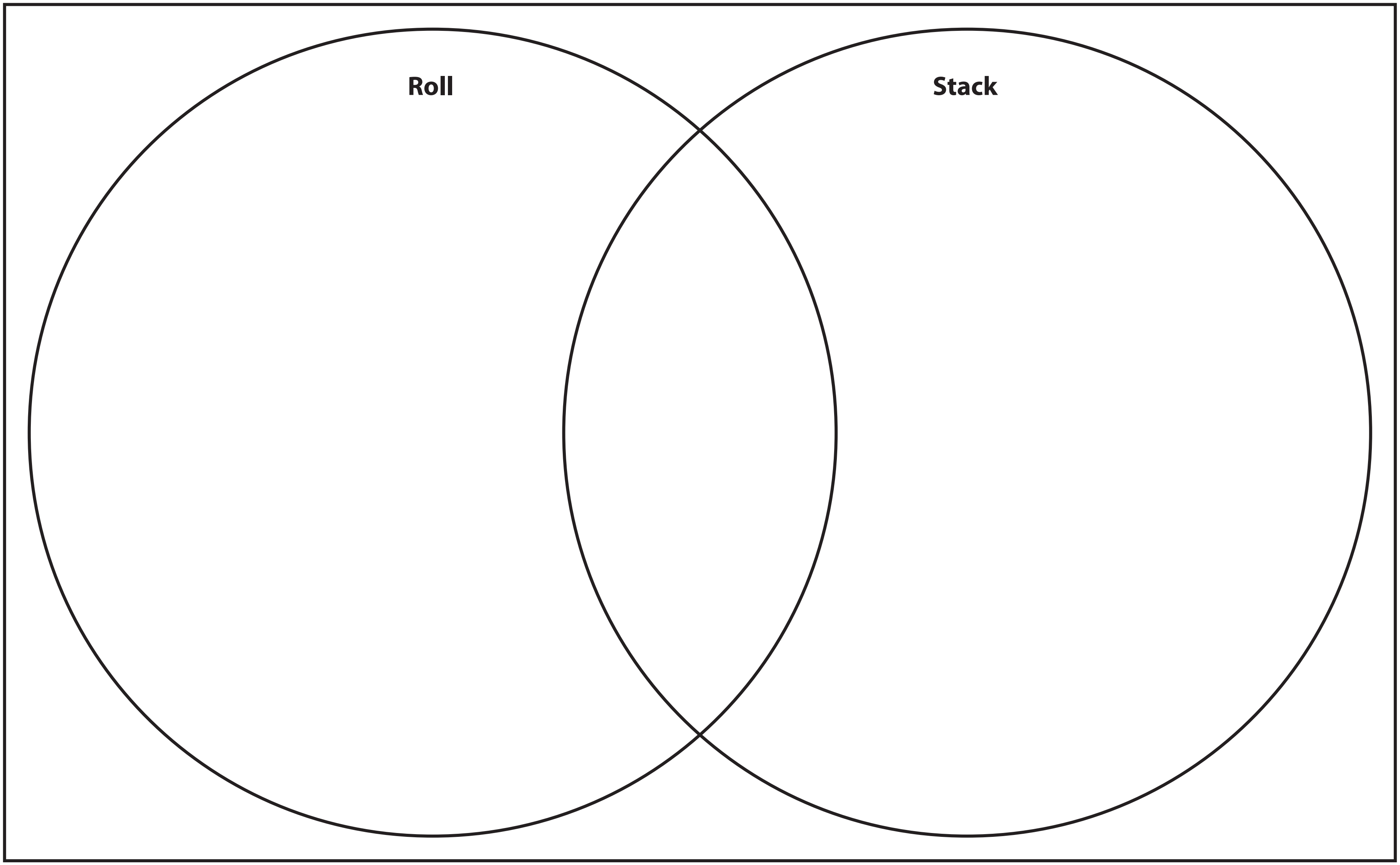
Record Sheet 3–A

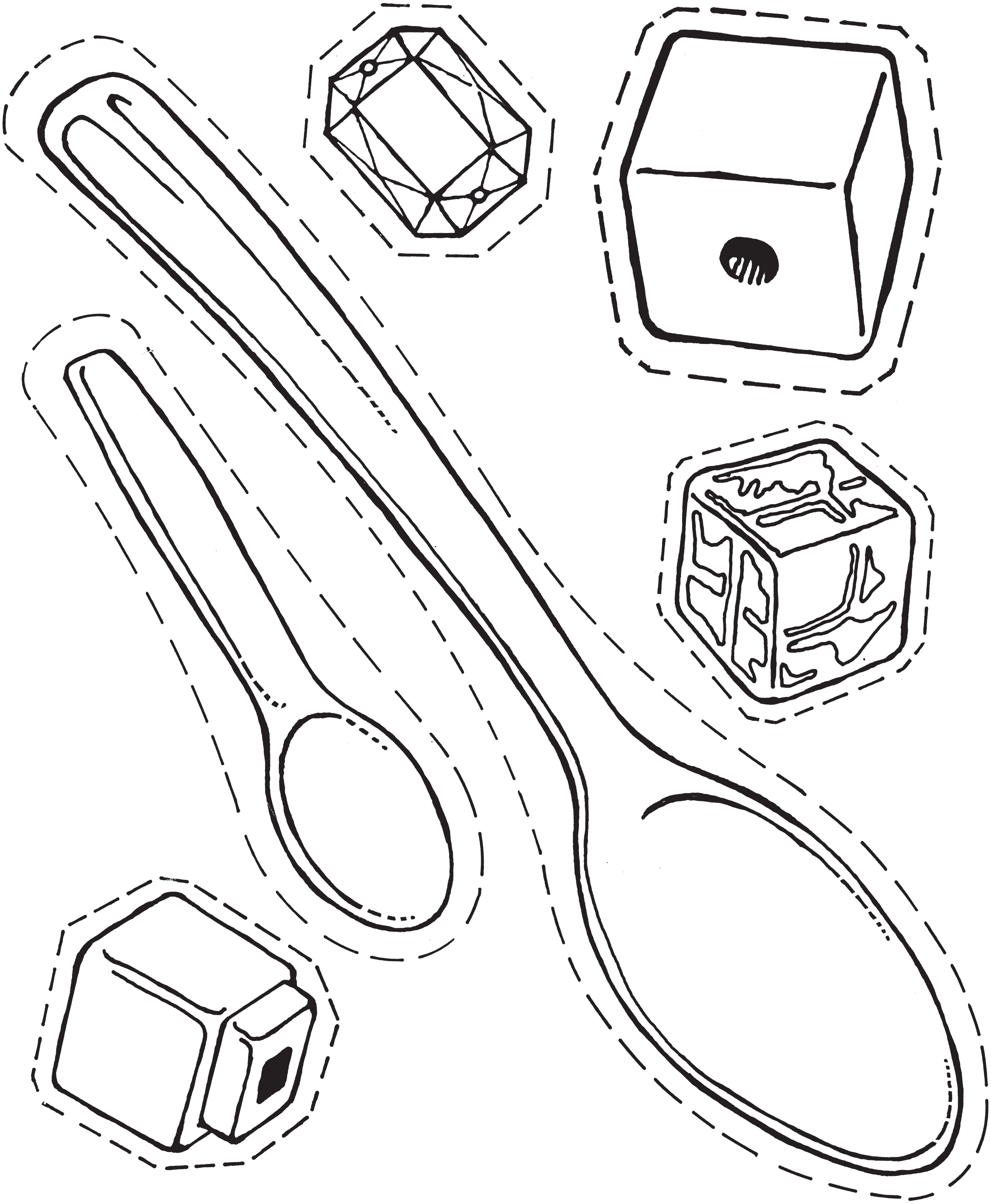
Name

Date

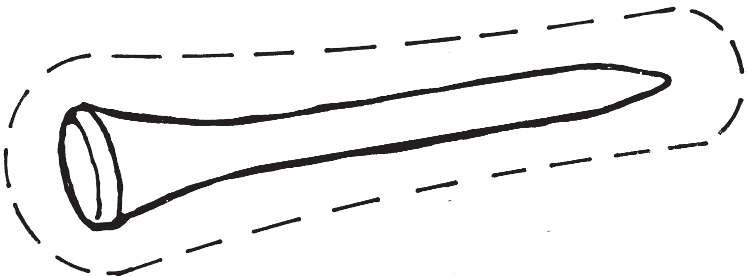
Rolling and Stacking Solids

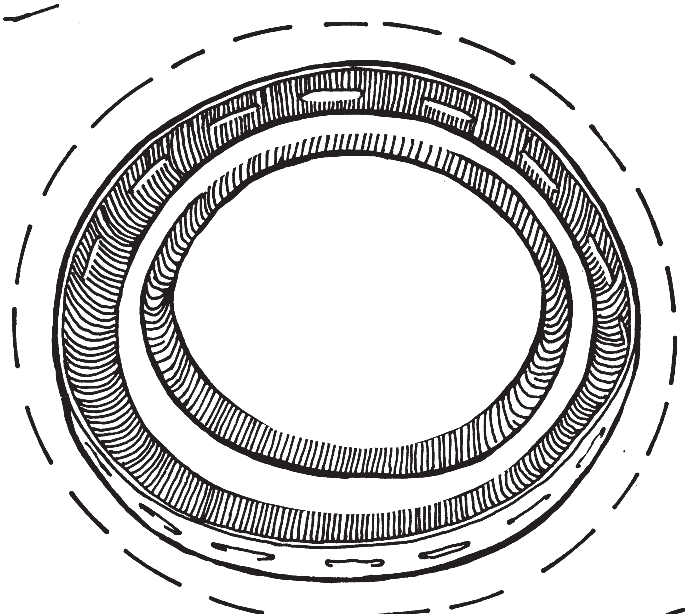


