Name _____

Fishing for Forces

It was a beautiful sunny day at the lake. Emma was going fishing with her dad and her best friend, Chloe. They were walking from the car to the dock when Emma's dad asked a question. "What did you girls learn in school yesterday?" he asked.

Emma sighed. Her dad asked a lot of questions. Fortunately, Chloe liked to answer questions.

"In science class, we learned about forces," Chloe said. "That's a fancy word for pushes and pulls."

"We played a game of tug-of-war," Emma added. "We all pulled on the rope. The teacher said that there were lots of forces pulling and pushing in the world around us, but I couldn't see them."

They had reached the end of the dock where their rowboat was tied up. "Hmm," her dad said. "I wonder if we could find some of those forces today. How about you yank on that rope to pull the boat to the dock."

Emma's dad held the rowboat against the dock while the girls climbed in. Then he stepped down into the boat, making it rock beneath them.

"There are lots of forces that you can't see," he said as he untied the boat. "But if you think about it, you can see what those forces do."

"What do you mean?" Chloe asked. She was pretty good at asking questions, too.

"Anything that's moving gets started with a push or a pull," he said. "If you see something moving, look for the force that made it start moving."

In the distance, Emma saw a sailboat skimming across the lake. “There’s a sailboat that’s moving,” she said.

“What do you think made it move?” Dad asked.

“The wind pushing on the sail,” Chloe said.

“Good thinking,” he said.

A motorboat roared past.

“What do you think made that motorboat move?” Dad asked.

“The motor,” Emma said. That seemed easy enough.

“How did the motor make the boat move?” he asked.

Emma thought for a minute. In the parking lot, she had seen a motorboat that was out of the water, on a trailer towed behind a car. “The motor has a propeller. The motor turns the propeller.”

“That’s right. The propeller is underwater. When it turns, it pushes against the water to make the boat move forward.”

Dad was rowing. Emma watched his arms as he pulled back on the oars. She felt the boat speed up each time he pulled. “Your arms pull on the oars to make them move,” she said.

Chloe looked over the edge of the boat into the water. “The oars push on the water.”

“And that makes the boat move,” Emma said.

“You two are getting good at this,” Dad said.

For the rest of the afternoon, they all looked for pushes and pulls. Chloe saw a kite flying over the beach. “The wind is pushing it up,” she said.

“And the kite string is pulling to keep the kite from flying away,” Emma said.

When they stopped for a swim, Emma felt her feet push down as she jumped from the boat into the water. The boat rocked when the water pushed it back up. Her hands pushed against the water as she swam. She pulled herself out of the water into the boat and watched the clouds drift by, pushed by the wind.

They never did catch any fish. But by the end of the afternoon, Emma had decided that she didn’t mind answering questions after all. She closed her eyes in the sunshine. The boat rocked beneath her. *It’s moving because the waves are pushing against it*, she thought. Just one more push in a world filled with pushes and pulls.