Q· You're magma. What's it like to be so hot?

A· Pretty cool, except for all the pressure. I'm sitting under miles of crust, and it weighs billions of tons. Unbelievable. Sometimes I just can't take it. That's why it's nice to escape to the surface through a volcano. The instant I hit the surface, I turn into lava and flow. Magma, lava, lava, magma—we're the same hot stuff: melted rock with a bunch of gases mixed in.

Q5 That's cool.

Aï No, hot. Molten. Red-hot. We're talking two thousand degrees Fahrenheit, or eleven hundred degrees Celsius. Hot, hot, hot. Many times as hot as boiling water.

Q OK, OK, you're hot. So do you only hang around in volcanoes, or are you anywhere else underground?

A: ANYWHERE else? You've got to be kidding. Magma is EVERYWHERE else underground! Except for one thin solid part on top, the earth's mantle is all me, myself, and I. You're sitting on magma right now. But don't get up. I'm at least twenty miles down.

Q· Wait a minute. If you're everywhere underground, why aren't volcanoes everywhere up here?

A: Well, there ARE five hundred active volcanoes in the world. About sixty of them blow up every year. So I do my best. Seriously, volcanoes don't just happen anywhere. I need the right place in Earth's crust before I can surface.

Q· And the right place is ...?

A: It's where the crust is so thin it's cracked, or it's got a hole in it. That's when I make my move. Either I blast out or spill out, depending on my type.

Q: What do you mean, your type? Isn't magma all the same?

A: No way. I come in four different types: andesite, basalt, dacite, and rhyolite. It's like having four different personalities. My basalt type is thin. It's weak. It's got no guts. I have to accept that. It makes bubbles and sprays and pretty fountains of lava and stuff when it erupts. My other kinds are thicker. They're strong. They're powerful. They rule! They make the best blasts, especially rhyolite, which is the thickest of all.

Q• You mean the type of explosion depends on the type of magma?

A· You got it.

Q· But why should it matter whether magma is thin or thick?

A· Come on, figure it out! Think of sipping water through a straw. Slides right up, doesn't it? Now imagine slurping up a mouthful of ketchup through the same straw. See how it works? It's harder for the thicker stuff to rise. And you know what that means.

Q˙ No, what?

A· It means trouble, and you spell that G-A-S. See, as I rise to Earth's surface, gases down here in the mantle rise too. Because of the pressure, those gases are trying to mix into Magma the Magnificent. When I'm thin and basaltic, that's no problem. I let them right in. We mix up, easy as pie. They dissolve, and we all float up the old vent and spray out the top. Then they drift quietly into the air, maybe making a little plop or whoosh or something. It's like popping the top of your can of cola VERY carefully, a little bit at a time. But when I'm thick—whole different story.

Q· What happens when you're thick?

A· I get stubborn. I block up the magma chamber like a big toe caught in your bathtub drain. The gases all crowd together below and around me. They want to get through, and I won't give. Ha! They bunch up in pockets and sit there fuming and expanding until finally—BLAMMO! This time it's like you shake and shake your cola and then rip off the top and spray it all over the place! We all blast out of there quicker than you can say "stratovolcano!"

Q˙ Strato-huh?

A· Stratovolcano. That's the kind of volcano made by the biggest blasts and the thicker kinds of magma. Mount St. Helens is a stratovolcano. So is Mount Vesuvius in Italy, and Mount Pelee in Martinique, and tons of other big guys. They're tall and steep, with sides all built up by lava and rock. Another name for them is composite.

Q˙ If thicker magma makes stratovolcanoes, what do volcanoes made by basaltic magma—the thinner kind—look like?

A· Kind of round and wide. Sort of like what a giant shield would look like if you laid it flat on the ground. That's why they're called shield volcanoes. Hawaii is full of them. In fact, the Hawaiian Islands **are** shield volcanoes.

Q· So you can tell just by looking at a volcano what kind of magma was inside? And what kind of explosion made it? Cool!

A· No, hot, I keep telling you. But you're right. And there's one other way to tell.

Q5 What's that?

A· Find a volcano. Wait for it to blow up. See what comes out! Speaking of which—I gotta cool off. I'm outta here.

Activity

POUR IT ON **The thickness of a liquid such as magma is called its viscosity, or resistance to flow. The viscosity of magma depends on its temperature, water content, and the amount of a mineral called silica in it. The thicker the magma, the more silica in it.**

To get an idea of how viscosity works for common liquids, try this experiment: Take a board about three feet long. Tilt the board at a 45-degree angle so that its bottom rests in a sink or on a table with a washable covering. Now, take common liquids of different thicknesses—water, liquid soap, rubbing alcohol, corn syrup, molasses, ketchup, and so forth—and pour a small amount of each into a liquid measuring cup, one at a time.

Pour each liquid onto the top of the board. Time its flow until it reaches the sink. How long does each one take to get to the bottom of the board? Try varying the angle of the board and the temperature of the liquids. What happens?