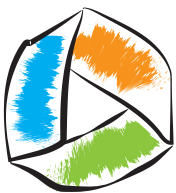




Reighlyn Sees Sharks

Plants and Animals Have Needs



STEM Taught® Next Generation Science

Motion and Stability: Forces and Interactions 3-PS2-1.

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.





Meet Samantha

Biologist
University of California-Irvine

Samantha Leigh grew up in Bel Air, Maryland. She has always loved the ocean and science. In high school, she volunteered at an aquarium and discovered her love of sharks. She went to Coastal Carolina University to earn her Bachelor's degree in marine science. Samantha earned her PhD at the University of California-Irvine, she studies the bonnethead shark, the first known omnivorous shark species! Her favorite part about her job is when she gets to swim with sharks in the wild. She loves being a scientist because she gets to learn something new everyday. There is still so much to discover about sharks and the ocean! Samantha also loves being a mom to her little girl, Reighlyn.



Meet Therma Thermometer

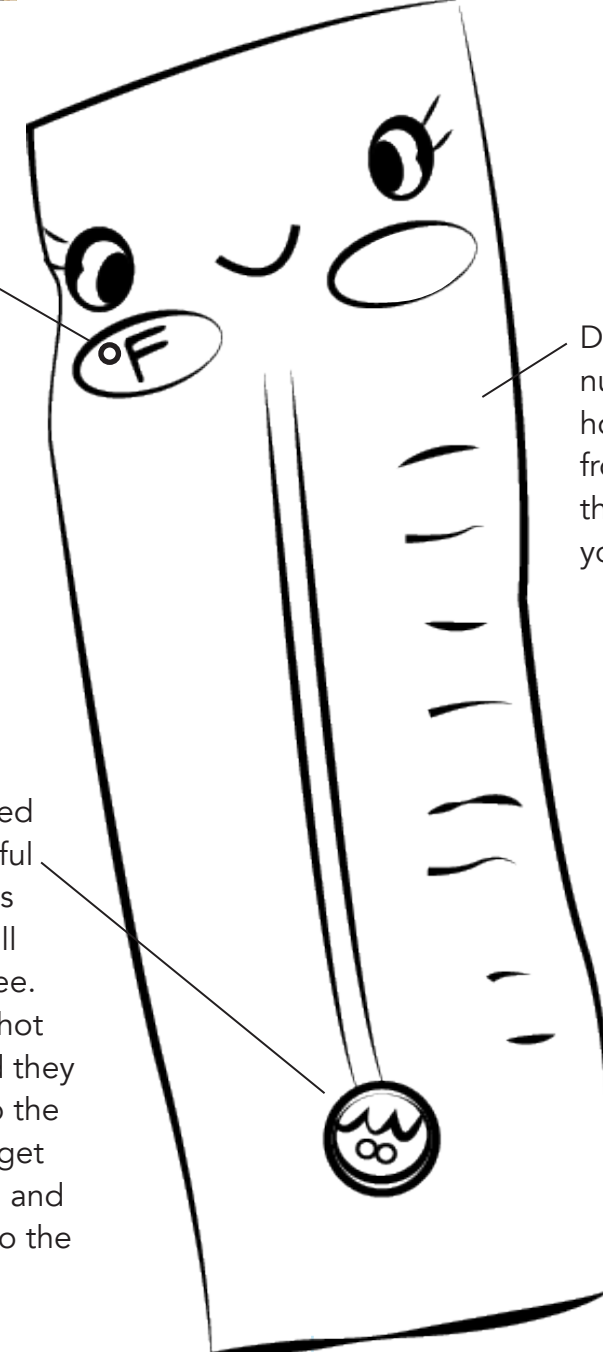


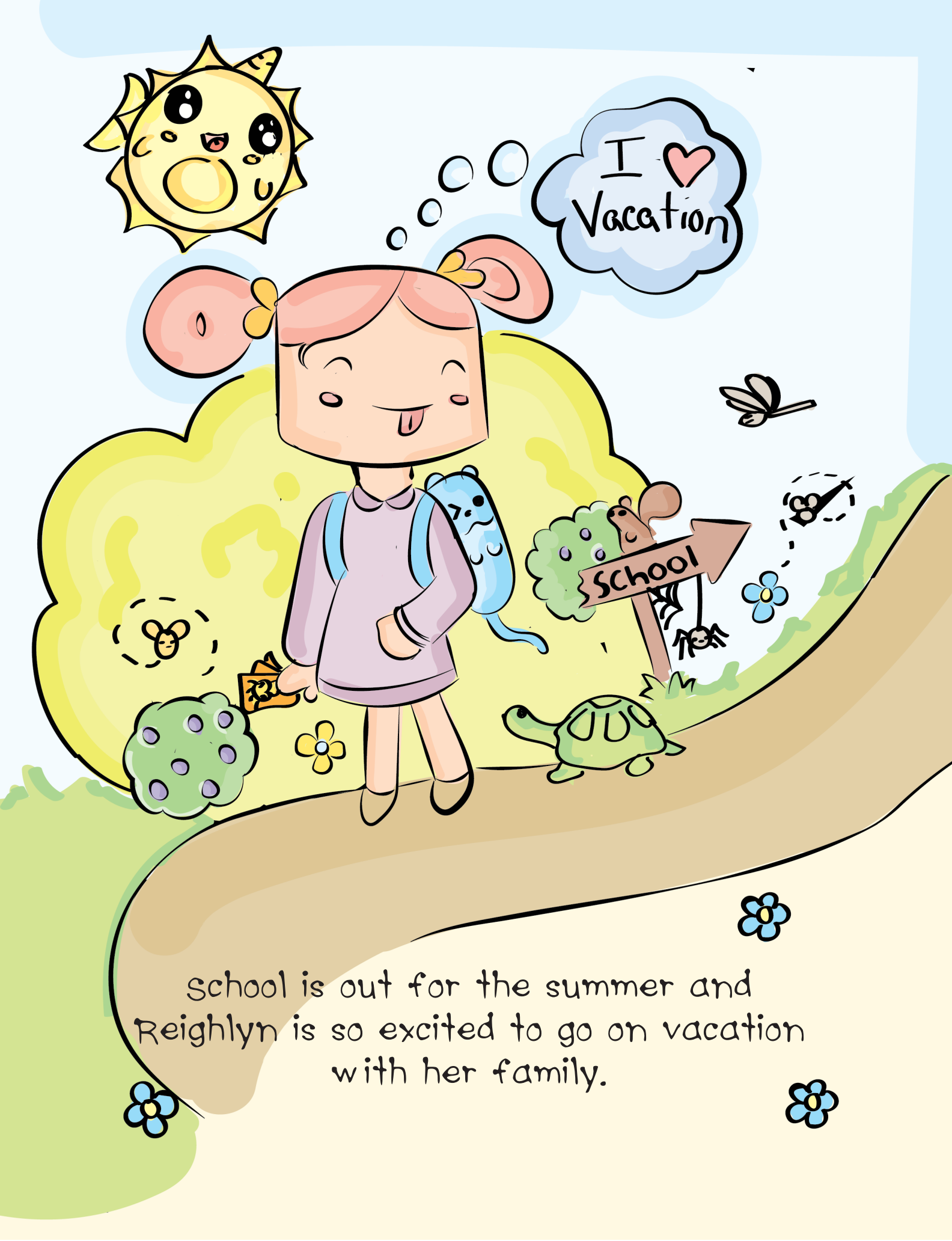
Real scientists like Samantha use tools to understand the world around them. One of the tools that Samantha uses is a thermometer. A thermometer helps you know how hot or cold something is. Let's get to know Therma Thermometer before we start.