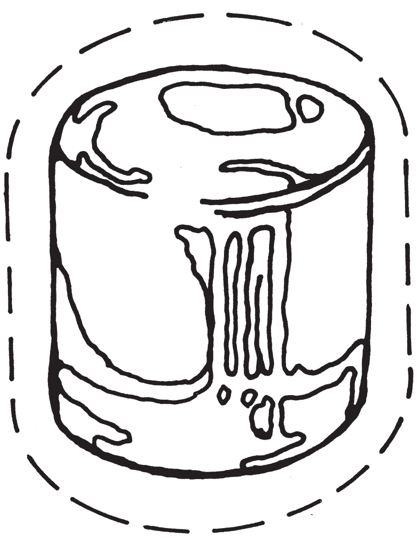
The 20 Solids



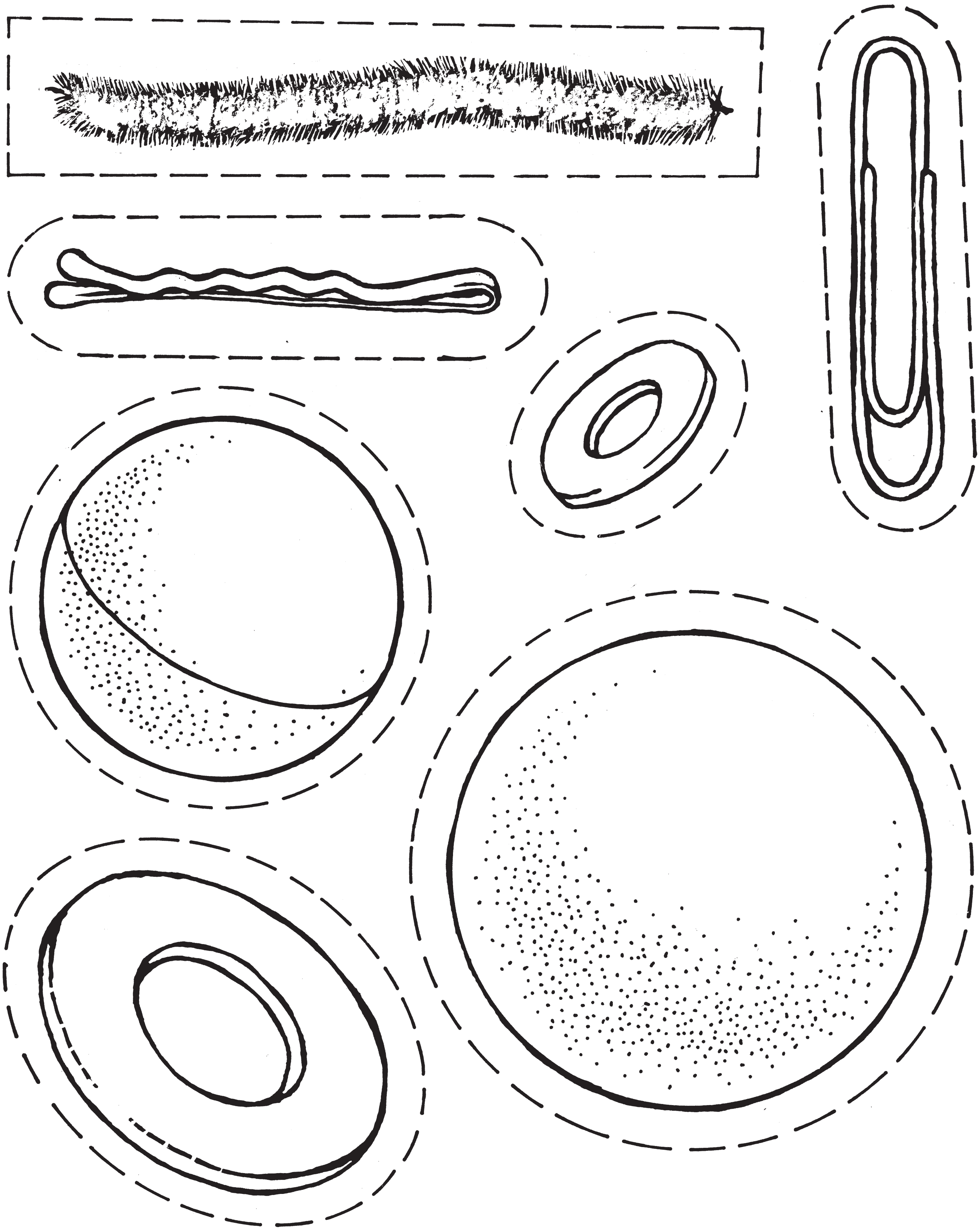
The 20 Solids *(continued)*







The 20 Solids *(continued)*



Sorting Solids: Scientists Do It Every Day!

