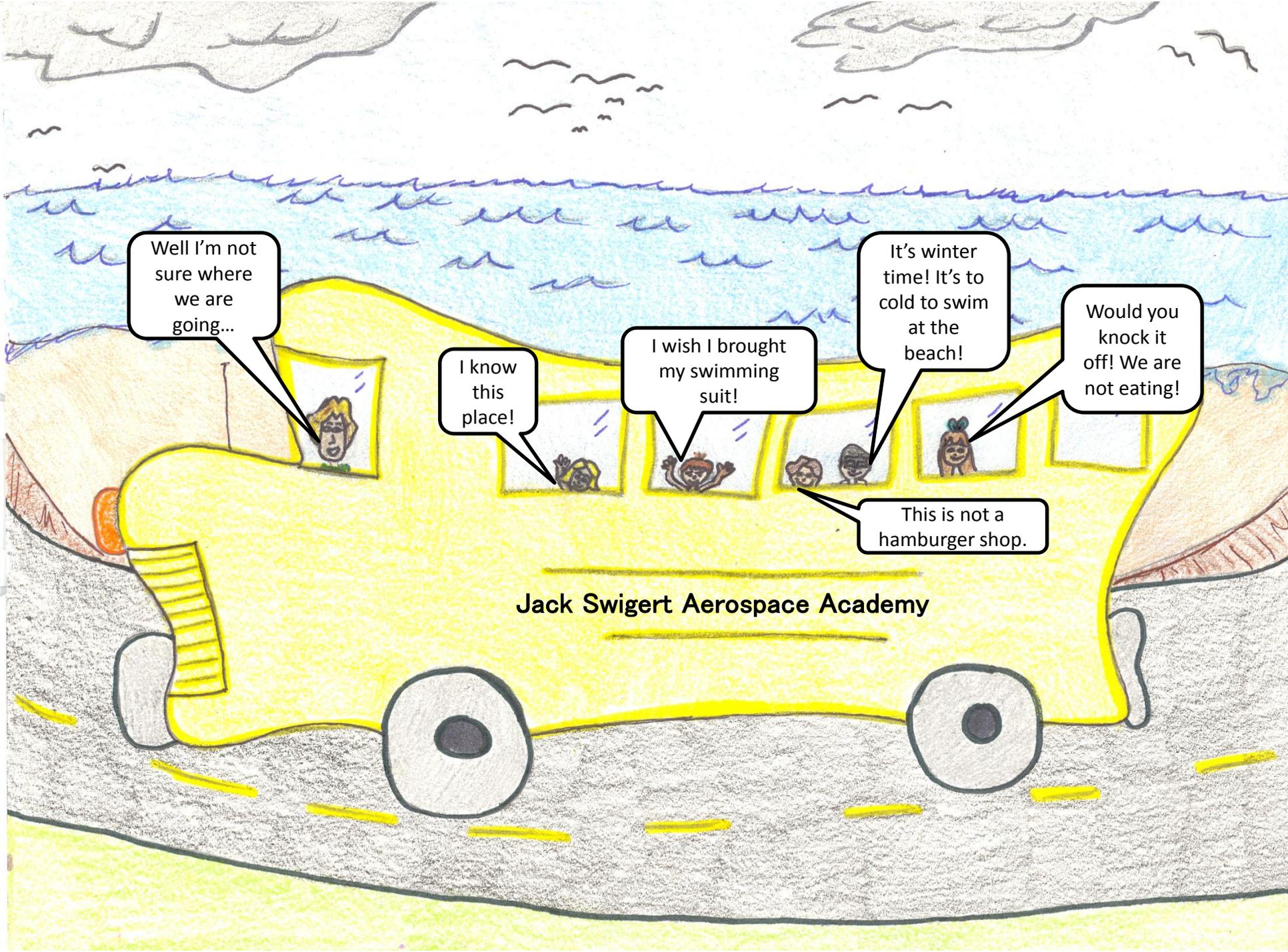


I hope we don't get lost...



The tour guide returned with a piece of paper. A map had been drawn on it. “This piece of paper is a map. I guess we had better follow it; maybe it will lead us to my rocks!” she said eagerly. The class was glad to be leaving the museum and they wanted to help find who stole the rocks! “Oh great, at least we don’t have to stay in this museum all day” Rex said gladly. “I just hope we don’t get lost” replied Rodriguez.





Well I'm not sure where we are going...

I know this place!