Do you see the little circle with an F? This stands for degrees Fahrenheit. You say this so that people know you took a temperature measurement.

Do you see the tube filled with red liquid? Be careful this is glass. The liquid is made out of lots of small particles, too small to see. When the particles get hot they start to vibrate and they take up a lot of room so the liquid rises. When they get cold they stop vibrating and can fit closer together so the liquid goes down.

Do you see the numbers? Do you see how they skip count from 0,10,20... what is the highest number on your thermometer?





This story is about Reighlyn
Reighlyn's Mommy is Samantha. Samantha is a scientist that studies bonnethead sharks. Reighlyn wants to be a scientist like her mom someday. Samantha thinks that Reighlyn is already a good scientist because she is curious and asks lots of questions.

Teacher led discussion:

I think it is likely that someone in this room knows a scientist.
Who in the room has a family member who is a scientist?

What does a scientist do? They study things such as plants, animals and other life. They study energy, light, planets, stars and space. They study flight. There is a scientific field of study for just about everything interesting in this world.

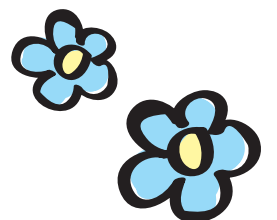
Who can be a scientist, and what does it take to be a good scientist? You can be a scientist! All it takes to be a good scientist is curiosity and an interest in learning and discovering new things! Kids are great observers and problem solvers. If you are curious, you are already a great scientist!

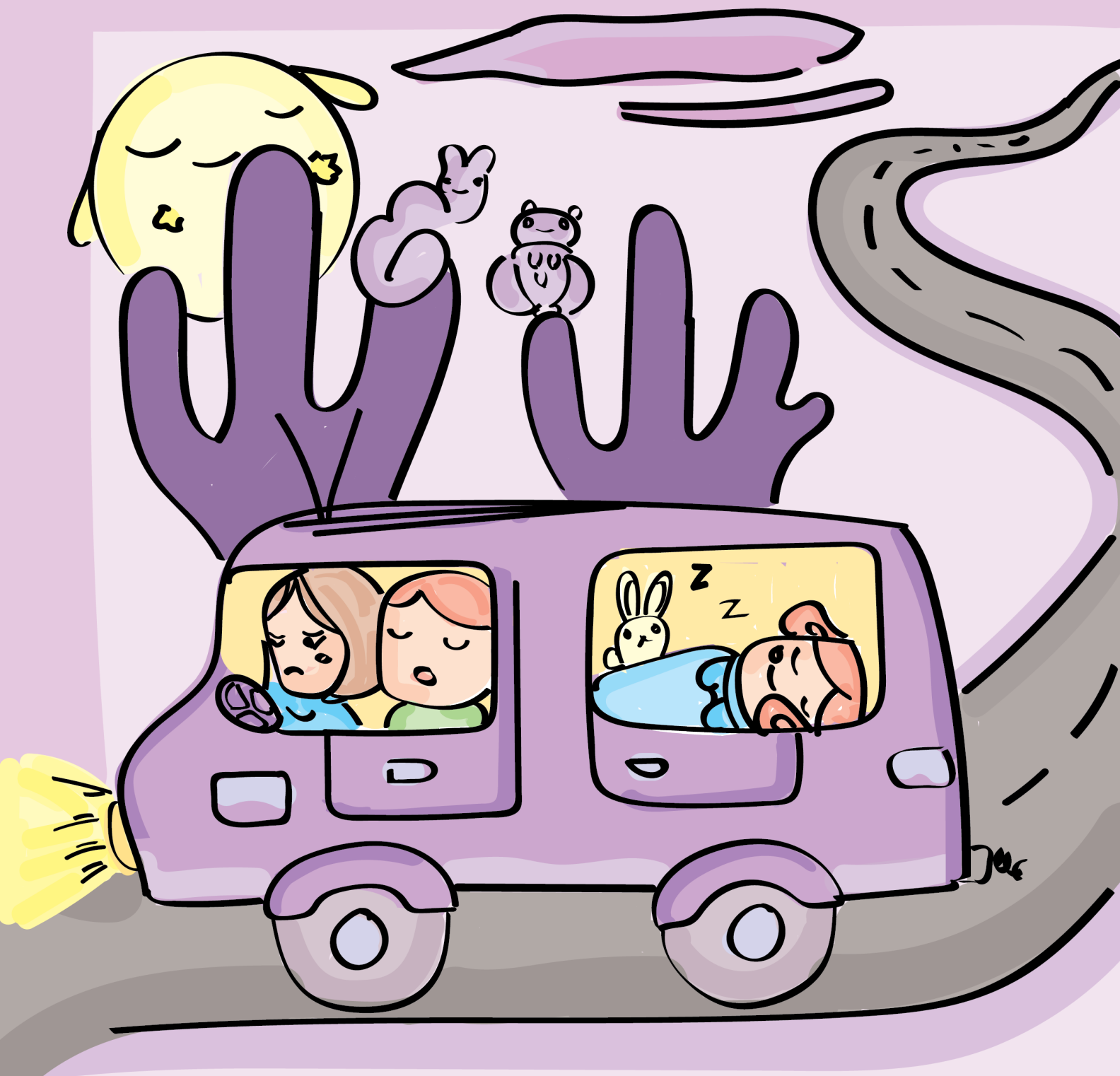
Take a closer look at the illustration:

What color is Reighlyn's backpack?

How many critters do you see in this illustration?

How many flowers do you see in this illustration?





They are heading to the warm, sunny, Florida Keys. Mom and Dad have been driving through the night.

Reighlyn traveled across the USA

For Reighlyn's summer vacation she will travel from California to the Florida Keys where bonnethead sharks live. The drive will take her three days.



This is a map of the United States. The red line represents where Reighlyn's family drove to get from California to the sunny Florida Keys. She drove almost 3,000 miles. That is a lot of miles. To drive three thousand miles, she had to drive 100 miles 30 times.

Teacher led discussion:

Can you find where you live on this map.