Dr. Michael Wise and Dr. Sorena Sorensen work at the National Museum of Natural History of the Smithsonian Institution in Washington, D.C. They are **geologists**—scientists who study rocks and minerals.

The mineral and rock collection at the Smithsonian includes more than 380,000 pieces. Some are almost too small to see. Some are as big as a buffalo.

All rocks and minerals are solids. In fact, one mineral, the diamond, is the hardest solid on earth. Have you ever found a rock or mineral and wondered what kind it was?

Just like the solids you have been exploring in science class, rocks and minerals can be described and sorted by their properties. Sorting rocks and minerals is a big job, because there are hundreds of different types. Geologists like Dr. Sorensen and Dr. Wise group rocks and minerals by families. They call a mineral family a **species.**

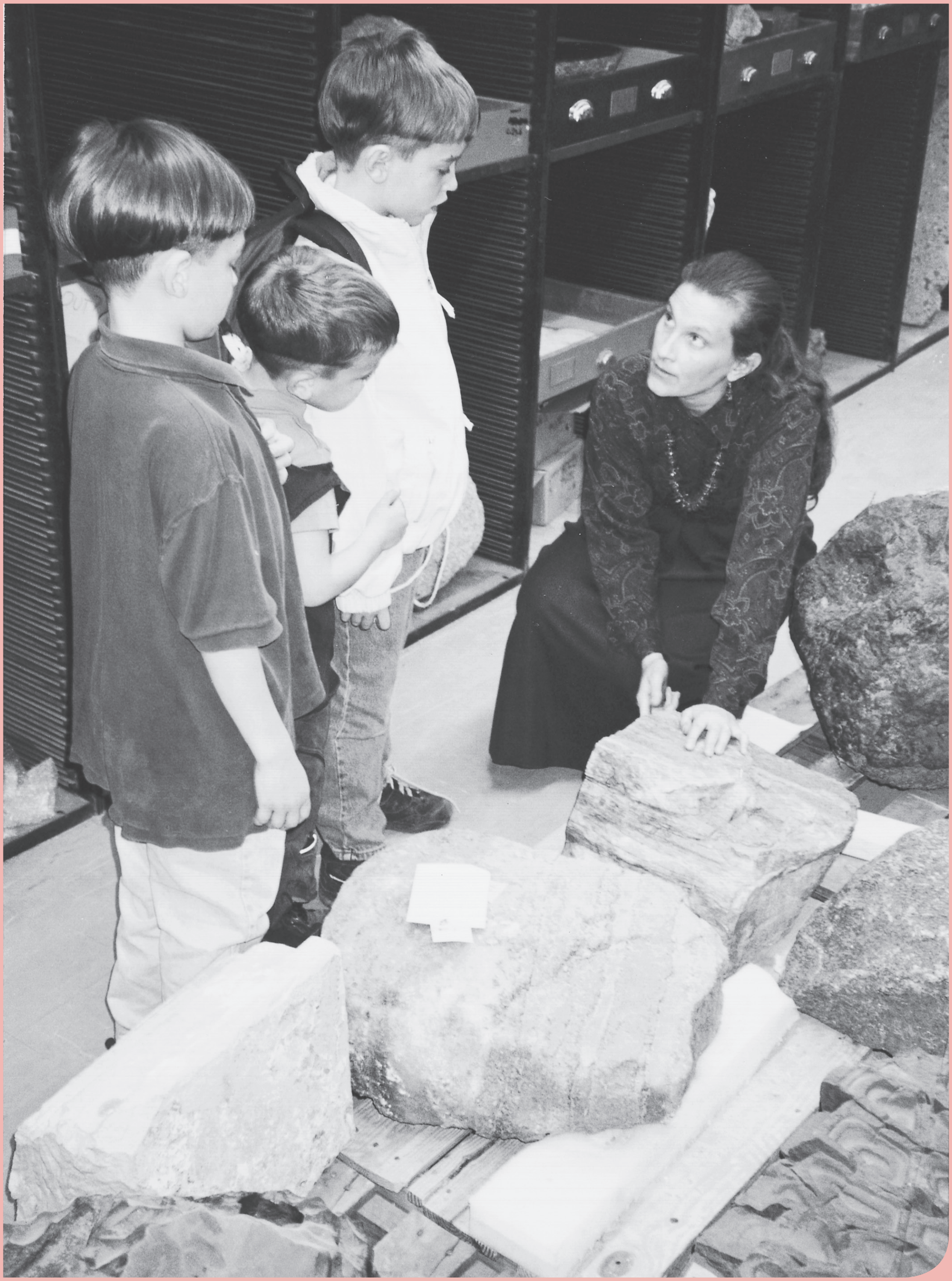
How do geologists sort minerals? They observe their properties. They often use a magnifying lens or microscope. Sometimes they do tests on the minerals.

One property of solids — color— can be tricky. This is because the same mineral can come in many colors. For example, the mineral quartz can be pink, purple, brown, or yellow. Sometimes it is as clear as ice. You can't identify a mineral just by its color.

What property do you think Dr. Wise and Dr. Sorensen find most helpful? It's one that you have explored in class.

If you said shape, you are right! Each mineral family, or species, has its own shape.

According to Dr. Sorensen, some of the rocks in the museum's collection are nearly 4 billion years old!



Even though quartz is found in many colors, it always has the same shape. Quartz always has six sides. Some minerals have a cube shape. The shape of a mineral is always the same because the tiny, tiny particles that make up each mineral are always arranged in the same pattern.

So, when Dr. Sorensen and Dr. Wise begin to identify a mineral, they look at its shape. How many sides does it have? Is the mineral long and thin, like a pencil? Or is it round, like a baseball? Do some of its sides come together in points? By answering these questions, they can identify a mineral and sort it into the right species.

But sometimes the geologists need extra help. They can't always see the special shape of the mineral or the way its tiny particles are arranged, even with a powerful microscope.

Sorting minerals with Dr. Wise

Then Dr. Wise takes the mineral down the hall to a special kind of X-ray machine. He puts the mineral on a small shelf inside the machine and takes an X-ray. The X-ray gives him an “inside view” of the mineral, just like an X-ray of your arm tells your doctor whether you broke a bone when you fell off your bicycle. With the X-ray, Dr. Wise can see how the tiny particles inside the mineral are arranged. Then he can identify the mineral.