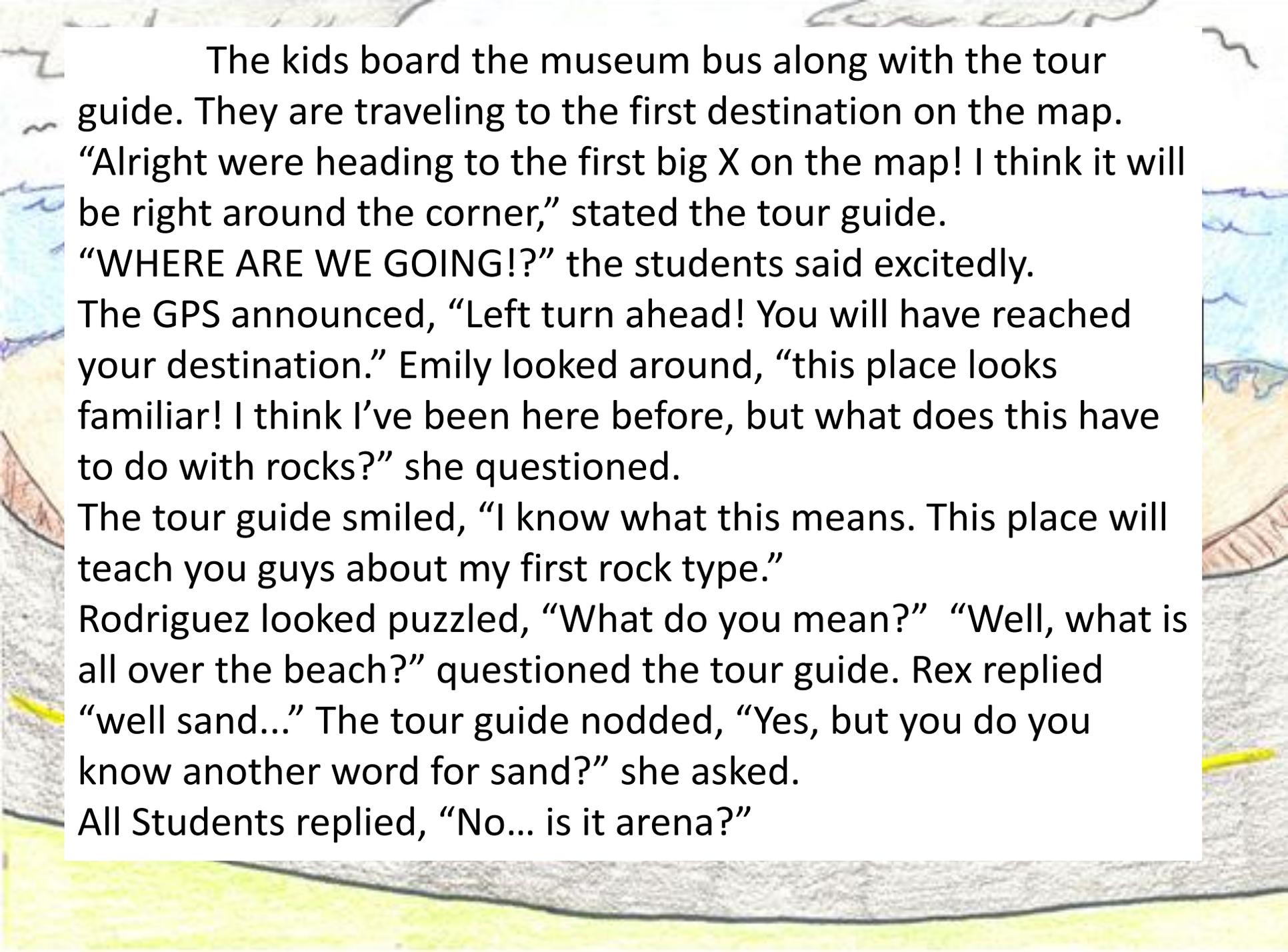
I wish I brought my swimming suit!

It's winter time! It's too cold to swim at the beach!

Would you knock it off! We are not eating!

This is not a hamburger shop.

Jack Swigert Aerospace Academy



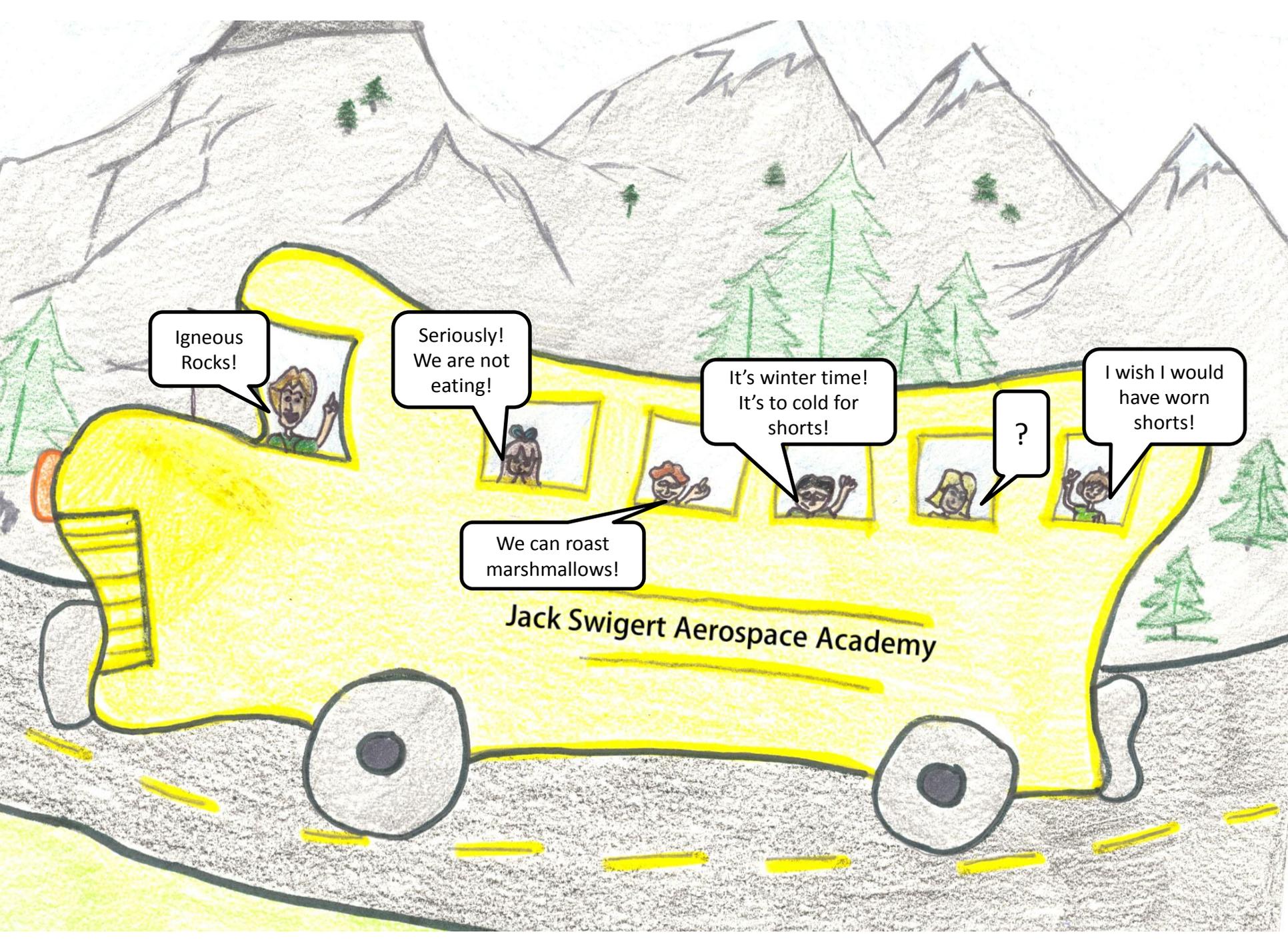
The kids board the museum bus along with the tour guide. They are traveling to the first destination on the map. “Alright were heading to the first big X on the map! I think it will be right around the corner,” stated the tour guide. “WHERE ARE WE GOING!?” the students said excitedly. The GPS announced, “Left turn ahead! You will have reached your destination.” Emily looked around, “this place looks familiar! I think I’ve been here before, but what does this have to do with rocks?” she questioned. The tour guide smiled, “I know what this means. This place will teach you guys about my first rock type.” Rodriguez looked puzzled, “What do you mean?” “Well, what is all over the beach?” questioned the tour guide. Rex replied “well sand...” The tour guide nodded, “Yes, but you do you know another word for sand?” she asked. All Students replied, “No... is it arena?”