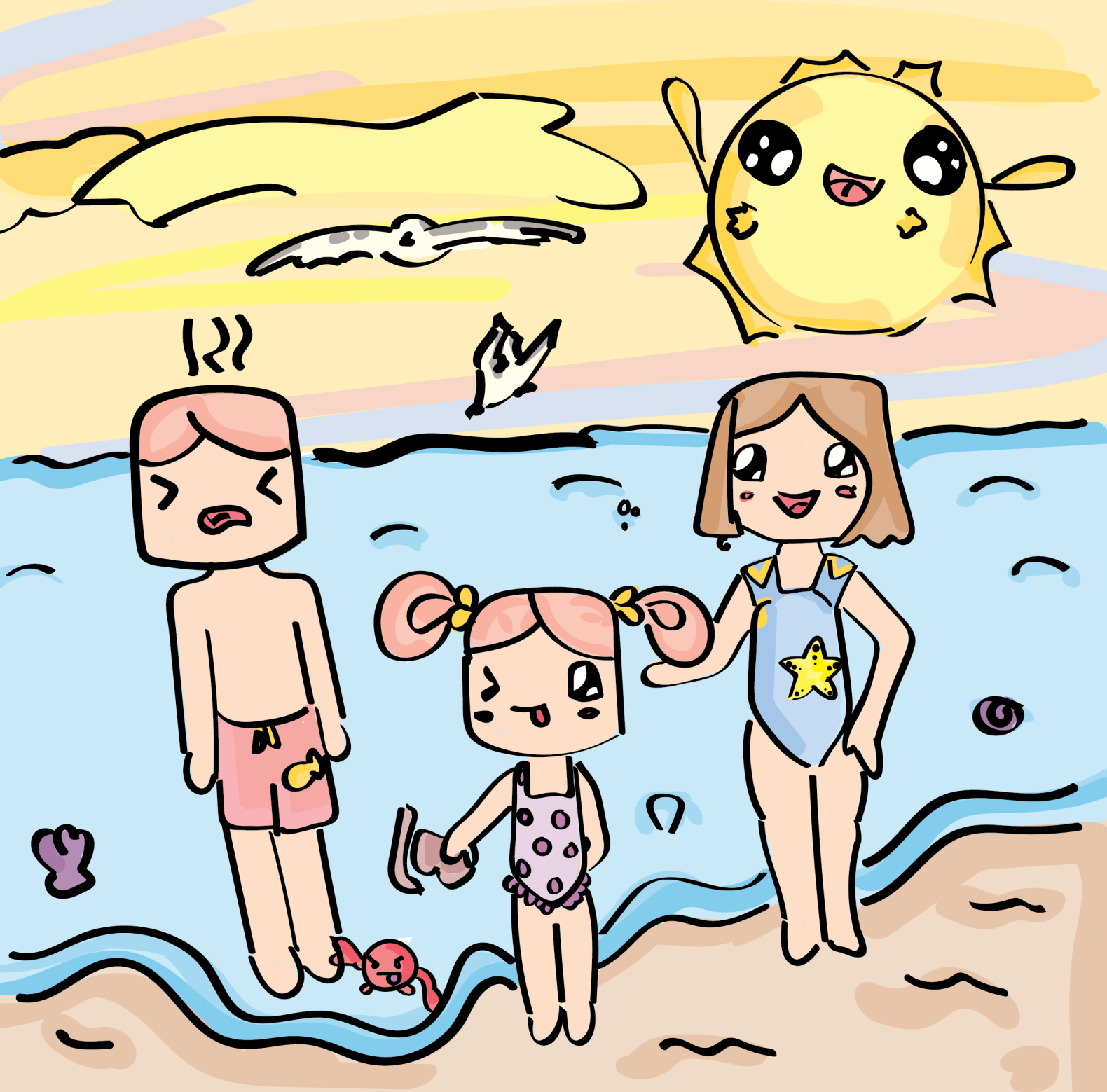
They reach the Keys just in time for sunrise. Reighlyn opens her sleepy eyes and looks out the car window.



This photo was Taken by Samantha Leigh of her research area in the Florida Keys .



she can see the ocean. The sun is just starting to wake up too and the sky is dancing with beautiful shades of pink, purple, and blue. Reighlyn is ready to explore!



As soon as they arrive, she and her parents slip into their bathing suits, grab their snorkels and goggles, and head straight to the sea. "SPLASH!" Reighlyn dives in!



Samantha works with sharks. She flips them upside down when handling them to calm them down and make them less wiggly.

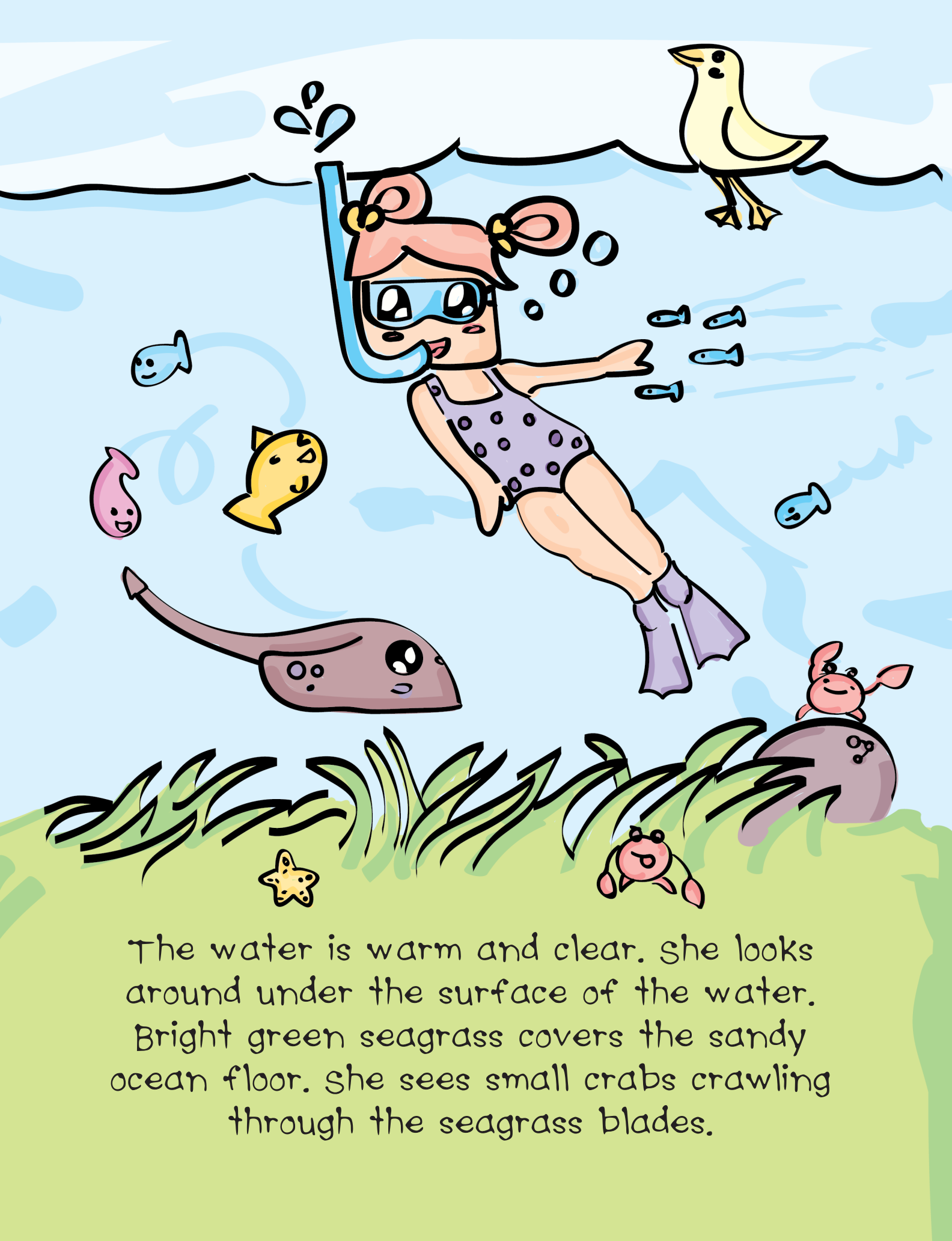
Reighlyn hopes to see bonnethead sharks as she swims in the ocean. Reighlyn's mother studies and researches bonnethead sharks as a scientist. She does not hurt the sharks, she just observes their feeding behaviors and analyzes the nutrients inside the food that they like to eat. Bonnethead sharks are different than all other known sharks because they regularly eat plants in the wild. An animal that eats both plants and animals is called an omnivore. Because humans eat both plants and animals, humans are omnivores. Most sharks are strictly meat eaters, but bonnethead sharks are omnivores.