Dr. Sorensen and Dr. Wise are now working on a new permanent exhibit in the museum called “Geology, Gems, and Minerals.” It will have rocks and minerals from all over the world. One section will focus just on the shape of minerals.

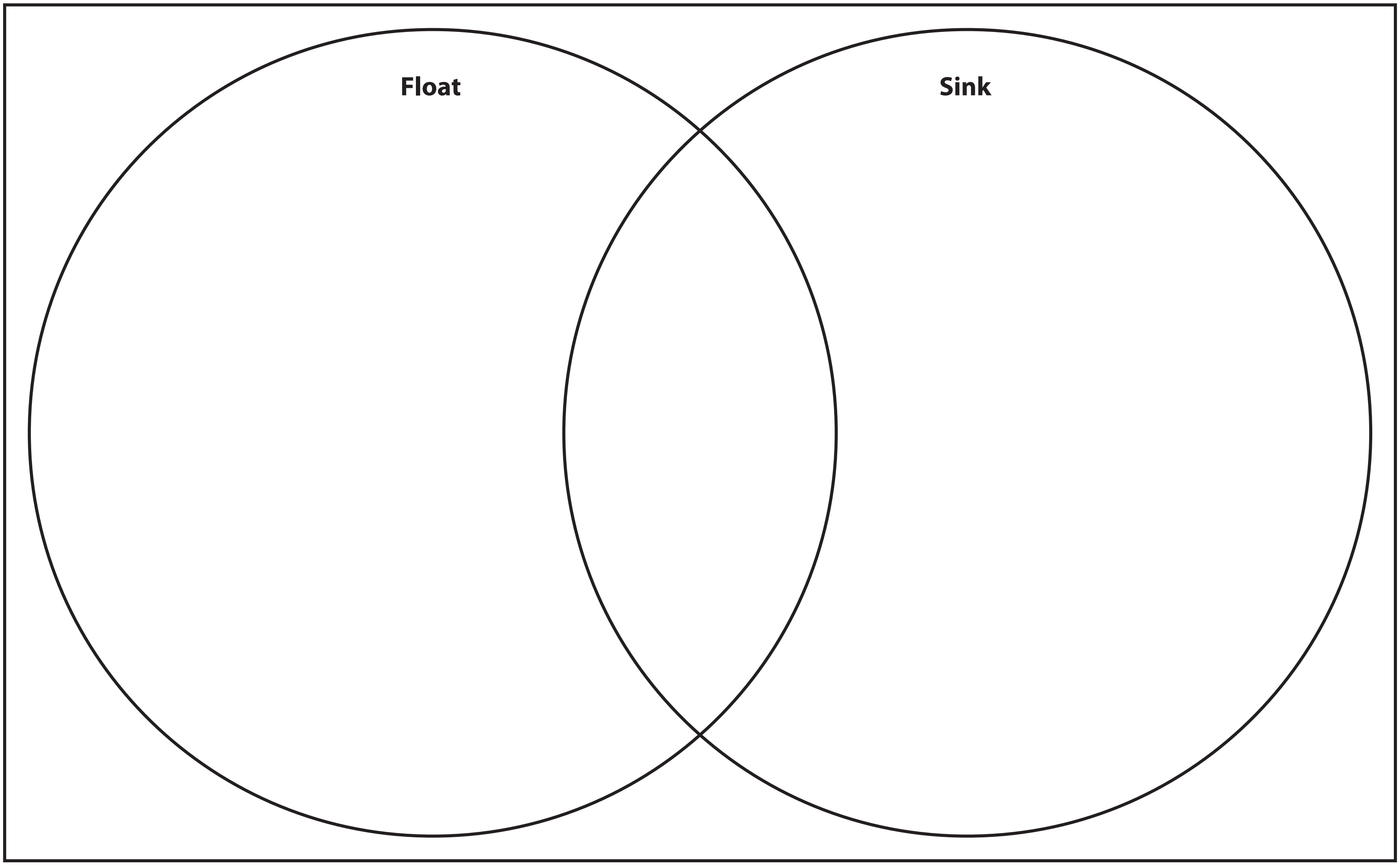
If your family takes a vacation to Washington, D.C., you might want to visit this exhibit. You might even see Dr. Sorensen or Dr. Wise leading a tour through the exhibit.

And now that you have learned how geologists sort minerals, you can explore them on your own. Because rocks and minerals aren’t just in museums. These solids are “on display” right in your own backyard!

Record Sheet 6–A

Name ______________________ Date ______________________

Floating and Sinking



Record Sheet 7-A

Name

Date

Testing Solids with a Magnet

Is the solid attracted to the magnet?

Yes	No

Record Sheet 9-A

Name

Date

Two New Solids

	Button	**Sponge**
Color		
Shape		
Hardness		
Rolls		
Stacks		
Floats or sinks		
Magnetic		

Reading Selection

Snow Friends

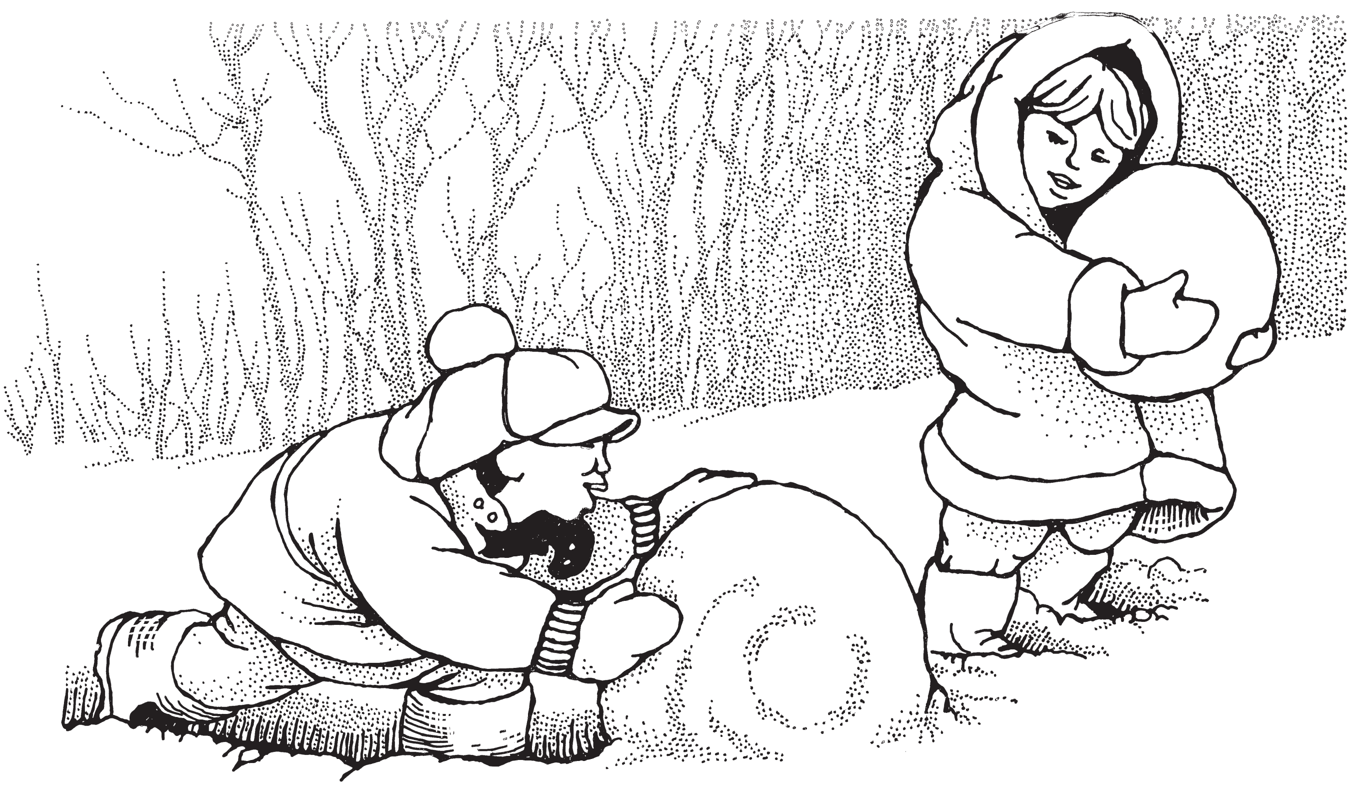
“Guess what, April. It’s snowing!”