Can we go find some sediments, and bring them back for Mr. Anderson?

Sure, that's a great idea!

The tour guide stated, “Well, rock and mineral fragments that are loose, like sand, are called sediments.” The class looked puzzled. Selena whispered, “what does that have to do with your first rock type?” The tour guide looked at the students, “Well, the process by which sediment material changes into solid rock is called lithification, and this just means that the sand is pressed together and makes it hard.” This made Marco think about making bread, “Is that kind of like bread, when it gets squished into a tiny ball to make tortillas? Lithification is a really big word..” The tour guide nodded her head in agreement, “Yes, but if you know the meaning it’s not as difficult. Because remember, when sand or small sediments are pressed together they form a hard rock, just like the squished piece of bread can become a flat tortilla and, if left to dry, it gets hard.” The students nodded and walked around the beach. They wanted to bring sediments back for Mr. Anderson. After gathering their sediments, the students and the tour guide boarded the bus.



Igneous
Rocks!

Seriously!
We are not
eating!

It's winter time!
It's too cold for
shorts!

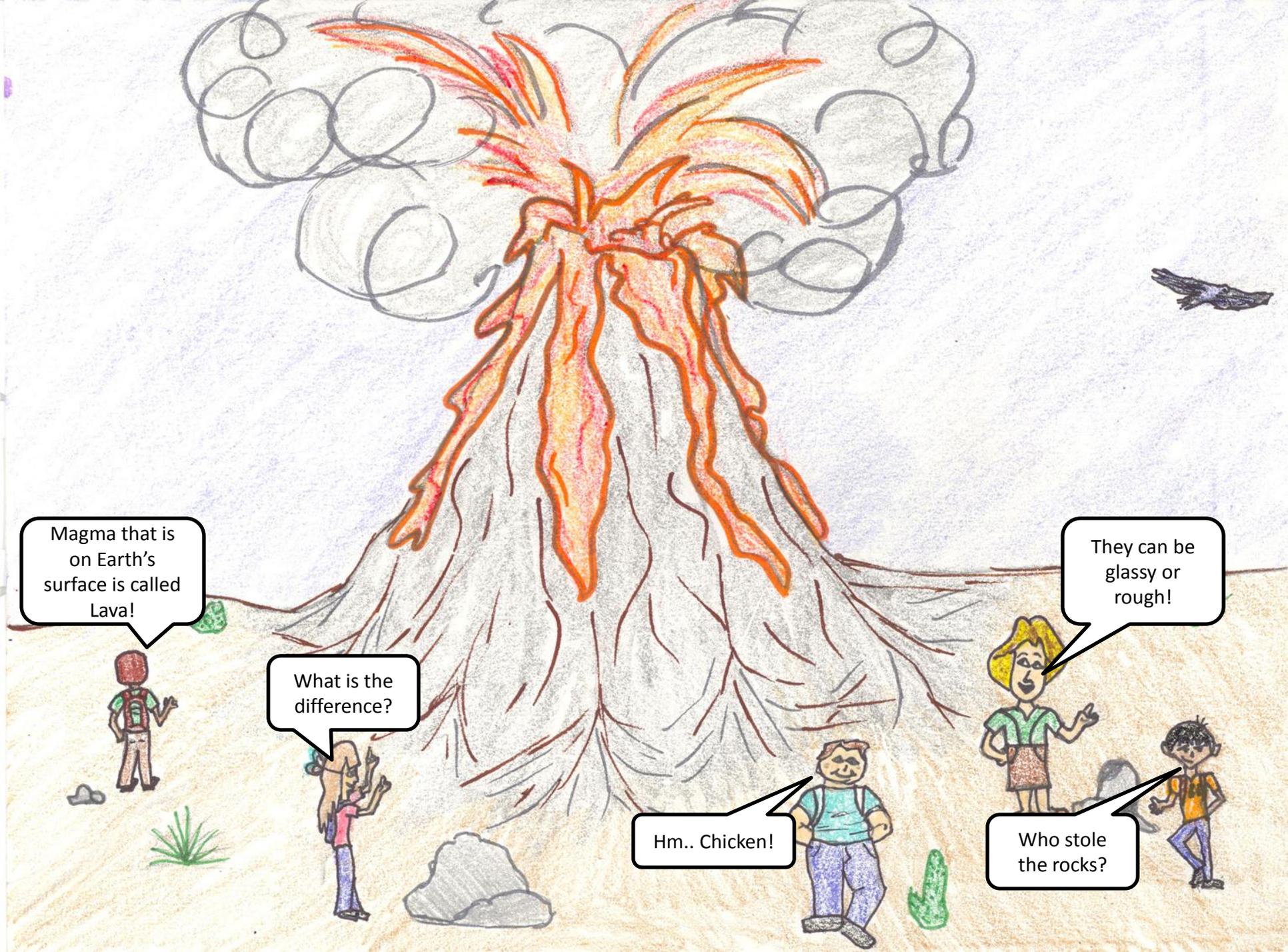
I wish I would
have worn
shorts!

?

We can roast
marshmallows!