Teacher led discussion:

What animals only eat other animals? Carnivores such as cats, lions, tigers, hawks, eagles, snakes, wolves, and sharks.

What animals only eat plants? Herbivores such as cows, sheep, and songbirds.

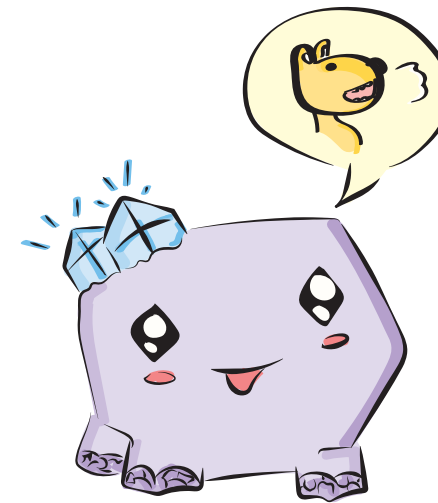
What animals eat both plants and animals? Omnivores such as crows, rats, chimpanzees, humans, and bonnethead sharks.



Animals Need Air

Reighlyn had many questions and lots to say. "I need air to breath, but sharks live under water! "How do sharks breathe?" she asked.

Her father answered, "You have lungs to help you breathe air. Sharks have gills to help them breathe under water. They need to be in the water to breathe."



Think - Pair - Share

- What types of animals can you think of that breathe?
- Do you think that all animals must breathe?

The water is warm and clear. She looks around under the surface of the water. Bright green seagrass covers the sandy ocean floor. She sees small crabs crawling through the seagrass blades.



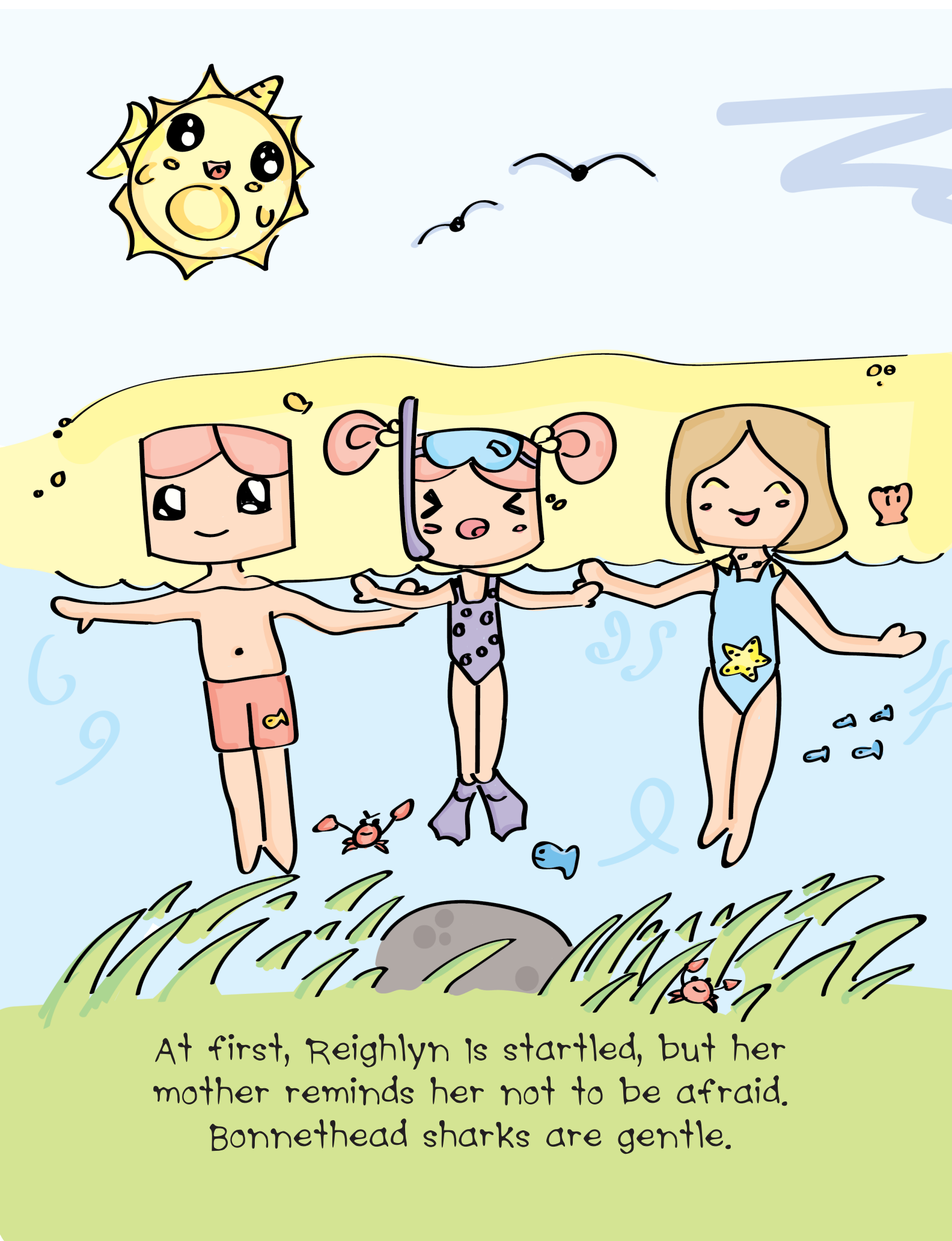
Then, a school of colorful fish swim by. What fun it is to swim among the sea creatures! All of the sudden, Reighlyn spots a bonnethead shark out of the corner of her eye!



This bonnethead shark is swimming over seagrass in the Florida Keys.

Bonnethead sharks eat seagrass

Reighlyn's mom is interested in bonnethead sharks because they eat seagrass as well as other creatures. They are omnivorous and that is very unusual for a shark. The bonnethead shark is the only shark species known to eat large amounts of plant material. Samantha designed an experiment to test how much seagrass bonnethead sharks actually digest after they eat it. She measures the nutrients contained in the seagrass before and after it is eaten by a shark. She found that the sharks do use nutrients from the seagrass to live and grow!



At first, Reighlyn is startled, but her mother reminds her not to be afraid. Bonnethead sharks are gentle.