When she heard her mother’s voice, April jumped out of bed. She ran to the window. A blanket of snow covered the yard. “Maybe you would like to build a snowman today,” her mother said.

It was April’s first snowfall. Her family had just moved to Michigan from Florida. April couldn’t wait to go outside and start her snowman.

She put on her warm coat, boots, a hat, and gloves. “Wow, it’s cold out here,” she said as she stepped into the snow. She looked up. Long icicles hung from the gutter of her house.

April started to roll a ball of snow for her snowman. It was hard work!



After a while, she heard a voice behind her. “Do you need some help? I have two buttons we can use for the eyes. And a carrot for a nose. I even have a long red scarf to put around his neck.”

April turned around. It was Lakeesha, her neighbor. The girls began to work together. When they were done, the snowman was taller than April!

April’s mother came out to take a picture. “There you are,” Mother said. “April, Lakeesha, and the snowman. Three snow friends.”

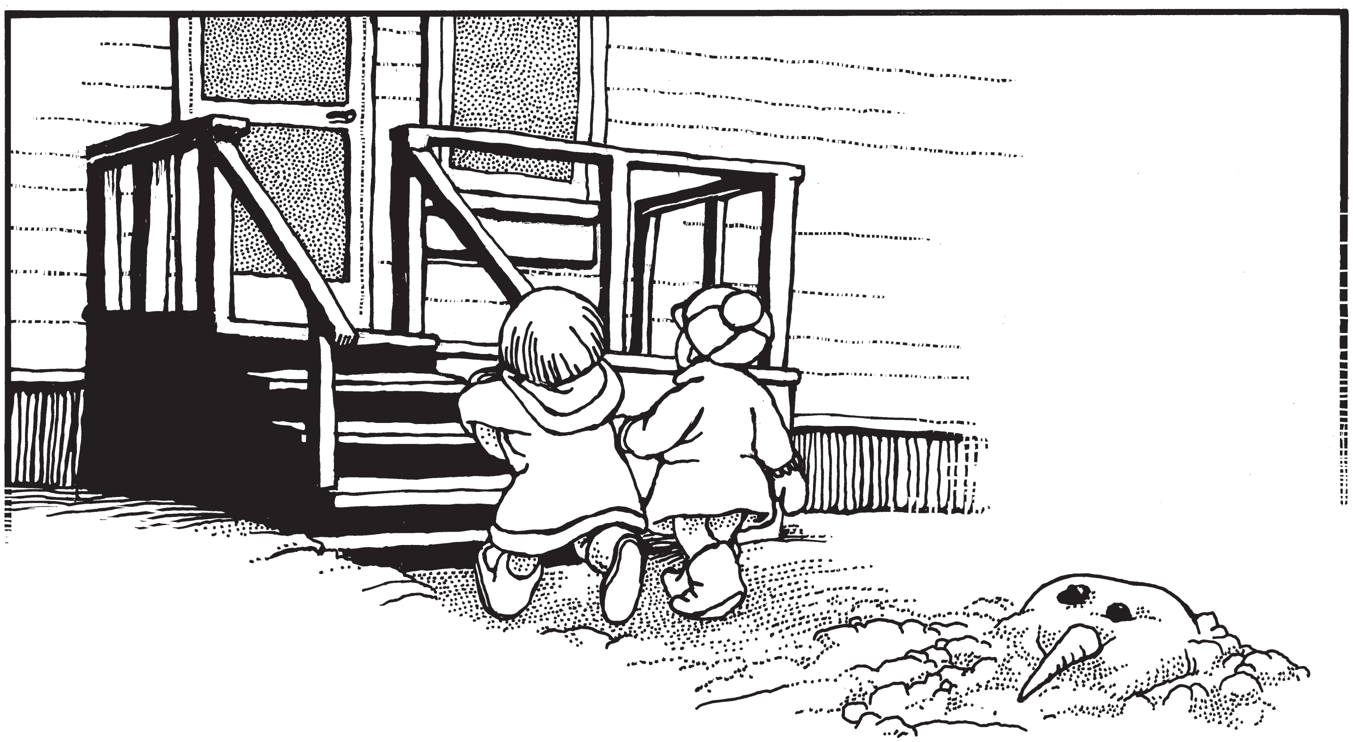
The next morning, Lakeesha came over to April’s house. The sun was shining. It was a lot warmer.

Splash! April looked up. The long icicles were melting, and one of the drops hit April right on her head. The solid ice had turned to water!

“Look at our snowfriend, Lakeesha,” April said. “Yesterday, he was taller than I am. Today, I am taller than he is. Did I grow overnight?”

“No, April. He’s melting. The warm sun is making him melt.”

April looked at the snowfriend. His head was tilted. His ears were drooping. The ground near the snowfriend was squishy.



April felt sad. She and Lakeesha had worked so hard to build it. “What can we do?” she said. “I don’t want our snowfriend to melt.”

“I have an idea,” said Lakeesha. She whispered it into April’s ear.

“Great,” said April. She ran into the house and came back with a plastic bowl and lid. “Will this work?”

“It’s perfect,” said Lakeesha. The two girls scraped some snow from the bottom of the snowfriend and shaped it into a solid ball. Then they placed the ball into the bowl and put the lid on.