Jack Swigert Aerospace Academy

“Alright, we are headed to the second X on the map!” announced the tour guide. The students stare eagerly ahead looking for the next location. “This place is perfect! You are all in for one hot find!” shouted the tour guide. The GPS announced, “Right turn ahead! Then you will have reached your destination.” Emily looked around, “I have never been here before. What does this have to do with rocks?” The tour guide looked at the students, “This is great. This place will teach you guys about my second rock type.” Rodriguez was confused, “What do you mean?” he asked. The tour guide replied, “Do you know what rock type is formed by lava erupting onto earth’s surface?” Rex thought he knew. “Well, lava is liquid,” he answered.



Magma that is on Earth's surface is called Lava!

What is the difference?

Hm.. Chicken!

They can be glassy or rough!

Who stole the rocks?



Selena thought she understood what the tour guide meant but she asked, “Well what is lava called when it is inside the earth?” The tour guide answered, “It is called magma. Do you know what liquid lava forms when it cools?” The students looked at one another and replied together, “No...” The tour guide tried to explain this more simply, “Lava that erupts onto earth’s surface can cool quickly or slowly, forming igneous rocks.”

Selena asked, “What’s the difference between cooling quickly or slowly?” The tour guide replied “Well, when lava cools quickly, it forms an igneous rock that is a glassy texture; and when lava cools slowly, it forms more porous and textured igneous rocks.”

Emily picked up a rock and asked, “What is texture?”





One rock is smooth like glass, the other is rough with lots of air pockets. Pumice actually floats!

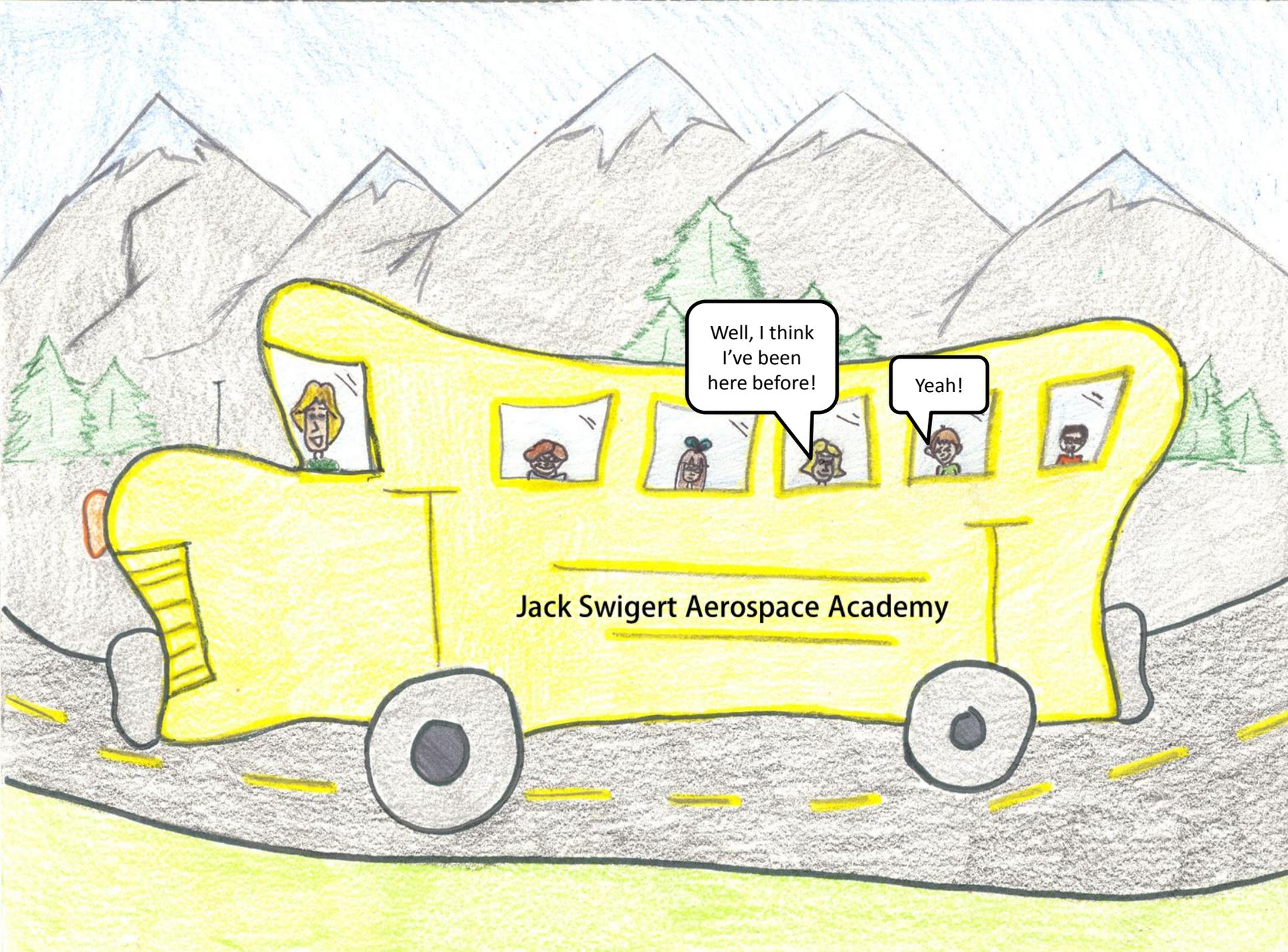
Pumice can float?

Igneous Rocks are the most abundant rocks on earth!



Selena brought a rock over to the tour guide, she still didn't understand what texture was. The tour guide answered, "Good question! Geologists classify igneous rocks by texture; it just refers to how big the sediments are in the rock and the arrangement of them. Here, feel this rock called obsidian, it feels like glass!" Selena felt the smooth black rock, "It does feel like glass, it is so smooth," she responded. The tour guide handed Selena another rock, "Yes, now feel this porous rock, called pumice." Selena felt the pumice, "This rock is so light, but it is very scratchy and rough." The tour guide nodded, "Selena, you are right about pumice being light! It is so light, it can sometimes float on water!" Rex joined their conversation, "Really, why?" The tour guide explained, "The rate at which lava cools controls the size of the crystals within the igneous rock, giving it either a glassy, porous, or a rough texture. Composition refers to what makes up the rock, and the minerals it contains." Emily looked at the rocks and said, "So the glassy rock that Selena felt cooled quickly and that is why it felt smooth like glass. The porous rock cooled very slowly, because it was very rough and light!" Marco wanted to know, "Well what happens if I through my sedimentary rock into the volcano?" The tour Guide responded, "Well, the lava will melt the rock and once the volcano erupts, and the lava cools it will turn your sedimentary rock into an igneous rock. The process of cooling and hardening is what creates igneous rocks." There seemed to be several of the igneous rocks around the volcano, Rex asked, "Are there a lot of igneous rocks on the earth?" Excitedly the tour guide responded, "Yes, they are the most abundant rocks on earth and are found all over the world." Selena looked up at the volcano, "There's no way I'm collecting any of these! Let's get out of here!" The students followed the tour guide back onto the bus.