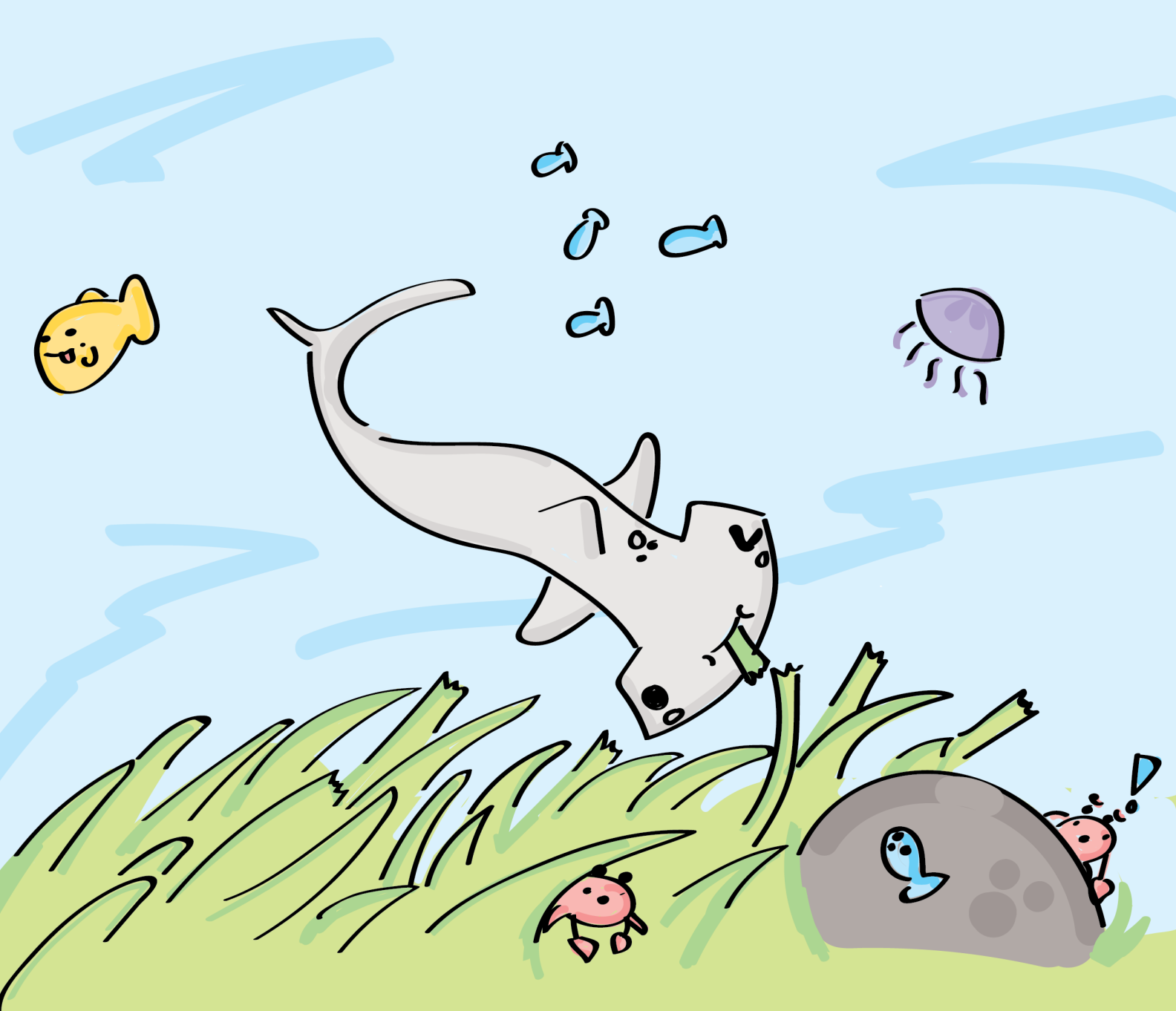


Bonnethead sharks are gentle

Bonnethead sharks are small and gentle. This is a photo of Samantha swimming with a bonnethead shark in her research area. It's kind of cute, don't you think?

Teacher led discussion:

Would you like to swim with a bonnethead shark? What would you want to discover if you could swim with and observe a bonnethead shark?



"What do bonnethead sharks eat?" Reighlyn asks. "Bonnethead sharks eat crabs, squid, fish, and seagrass," said her mom. "Just like you need to eat to grow big and strong, so does the shark! The shark needs to eat in order to have energy and grow. It uses energy from its food to swim and explore,



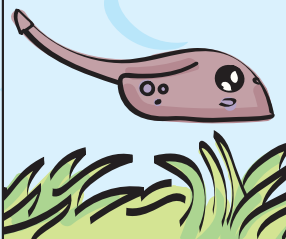



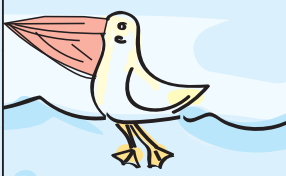

Animals Need Food



Think - Pair - share

- What types of foods do animals eat?
- Do you think that all animals need to eat food?



Kelp Plant	Manatee Herbivore	Sting Ray Omnivore	Crab Omnivore
 <p>All food starts with something eating a plant. Plants make their own food using sunlight and water! This is a special type of plant called algae. Plants also help make our air.</p>	 <p>I eat sea grass, only sea grass, when I'm hungry some so I'm an herbivore. I drink water when I'm thirsty, but here is the worst, I'm endangered but I'm friendly.</p>	 <p>I eat worms clams snails and shrimp, when I'm hungry, so I'm an omnivore. I drink water when I'm thirsty, I'm a friendly fish just don't step on me, owee I sting.</p>	 <p>I eat clams, oysters, mussels, algae, when I'm hungry, so I'm an omnivore. I drink water when I'm thirsty and I eat things that died which helps clean the ocean floor.</p>
Sea Grass Plant	Bonnethead Shark Omnivore	Pelican Carnivore	Killer Whale Carnivore
 <p>I don't eat other things no no, I can make my very own food. With sunlight and water I survive, I'm a type of plant that helps keep ocean creatures alive.</p>	 <p>I eat crabs, fish, squid and sea grass when I'm hungry I'm an omnivores shark. I drink water when I'm thirsty and I'm shy. I have eyes on the sides of my head.</p>	 <p>I eat little fish, big fish when I'm hungry, so I'm a carnivore. I drink water when I'm thirsty and I have a cool beak. Watch me scoop up 3 gallons of water, sweet!</p>	 <p>I eat squid, octopus, fish and seals, when I'm hungry, so I'm a carnivore. I drink water when I'm thirsty and I live in the Arctic. I'm the top predator.</p>

Class activity:
Discover what animals need to survive with this fun pocket pet activity.
Make a pocket pet book and have fun with the hungry animals game.



Just then a cool current swept by. "What about when it gets chilly?" asked Reighlyn.

"Do the sharks have coats to keep them warm?" "Not quite," said her Mom. "If the water gets too chilly, then the sharks swim to warmer water."

Animals Need Warmth

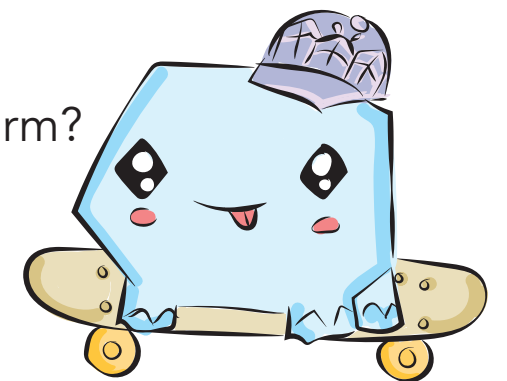
This all made sense to Reighlyn, but she started to wonder about other types of animals besides sharks...

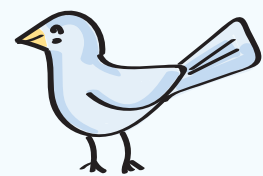
"Do all animals need to be able to eat food, drink water, breathe, and keep warm?" asked Reighlyn.

Reighlyn's Dad answered "Yes! All animals need to be able to eat, drink, breathe, and stay at a nice temperature. But...every animal is different. They eat different food, they breathe in different ways, and they like different temperatures."