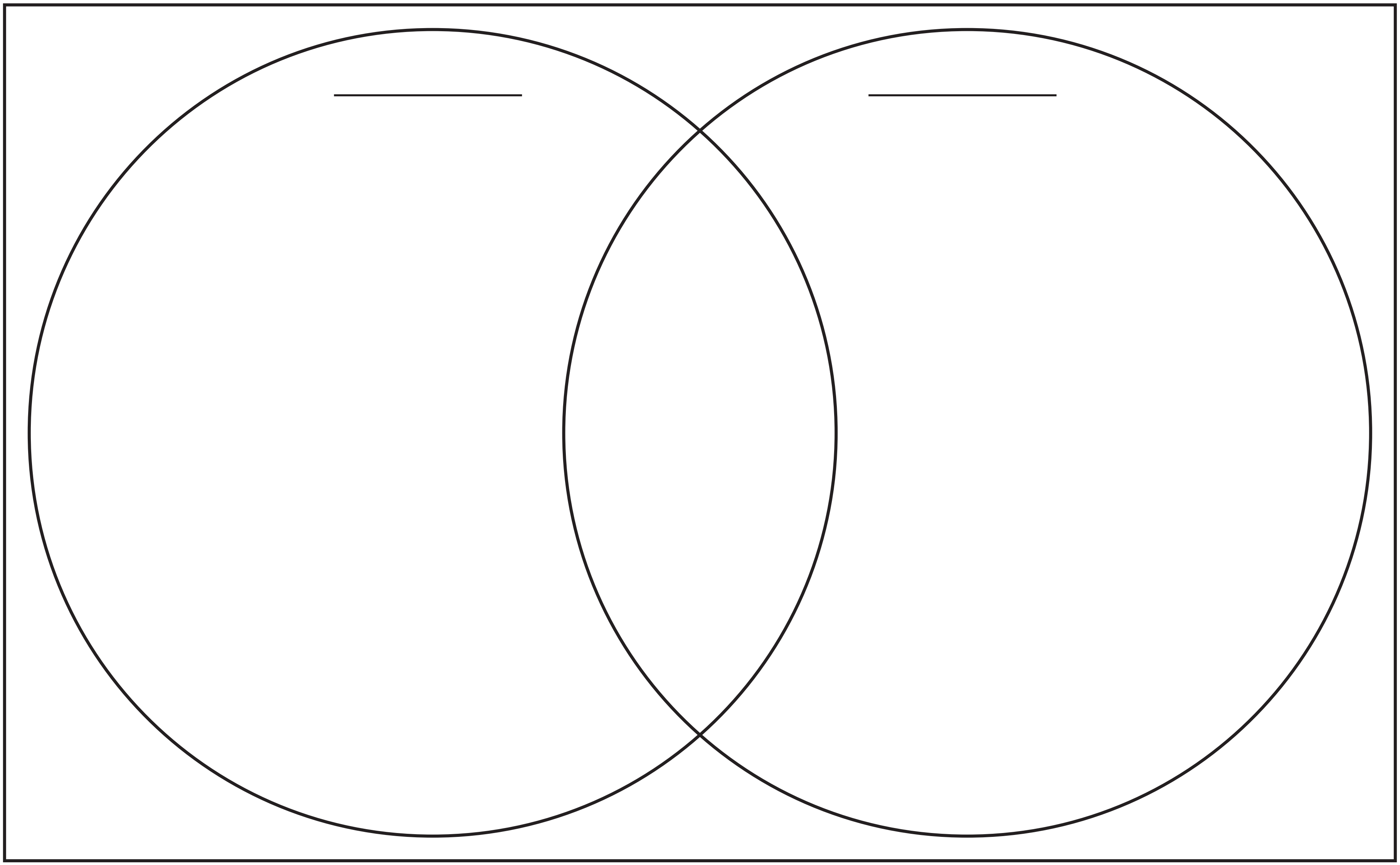
“Now let’s put the bowl with the snowball into the freezer. We can keep it frozen solid until next year and use it to start our next snowfriend.” The two girls giggled and ran inside.