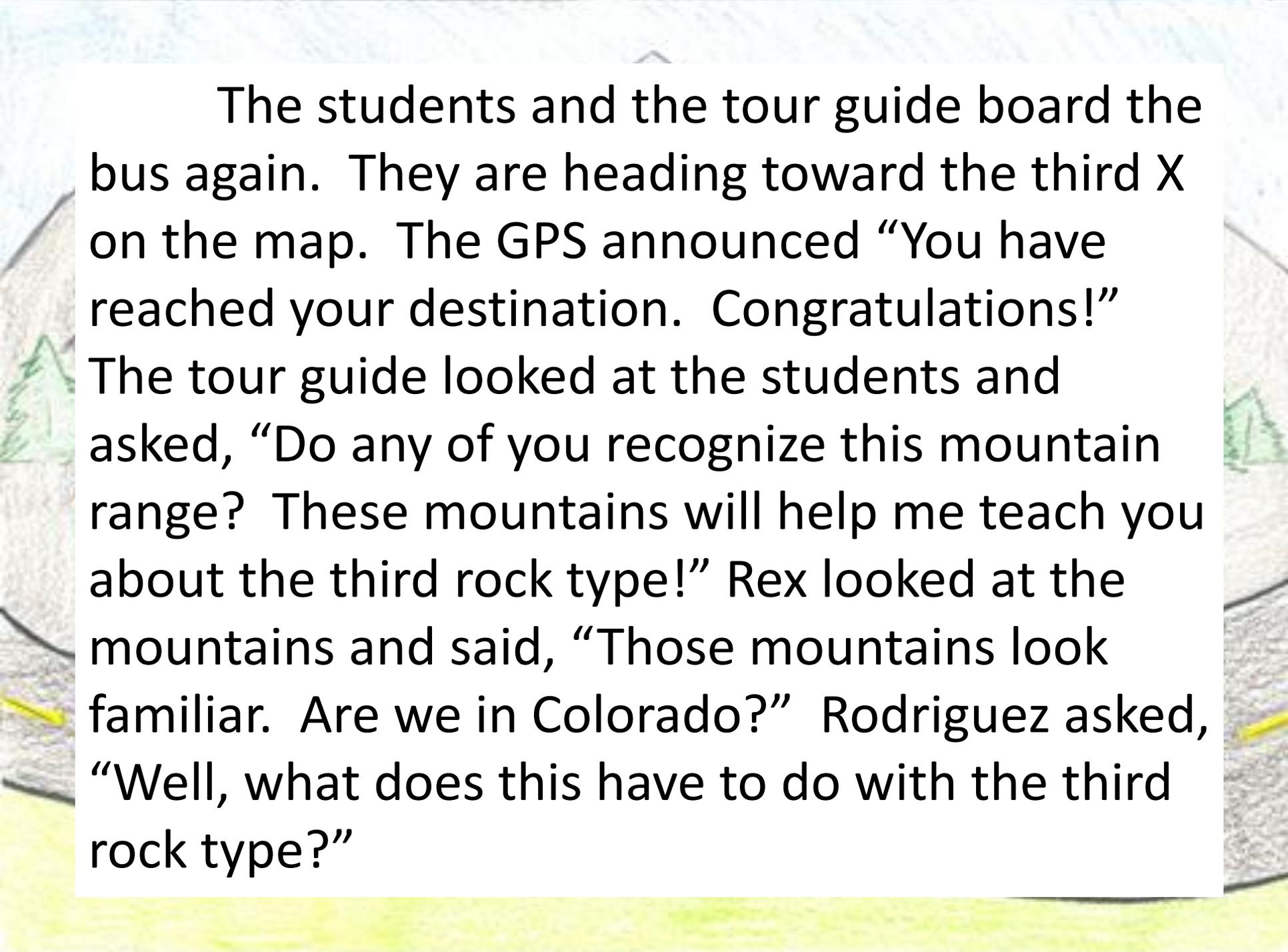




Well, I think I've been here before!

Yeah!

Jack Swigert Aerospace Academy

The background of the slide is a stylized map. It features green mountain ranges, yellow lines representing roads or paths, and a light-colored terrain. The map is partially obscured by a white text box in the center.

The students and the tour guide board the bus again. They are heading toward the third X on the map. The GPS announced “You have reached your destination. Congratulations!” The tour guide looked at the students and asked, “Do any of you recognize this mountain range? These mountains will help me teach you about the third rock type!” Rex looked at the mountains and said, “Those mountains look familiar. Are we in Colorado?” Rodriguez asked, “Well, what does this have to do with the third rock type?”



But, who stole the rocks?

I think she means these rocks replaced their parents.

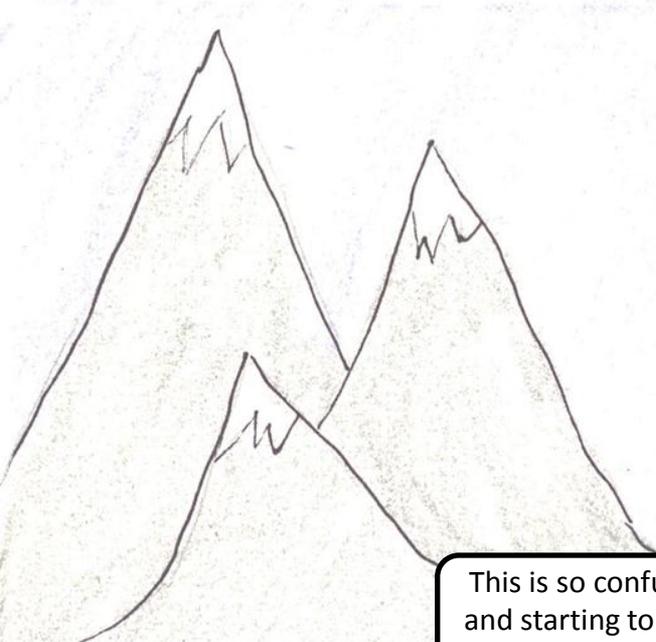
So, you are telling us these rocks have parents.

