

# Issues in Earth Science

“Eww, There’s Some Geology in my Fiction!”

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## Teacher Resources

*Young urban explorer LaRose becomes a true original when curiosity and imagination involve her and Grandpa Deon in a real environmental science investigation.*

# A True Original

by

Mary Ibe



been good at finding chimneys.”

”Oh, wow! This is a really good one!” LaRose said, pointing to a wet mound. It looked like a tiny, lumpy smokestack.

“Yeah, that is a nice one, Rosie-bug,” Grandpa Deon said. “You always have

LaRose smiled, feeling too old to still be called “Rosie-bug,” but somehow not minding that it was her beloved grandpa calling her that.

LaRose and Grandpa Deon were keeping up their tradition of hunting for crayfish chimneys after the spring rains. Crayfish chimneys aren’t like the chimneys that go with a fireplace. A crayfish chimney forms when a crayfish digs a tunnel, making little pellet-sized balls of mud out of the soil. They stack these mud pellets outside of their tunnels and the piles end up looking like little chimneys.

“Hey, did I ever tell you about my prize-winning crayfish chimney collection?” Grandpa Deon asked.

“What?!” LaRose said, with surprise. “You mean to tell me that we’ve been hunting for crayfish chimneys every spring and you are just now telling me this? How could you hold back that kind of information from your favorite Urban Explorer?!?” She playfully tapped his arm for emphasis.

Grandpa Deon and LaRose referred to themselves as Urban Explorers. Even though they lived on the edge of a large city, they still looked for nature wherever they could find it. The drainage ditch that ran along the sidewalk that stretched between their two apartment buildings supplied hours of fun for them.

“Come on over to my workshop and I’ll show it to you,” Grandpa Deon said.

The two of them made the short trek to what Grandpa Deon called his workshop. It was really the maintenance shed for the apartment complex. Grandpa Deon got a reduced rate on his rent in exchange for doing odd jobs and fixing things in the apartments. He unlocked the shed door and they walked in. Stacked up on a high shelf was an assortment of jars with lids on them. Grandpa gently took one of the jars down and dusted off the lid and the sides of it and handed it to LaRose.

LaRose peered into it and slowly turned the jar around. “Yeah, now I see it. It is definitely a crayfish chimney. How old is it, do you think?”

“It must be fifty years old. I collected about twenty chimneys for a school assignment when I was about your age. We had to collect something and learn how to classify it. Most kids collected leaves or feathers or stones. But, even back then I loved crayfish chimneys. I decided that I would dig some up and save them in jars. I let them air dry and I labeled them based on where I found them and arranged them according to size and location.”

“But you said they were prize-winning. What did you win a prize for?”

“Originality!” Grandpa Deon bellowed with mirth. “My teacher said nobody had ever submitted crayfish chimneys for the assignment. See, there’s the blue ribbon she gave me,” he said, pointing to a faded blue ribbon with its tail tucked under one of the jars.

LaRose gently took the ribbon from the shelf and read the hand-lettering on it. It said, “For Deon, A True Original!”

Seeing the look of pride Grandpa still had when he looked at the ribbon made LaRose smile.

The next day after school, LaRose again met Grandpa at the drainage ditch. “Hi Grandpa, I’m going to be an original. I’m going to collect crayfish chimneys, too!” “Now how can you be original if I already did that?” he asked.

“Well, I’m not only going to collect them, I’m also going to analyze them,” LaRose said.

“What will you analyze?” Grandpa asked.

“I haven’t figured that part out yet, but I’ll think of something,” she answered.

“Well, you should think of something quick, because it seems like either the crayfish chimney season is really short this year or there are way fewer crayfish than there used to be.”

“Hey, that’s it!” LaRose said. “There aren’t as many crayfish as I remember from when I was really little. I can analyze them to figure out why that is.”

“From what I remember, there were not only more crayfish, but the area where I would find chimneys as a boy was much larger back then. Now it seems like we mostly find them in this little part of the creek that bends away from the street.”

LaRose looked up at the banks of the little creek that had provided so many hours of entertainment. It was covered in trees, roots and shrubs, all sprouting new spring leaves. Water dribbled from a pipe that drained the water off of the road. It made a pretty sound, like a little waterfall, as it fell into the drainage ditch. She sighed with contentment. “I just love this place,” she said. “But now I’m worried. We are definitely onto something about the crayfish disappearing. I wonder what it could be?”

“I don’t know what’s going on, but we are Urban Explorers, so let’s investigate!”

“Ok. Let’s start by seeing how far the area where we can find crayfish chimneys goes,” LaRose suggested.

“It seems like it stops right here,” LaRose said, pointing to an area that ended close to the little drainpipe waterfall from the road. “Grandpa, when you were a kid, how far could you go and still find chimneys?”

“Well, that would be hard to compare because when I was a boy, that street didn’t even exist,” he said, pointing up the bank to the nearby road.

That night LaRose searched the internet for ideas on how to find out more about the disappearing crayfish chimneys. She didn’t discover any answers, but she did come across a soil test kit that looked interesting. She could get it for free from a county agency. She filled out a form online and a few days later, she got a test kit in the mail. She followed the instructions and mixed samples of chimney soil with water and tested the mixture for sulfates using a strip of paper. All she had to do was see if the paper changed color and report the paper color and location of the soil sample to the agency.