Record Sheet 12–A

Name

Date

Comparing the Flow and Shape of Liquids



Record Sheet 13–A

Name

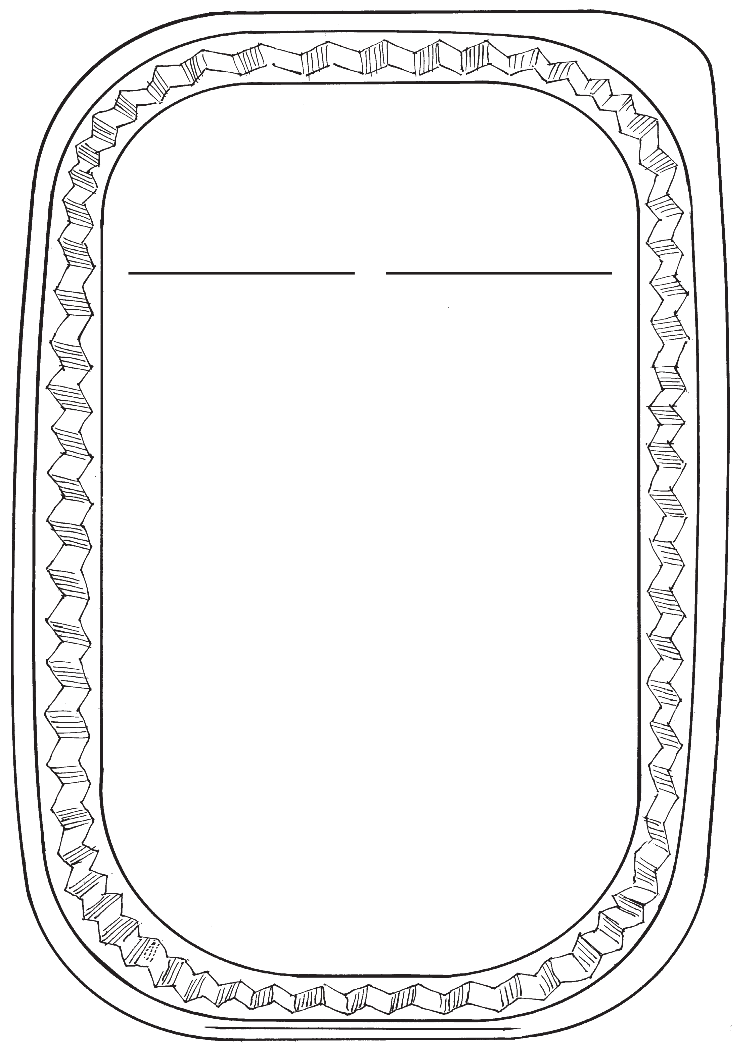
Date

Racing Drops

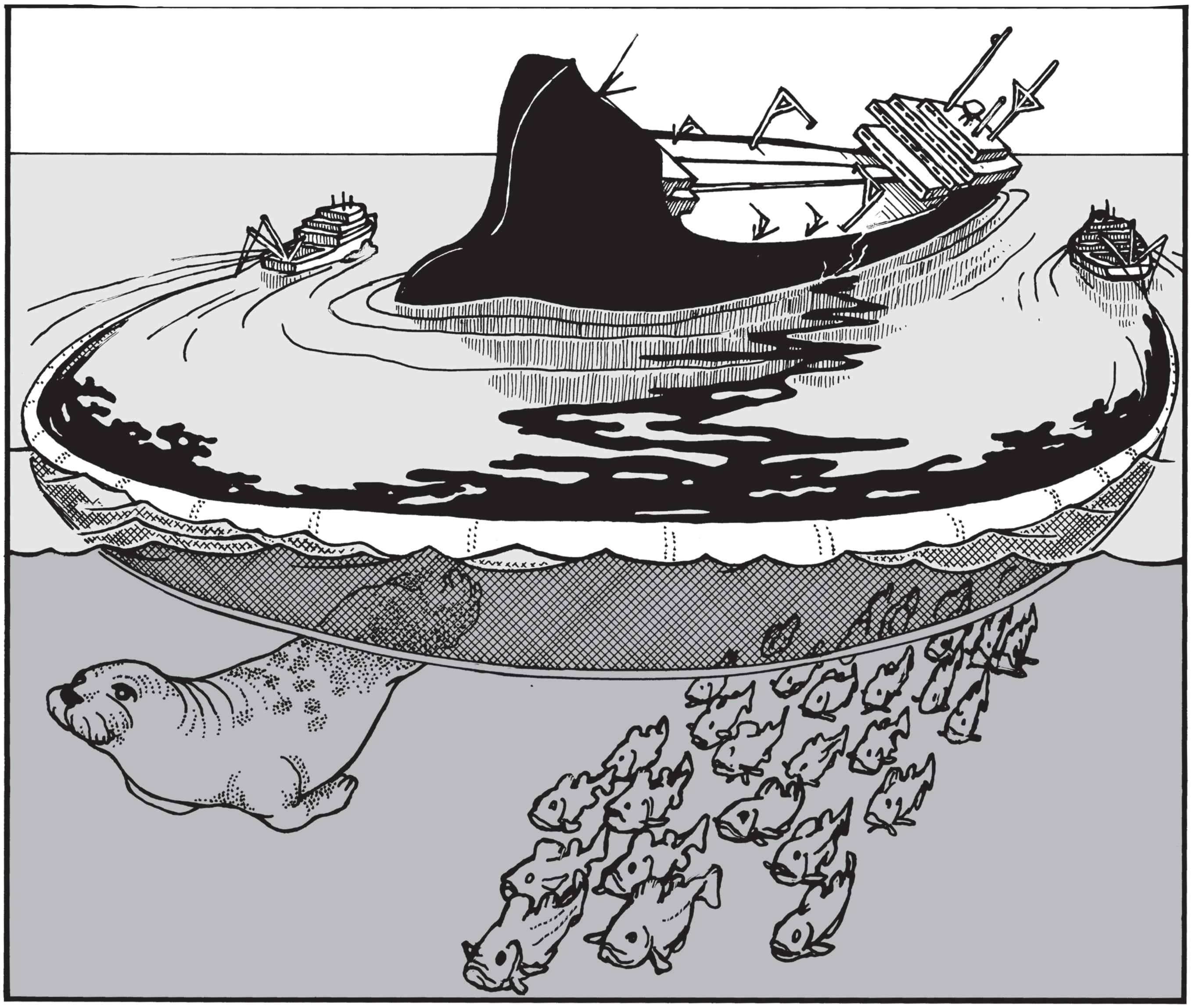
I think

will win the race because

Circle the name of the liquid that wins.



Oil Spills: Cleaning Up, Keeping Clean



You have seen what happens when you pour oil into a cup of water. The oil spreads out on top of the water, and it floats. But what do you think would happen if millions of gallons of oil were poured into the ocean? You would have an **oil spill.** And you would also have a *big* cleanup job!

Oil can be spilled by oil tankers. These are ships that carry oil that will be used for fuel. Sometimes the oil tankers get into accidents, and the ship's tanks are ripped open.

Oil gushes out from the tank in a thick, black blanket. The oil floats on the water and spreads out. Because the water is cold, the oil usually gets more viscous—like honey that has been in the refrigerator.

Large spills kill many animals and plants. Animals are poisoned if they eat food that is covered with oil. They also get sick when they lick oil off their fur or feathers. Others drown because they can't fly or swim when they are covered with oil. Sometimes animals freeze to death because oily fur and feathers can't keep them warm.

Rescuing animals covered with oil is hard work. Rescue workers wipe oil from around the eyes and beaks of seabirds. They give seals and other animals baths with gentle soap. Imagine how hard it is to give a bath to a seal!

People are still trying to figure out the best ways to clean up oil spills. What works well in one place might not work as well in another place. Everyone agrees, though, that what's most important is to act quickly. First you have to try to trap the oil, and then you have to decide how to clean it up.

One way to trap the oil is to use a kind of huge floating fence called a **boom.** Cleanup workers then use a giant vacuum cleaner to suck up the oil that's floating on the water. They might also float pads on the oil. Just like a sponge soaks up water, these pads soak up oil.

But what if the oil can't be trapped? If nothing more is done, wind and waves may mix the water with the oil, just like you did when you mixed the oil and water in science class. The oil breaks into tiny drops that spread out into the water.

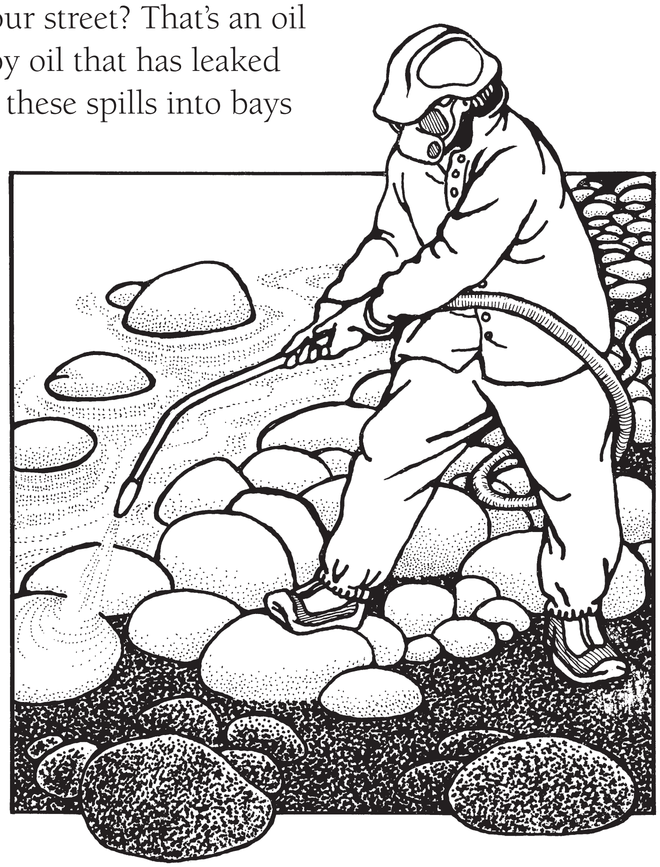
Cleanup workers may spray soapy chemicals on the spill. These chemicals break up the oil into little drops. This is like what happens when you use soap to wash oil off your hands.