Metamorphic Rocks!

The tour guide looked at the students and announced, “We are at the base of the Rocky Mountains! A long time ago, igneous and sedimentary rocks were changed or metamorphosed, deep within Earth’s crust. The rocks changed because they were responding to the changes in temperature, pressure, stress, and chemical changes.”

Marco thought, “All this talk about heat and change makes me hungry for cake!” The tour guide said, “Actually, metamorphic rocks are like cake!” “How?” said Marco. Annoyed Selena said, “How can you think about cake when we are so close to solving the mystery!” The tour guide explained, “When you are making a cake you pour the batter into a pan and place it in the oven. When the batter is in the oven it goes through intense heat and changes form. It turns into a thick puffy cake. If you leave the cake in the oven too long it continues to cook under the heat and turns into a very hard substance. This is like the changes that a metamorphic rock goes through.”

Marco laughed, “So, metamorphic rocks are like burnt cake?” Rex chimed in, “My parents burnt my birthday cake last year, it was not very funny!” The tour guide continued, “Well did you know every metamorphic rock has a parent rock?” Selena was confused, “What happens to their parents?” “Well, those sedimentary and igneous rocks morph or change into metamorphic rocks!” explained the tour guide.



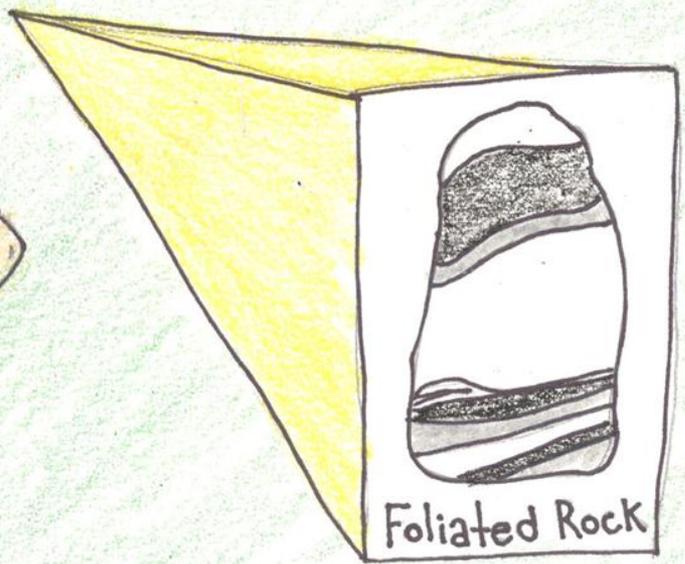
Foliation like Cake layers



This is so confusing,
and starting to make
me hungry!