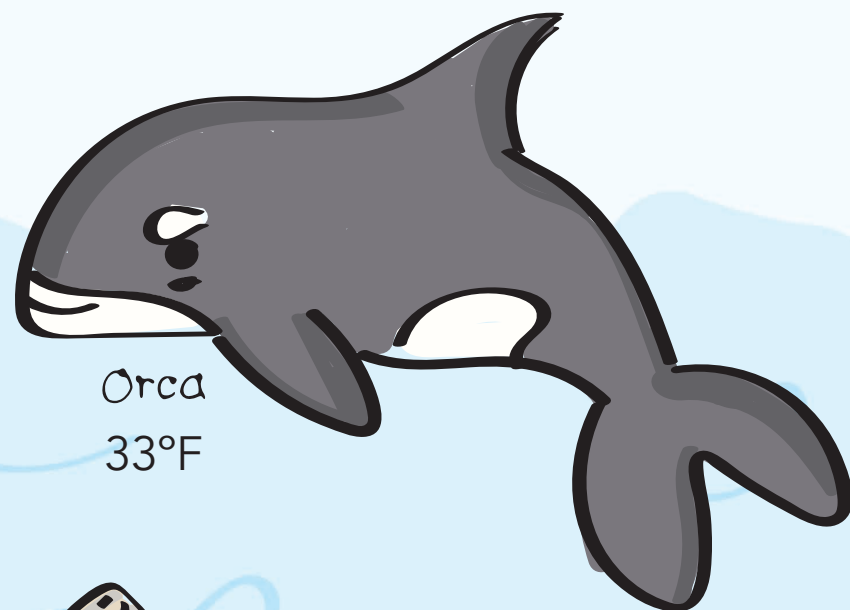
Think - Pair - Share

- What types of animals like it warm?
- What types of animals like it cold?
- How do mammals stay warm?
- How do snakes and lizards stay warm?
- How do sharks stay warm?

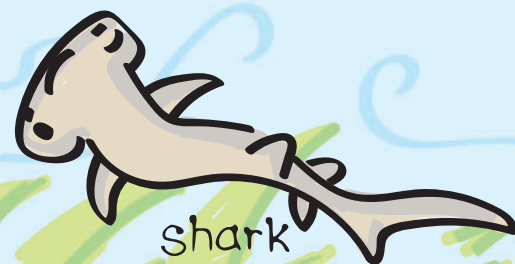




Bluebird
62°F



Orca
33°F



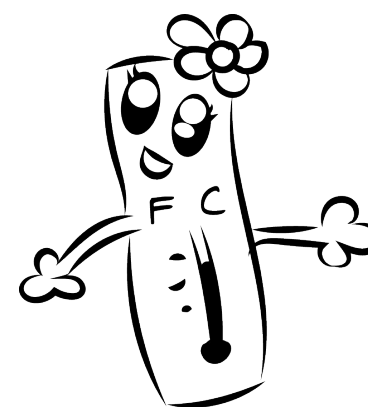
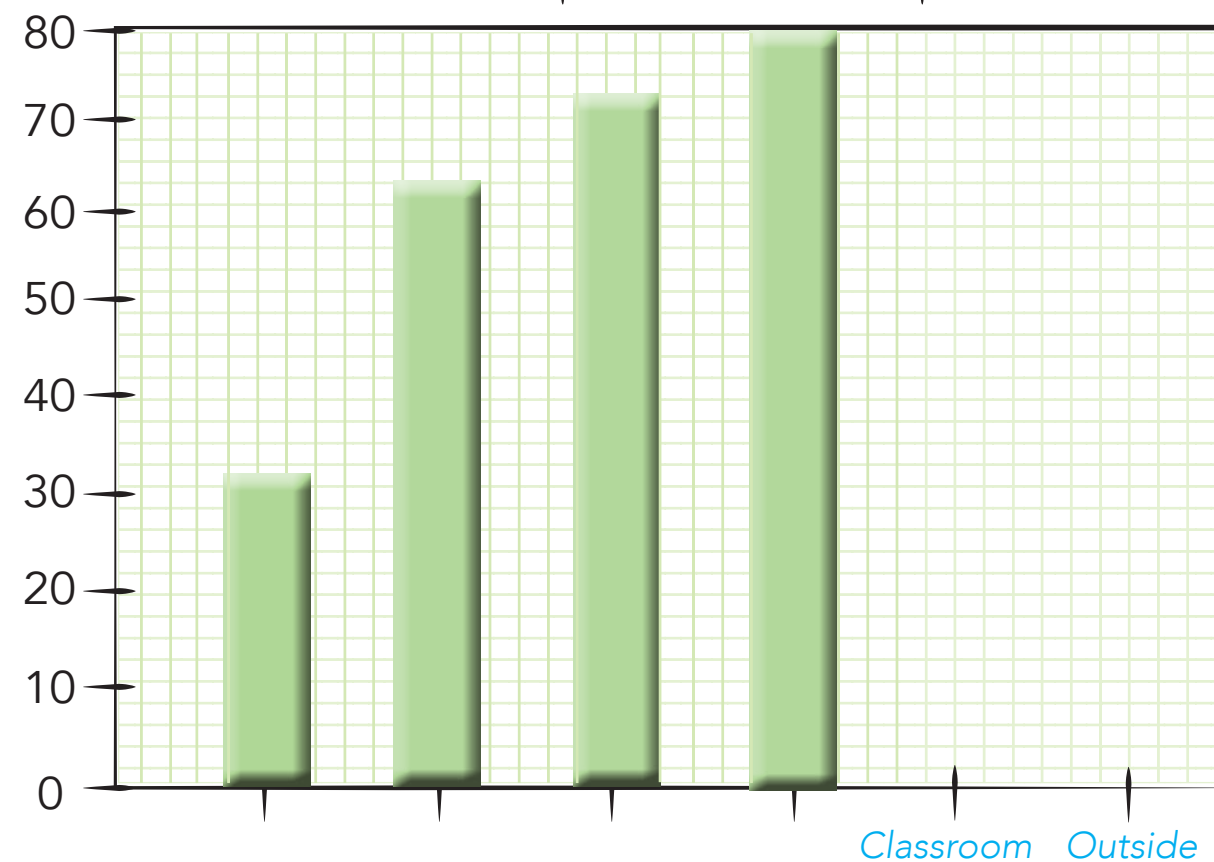
Shark
72°F



Manatee
80°F

Different animals like different temperatures.
Some like it warm and some like it cold.