Sometimes the workers set larger spills on fire to burn up the oil. This works well, but it can lead to other problems. For example, the smoke may pollute the air, and the ashes pollute the water.

Cleaning up oil that reaches the shore is the hardest job of all. The oil covers everything with a sticky, slimy blanket that may harden like road tar. Sometimes workers spray hot water on the shore. Hot water makes the oil less viscous, so it will rinse off. Unfortunately, this puts oil back into the water. The hot water may also harm animals and plants living on the shore.

Finally, scientists are experimenting with bacteria that eat up oil. Bacteria are very small organisms that you can't even see. This new cleanup method is very exciting because it does not appear to harm plants or animals.

What's the best solution to the oil-spill problem? It's to stop the spills before they happen. Have you ever seen a puddle of water with shiny rainbows in the middle of your street? That's an oil spill! These "slicks" are usually caused by oil that has leaked from cars or lawn mowers. Rain washes these spills into bays and lakes, where they pollute the water. This "small" kind of oil pollution is the most common and does the most harm. These spills occur every day in places all over the world.



What can you do to prevent oil spills? You can ask adults to be careful with gas and motor oil. You can also conserve energy. Much of the energy we use to heat our homes and schools comes from oil. The less energy we use, the less oil we'll need.

And the fewer oil spills there will be!

Record Sheet 14–A

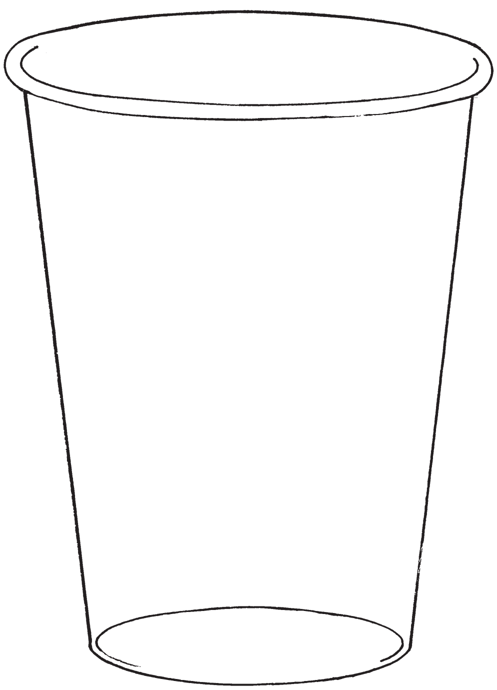
Name

Date

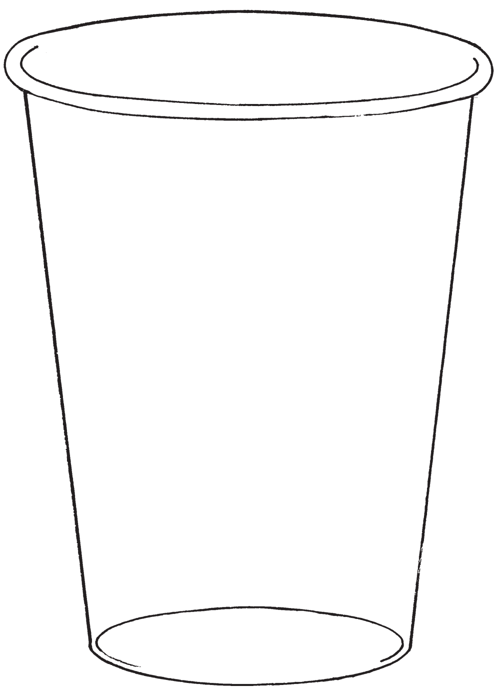
Mixing Liquids

My liquid is

I predict



Before stirring



After stirring

Record Sheet 15–A

Name

Date

Two New Liquids

Describe how the corn syrup looks and feels and how it flows.

Describe how the red shampoo looks and feels and how it flows.

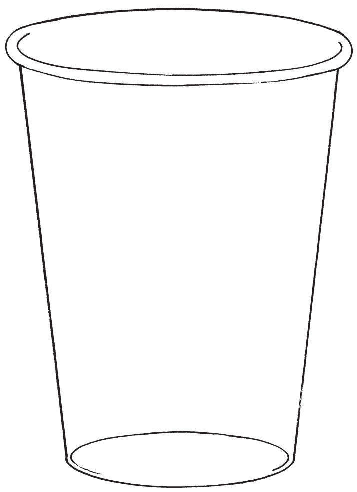
Record Sheet 15–A

Name

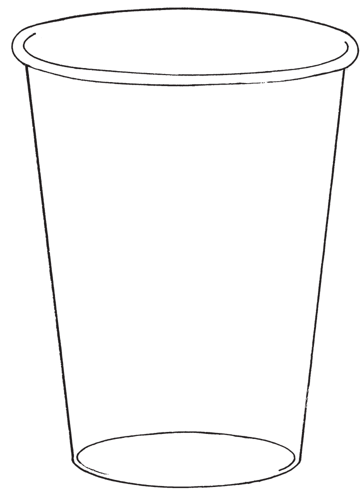
Date

Two New Liquids, *continued*

Mixing corn syrup and water

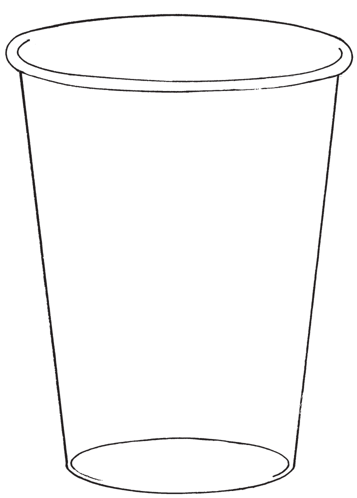


Before stirring

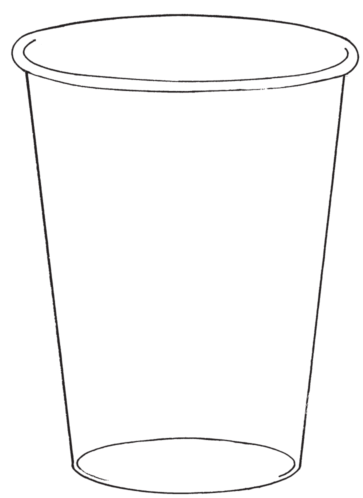


After stirring

Mixing red shampoo and water



Before stirring



After stirring

Record Sheet 15–A

Name

Date

Two New Liquids, *continued*

I think

will win the race because

Circle the name of the liquid that wins.