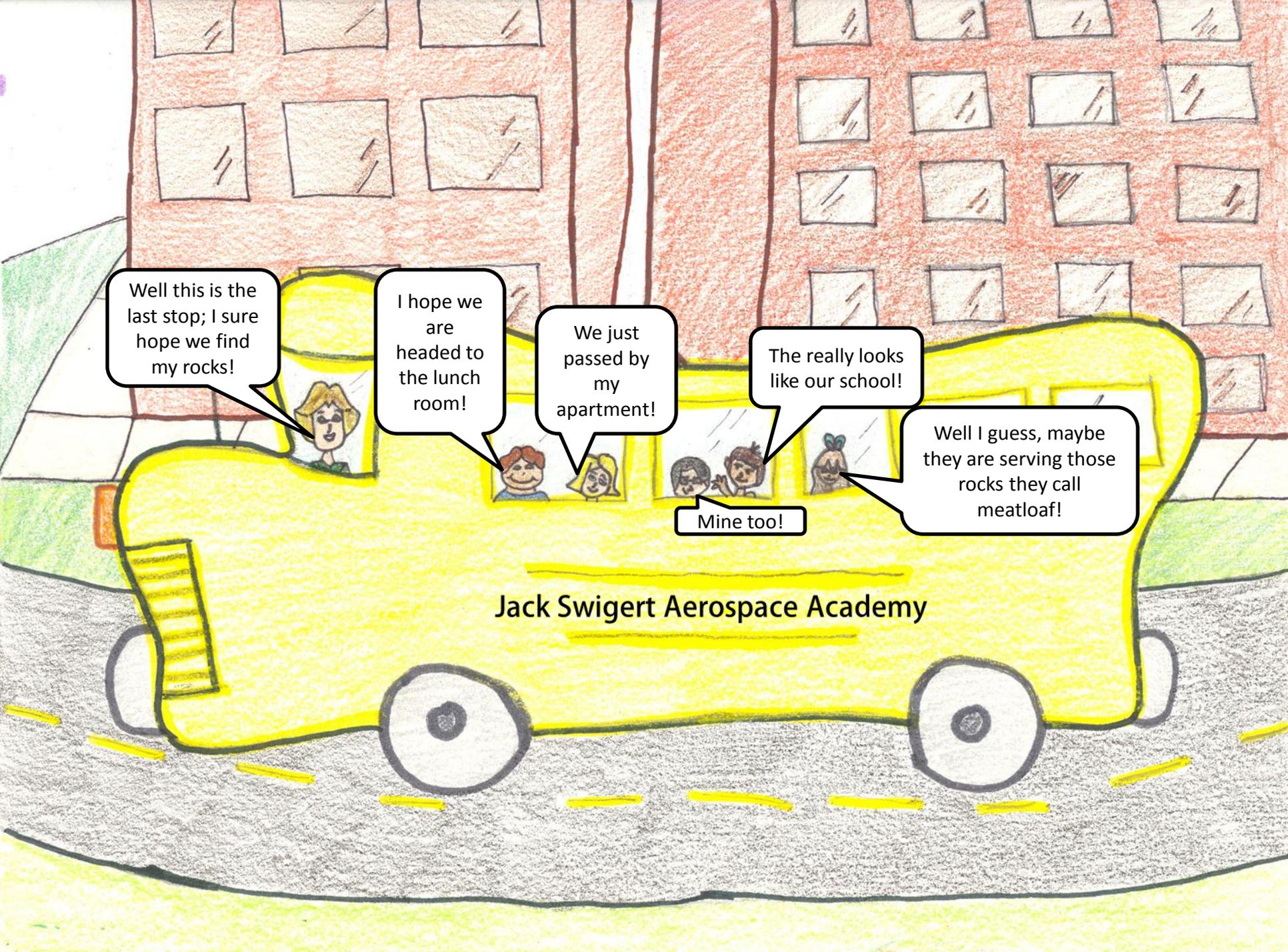


Just think, metamorphic
rocks are like cake.
Many layers!



Rodriguez wanted to know, "How do you know which rocks are metamorphic rocks?" The tour guide thought and replied, "The most obvious characteristic in metamorphic Rocks is called foliation, but it is not present in all metamorphic rocks. Foliation results when uneven pressures cause flat minerals to line up giving the rock a layered appearance. Non-foliated metamorphic rocks have grains that are not flattened." "Well what do you mean by layers?" asked Selena. The tour guide explained, "Think of the cake we were talking about earlier. If we piled many of those cake layers on top of one another and cut a really big slice, it would have a stripped appearance!" Rex replied, "Like wedding cake!" The tour guide said "Yes, like a big piece of wedding cake!"

Marco stated, "This is so confusing and is starting to make me hungry!" The tour guide clarified, "Just think, metamorphic rocks form when parent rocks are squeezed, heated, or exposed to hot fluids. During metamorphism the rocks do not melt. They remain solid, but the texture and the mineral composition of the parent rock changes." Emily exclaimed, "The word metamorphic just means that the rocks change form!" "Very good, I think we have all learned a lot. Let's hop back in the bus and see where this last X on the map takes us!" replied the tour guide.



Well this is the last stop; I sure hope we find my rocks!

I hope we are headed to the lunch room!

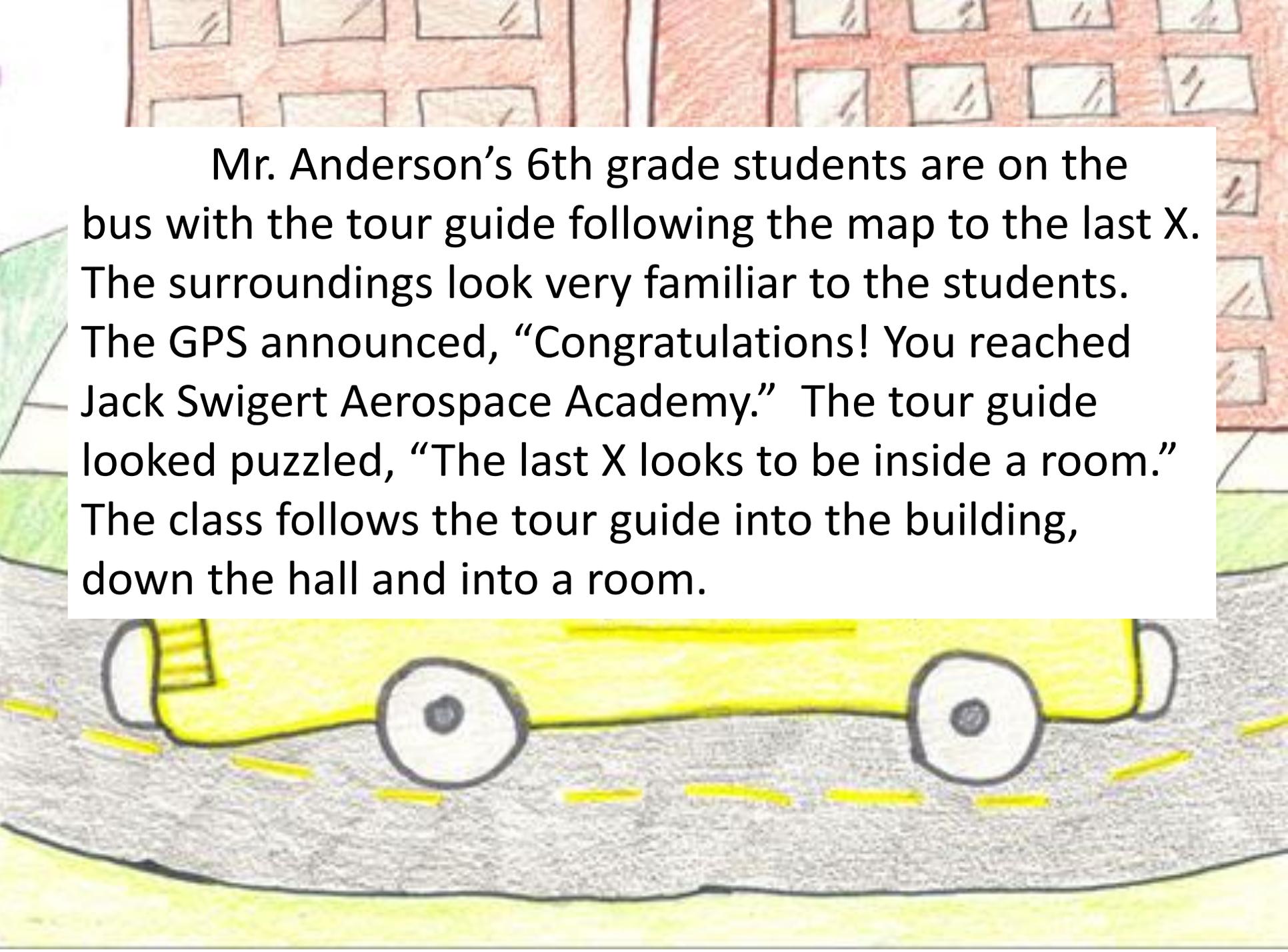
We just passed by my apartment!