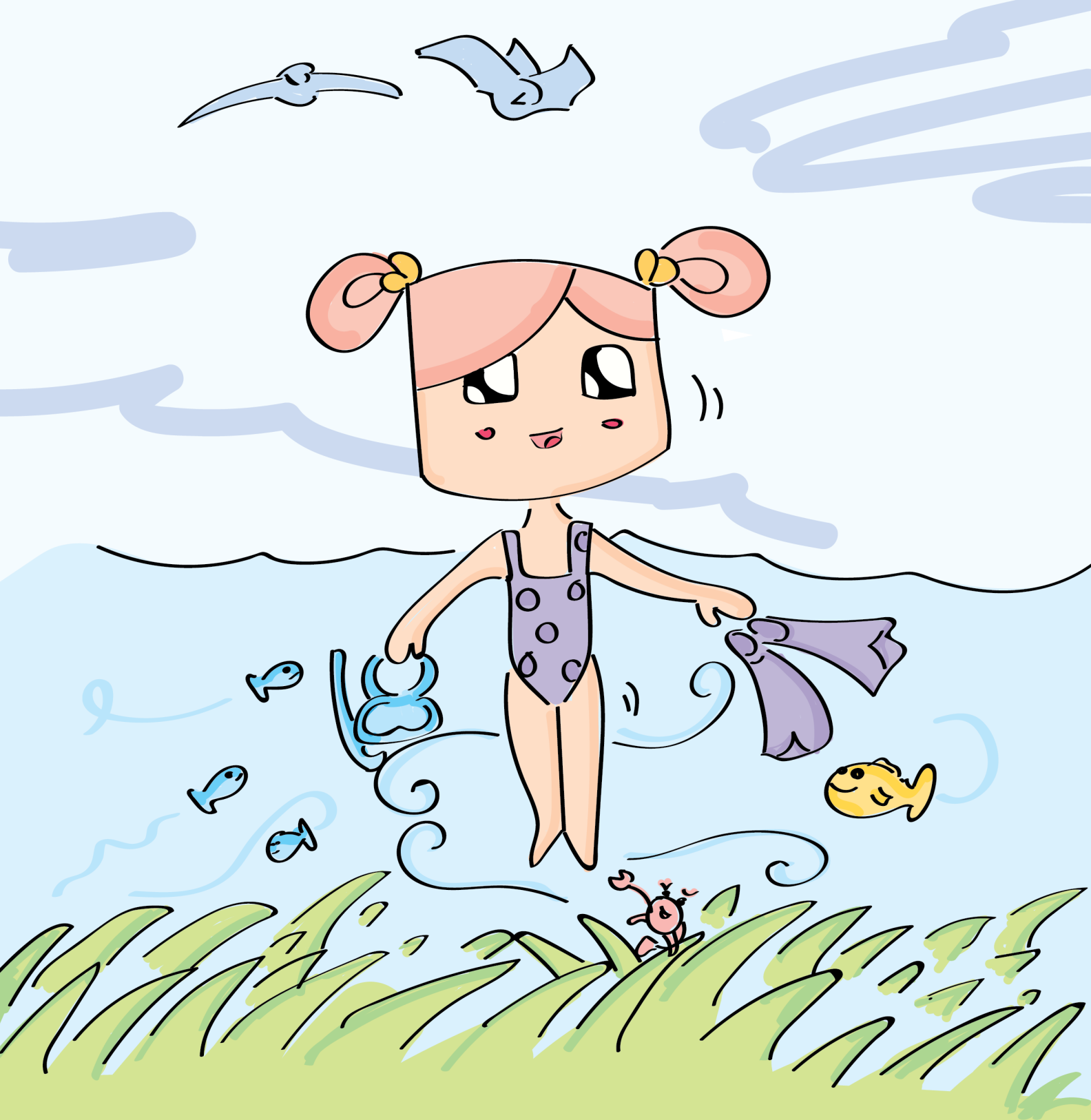
Ideal Temperature Graph



Kea The Crate activity:

Pass out a Thermo Thermometer to every student so they can find out the temperature of the classroom. *Which animals like it cooler than your room? Which animals like it warmer than your room?* Now measure the temperature outside. *Is it warm enough*

for Bluebirds? Talk about their observations. Look at the graph together as a class. Show them how the bars show temperature measurements. There is even a spot for you to graph your classroom and outside temperature. Finally match each animal to their bar on the graph. *Which animal would not do well in the warm Florida Oceans?*



Reighlyn and her family continued to swim through the ocean, looking at all of the different animals and plants.



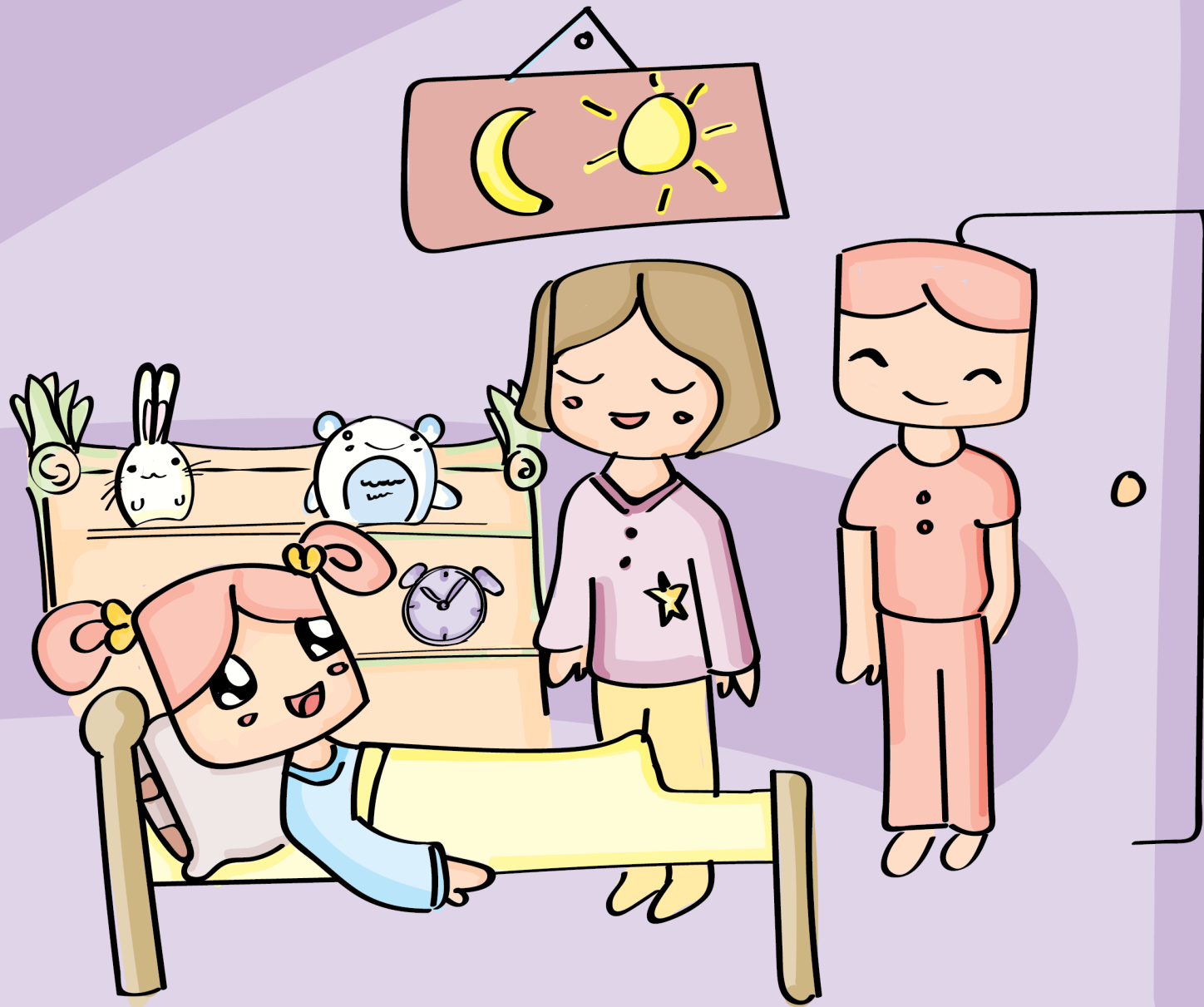
What do plants need to survive?



Think - Pair - Share

- Do you think that plants need air, and water
- Can you think of a plant that could survive in the cold snow, and one that could not?

"Plants!" thought Reighlyn. "What about plants? They are not animals, but they are still living things, what do they need to survive? Her dad explained, "Plants make their own food using sunlight, and water in a process called photosynthesis. That's why we need to water the plants in our garden everyday. Also, plants can't put on a coat when it's cold, and they can't move to a warmer place. That's why some plants loose their leaves when it gets too cold. They wait until springtime to wake up and grow again."