LaRose opened the county agency website and began to answer the questions it asked her about her results. She hit submit on her responses and went to bed.

The next morning, she noticed a notification in her inbox. It was from the county agency. They said that her test results were very interesting, and they wanted to know if she could get any more test samples from the same area. LaRose gathered up as many old jars as she could find in her recycling bin and went to collect samples to test.

She submitted the results of her new test samples that same day. Just like before, the very next day, she had a message from the county agency, asking for more samples. She was out of jars, but she knew where she could get some more.

“Grandpa!” she called, swinging open the door to his workshop. “Is there any chance I could use some of the soil from your crayfish chimney collection? I only need a couple of spoonfuls from each.”

She explained to him why she needed them. He agreed to let her scrape some soil from each of his jars. He also gave her his category sheet so she could report to the county agency the location of each chimney.

As LaRose looked at his location list, she said, "Hey, some of your chimneys are in almost the same exact location as the samples I already submitted. I wonder if the results will be the same?" She completed the testing and became worried when some of the paper strips from Grandpa Deon's samples turned a different color than the samples she gathered the first time. When she submitted Grandpa's results, she mentioned the color difference and asked the county agency if there were any further types of analyses they could do on all the samples to explain the difference.

Two days later she got another message from the county agency. It said: Would you be able to send us actual samples of soil for further analysis? We would like to investigate further. Also, we noticed that you submitted some sample locations twice. Could you please supply the dates you collected the samples?

Their request caused LaRose to realize that the county agency seemed to be very eager to learn more about her samples. What did they find so interesting about her samples? Had she stumbled across something important? She had to find out more. Maybe it would somehow help the crayfish. So, instead of just answering their questions, she decided to also ask them a few questions.

In her response she asked them, “Is there something unusual about the samples I submitted? Do you think there is something in the soil affecting the crayfish? I don't know the exact date for all of them, but my best estimate is that the most recent batch of results I sent to you was from fifty years ago. The first batch I sent you was May 22 and the second batch was from May 24.”

The very next day, the county agency sent her a short response with a question: “May 22 and 24 from fifty years ago?”

“No. From this year,” LaRose typed and hit send.

She immediately got a notification from them. It said,  
“Can we call you?”

“Give me five minutes,” she responded and gave them  
Grandpa Deon’s cell phone number.

LaRose ran to her Grandpa’s workshop and opened the door with a shout, “Grandpa, the phone’s going to ring, please answer it!”

Just then, his phone rang.  
“Hello?”

“Hello, may I speak with LaRose Taylor please?” said a voice.

“May I ask who is calling?”  
“This is Shari from the County Water Agency. LaRose has submitted some soil samples to us that we would like to speak to her about.”

Grandpa looked wide-eyed and passed the phone to LaRose.

“Hello,” LaRose said, trying to sound confident.

“LaRose, what a pleasure to speak with you. I am Shari, the researcher in charge of the Citizen Science Soil Sample Project you have been submitting test results to. Did you know the samples you collected are telling quite a story?”

“What do you mean?” she asked excitedly.

“We think that the chemicals in the soil are impacting the whole ecosystem, not only the crayfish. What changes have you noticed?”

“We have noticed that there doesn’t seem to be as many crayfish chimneys the last few years,” LaRose said.

“Your test results indicate that now there are large amounts of chemicals in the soil that could be harmful to plants and animals. The samples from fifty years ago do not show evidence of any of these chemicals. Parts of the geochemical fingerprint of the soil have changed over time and we want to learn more.”

“I don’t know what that geochemical fingerprint thing is you mentioned, but I can tell you that there is a road near the creek that wasn’t there fifty years ago,” LaRose said.

“We know about that road and the data from your samples confirm our suspicions. We want to do some more tests to look at the soil’s fingerprint. The fingerprint, or the types of chemicals that are in the soil in your samples, is intriguing. Your soil samples look like they might be a key piece of information for our project. Not many people have such an interest in crayfish chimneys. You are a true original, LaRose! Can we meet you sometime and look at your samples?” asked Shari.

LaRose talked to Grandpa Deon and the three of them worked out a time and a place to meet.

“Your curiosity is really something, LaRose,” Grandpa Deon said. “Just imagine, your soil samples are going to help all the wildlife in the area!”

Grandpa Deon reached up and took his prize-winning blue ribbon off the shelf and said, “Here LaRose, you deserve

this ribbon. Even the county agency thinks you are a true original!"



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**Mary Ibe** is a writer who has been enamored with writing fiction ever since winning a Scholastic Writing Award in ninth grade. While a middle school science teacher for twenty years, Mary would get her writer's fix by having stories published here and there in periodicals such as *Girl's Life* and *Primary Treasure*. She currently writes middle school STEM curriculum for Project Lead The Way, an organization that provides project-based curriculum. After visiting an impressive Rock and Mineral Museum on vacation, Mary knew it was time to get back into writing fiction, which is how this story on geochemical fingerprinting emerged.

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Credit: A True Original artwork by Autumn Williams.

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