The really looks like our school!

Well I guess, maybe they are serving those rocks they call meatloaf!

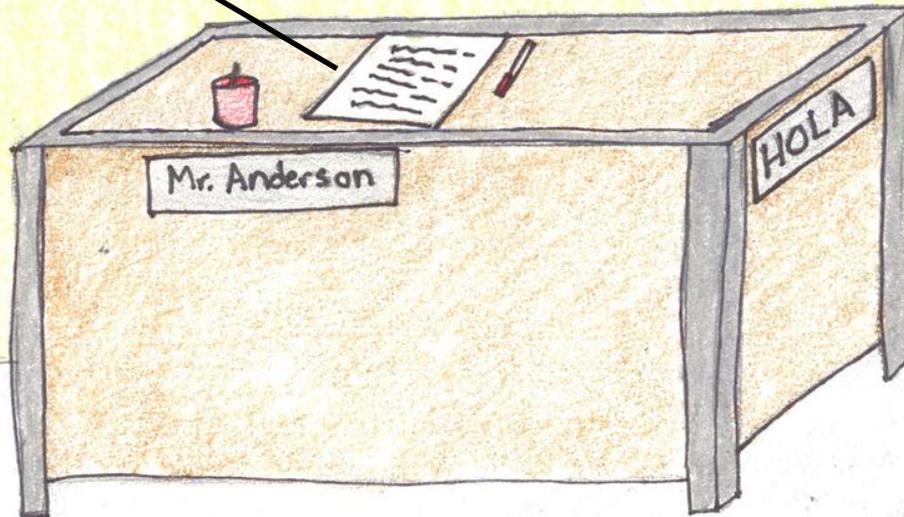
Mine too!

Jack Swigert Aerospace Academy

The background of the page is a colorful illustration. At the top, there are several red brick buildings with many windows. Below the buildings is a grey road with yellow dashed lines. In the foreground, the front of a yellow school bus is visible, showing its headlights and wheels. The text is centered in a white box over the road area.

Mr. Anderson's 6th grade students are on the bus with the tour guide following the map to the last X. The surroundings look very familiar to the students. The GPS announced, "Congratulations! You reached Jack Swigert Aerospace Academy." The tour guide looked puzzled, "The last X looks to be inside a room." The class follows the tour guide into the building, down the hall and into a room.

Congratulations students!
You have learned all about the three rock types. Your last mission, should you choose to accept, is in the Mars lab. Please follow the tour guide and make your way to the Mars lab. You will find me there. Hurry, this note will self-destruct in 1 second! KA-BOOM! Just kidding, this is just a piece of paper... now move it!



That looks like a note on Mr. Anderson's Desk!



The tour guide shouts, "This map leads us to your classroom!" Emily questioned, "Why would it lead us here?" "Yeah, none of us took the rocks!" said Rex. Rodriguez stated, "Maybe we have to find another map." "This is not the lunchroom!!" Marco said disappointed. "Hmmm... where is Mr. Anderson?" asked Selena. "Maybe he went back to the museum to find us." stated Rex.

The note reads, Congratulations students! You have learned all about the three rock types. Your last mission, should you choose to accept, is in the Mars lab. Please follow the tour guide and make your way to the Mars lab. You will find me there. Hurry, this note will self-destruct in 1 second! KA-BOOM! Just kidding, this is just a piece of paper... now move it!

The tour guide started walking toward the door, "We had better go to the Mars lab!" Emily asked, "You don't think Mr. Anderson took the rocks do you?" Rex replied, "I bet he thought they were worth money." Marco followed Rodriguez out the door. "This is probably just a big joke." said Marco. "Well we are almost there!" answered Rodriguez.

Hi Class, how was your field trip?
Ready to lose this challenge?



Easy, we learned about
these rocks all day!

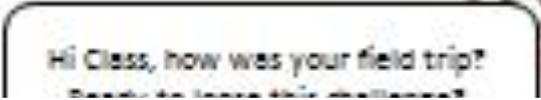


You stole
them!

Loser... you are
going down!

It's on, I can't
believe you
stole them!

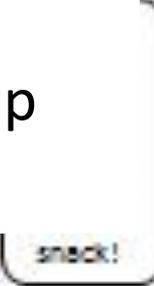
You
could
have at
least
thrown
in a
snack!



Hi Class, how was your field trip?

Selena turns the door knob and walks into the Mars lab. “Mr. Anderson! YOU Stole the rocks??? WHY?” shouted Selena. “Hello class, Did you have a fun field trip? I hope you learned everything you could about the three rock types. I have one last thing you all need to do. Get this rover to uncover the three rock types in the Mars lab and place them in the correct buckets!” explained Mr. Anderson. “This will be so easy. We know all about these rocks!” replied Rodriguez. “Yeah, we learned so much. I bet we could find them faster than you could!” dared Marco. “It’s on, we had better get back to the room and make our plans to collect these rocks!” challenged Mr. Anderson. All the students cheered, “YEAH!!!” The students followed Mr. Anderson and the tour guide back to the classroom to draw up plans to rescue the rocks.

ole
n!



snack!





Oh man, how long will this take. I need those rocks back. However, I want to see these kids kick Mr. Anderson's butt first!

Let's make him bring us Mars Candy Bars!!

The tour guide looked worried, “Oh man, how long will this take. I need those rocks back. However, I want to see these kids kick Mr. Anderson’s butt first! They all know that sedimentary rocks are built up in layers, have very small sediments and weather away easily. Igneous rocks form from melted rock that cools and hardens; they are also the most abundant on earth! In addition, metamorphic rocks are formed underground through heat and pressure. Metamorphic rocks are common in our own back yard; The Rocky Mountains. I have been on the best mystery hunt! Now let’s go find those rocks and beat Mr. Anderson!!” she said excited to help the students win! The students, the tour guide, and Mr. Anderson head back to the classroom to create the plans they need to uncover the rocks with the rover. They are going to race Mr. Anderson for the fastest time and correct classification. Loser brings treats or does classroom chores.

Not the end...