After swimming in the ocean all day long, it was time to go back to the hotel to rest. Reighlyn took a nice warm bath, got into some cozy PJ's, and snuggled into her bed.

Living things also need rest?

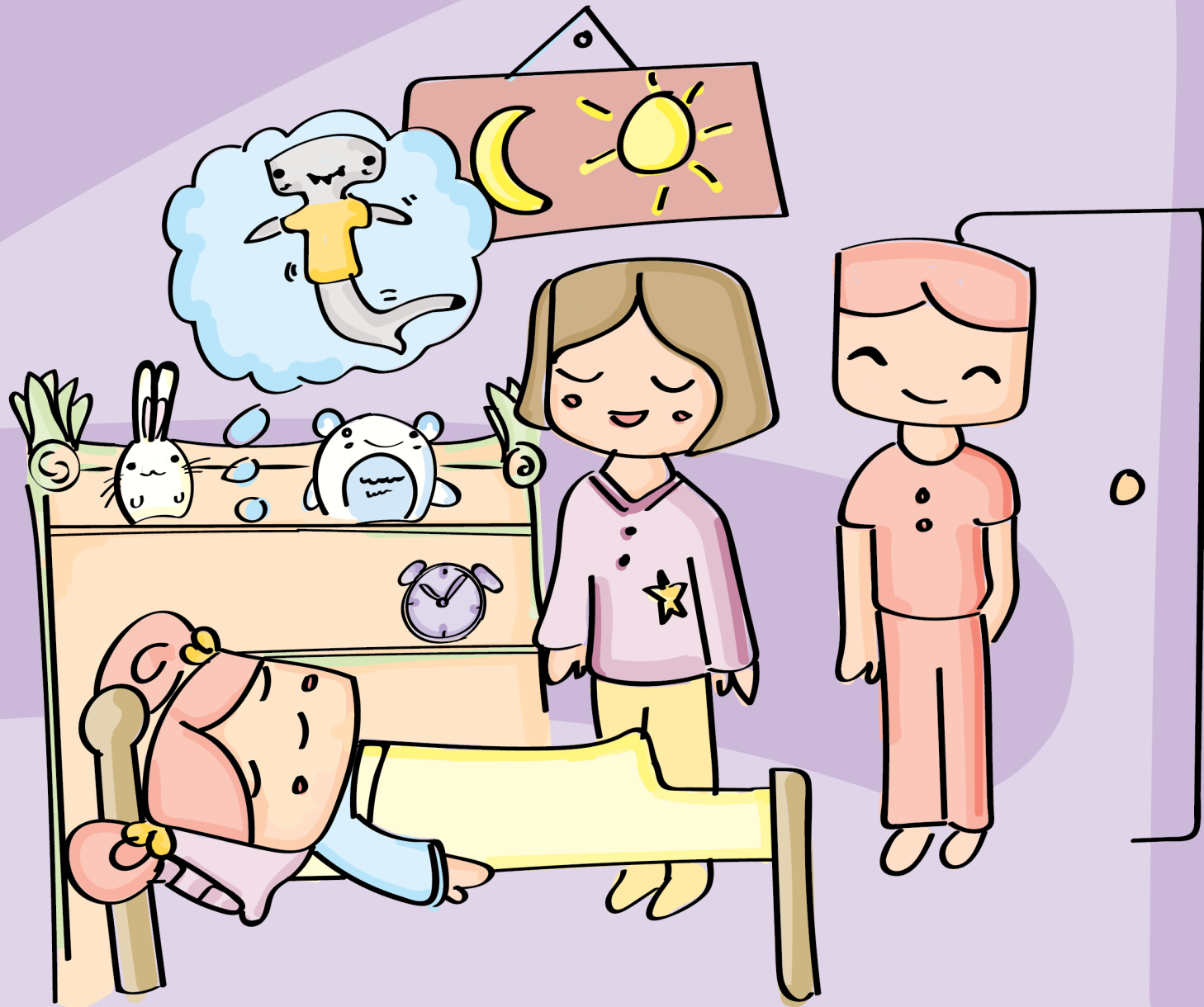
She let out a big yawn and closed her eyes. She was thinking about all of the amazing things that she learned today. Then, she suddenly thought of something... "What about sleep?" she asked her mom and dad as they tucked her into bed. "Do plants and animals need to sleep?"



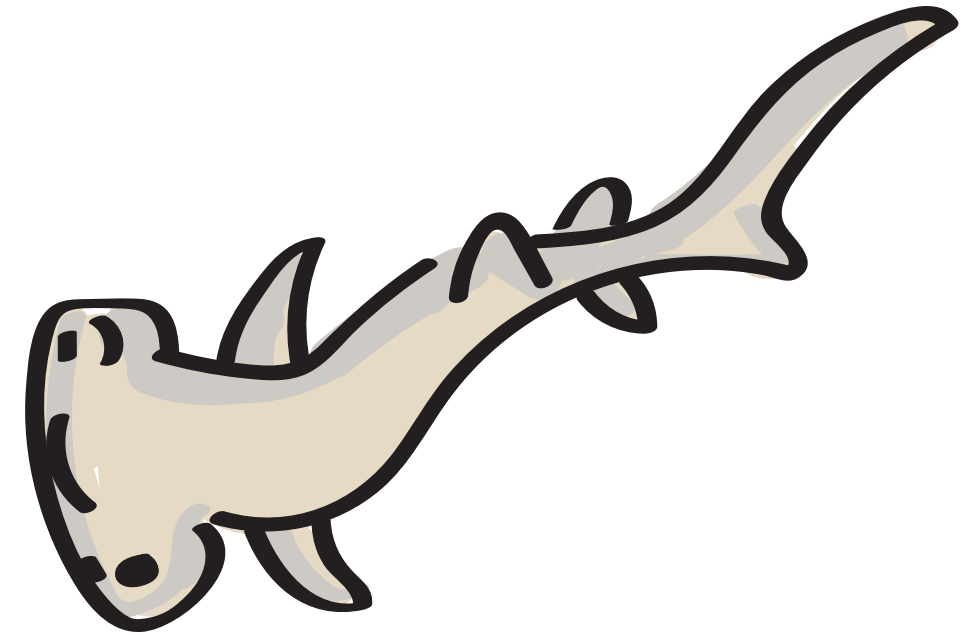
Think - Pair - Share

- Do you think that all animals sleep, what about sharks?
- Do you think that plants rest?

"Every living thing needs to rest." Said her dad. "That's right" said her mom, "all living things need to rest for little while, even if they don't go to sleep completely. And plants can only photosynthesize, or make their own food, during the day time when the sun is shining. At night, they rest and save their energy for the next day."



"Can we explore more tomorrow?" asked Reighlyn. "Of course" said her parents. "Good night, Reighlyn" "Good night Mom and Dad!" said Reighlyn. And with that, she fell right to sleep.



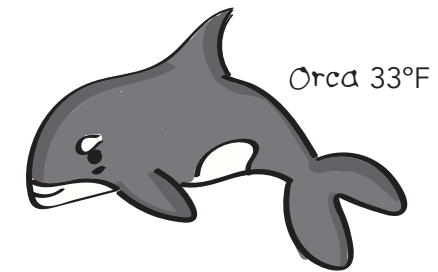
Can you guess what Reighlyn was dreaming about?

It's Time to be a scientist

Now it's your turn to use some real scientific tools named Therma Thermometer and Pippi Pippette. Every student can have their own, just remember to be careful with them. Let's work at making different temperatures. Try using your body as a thermometer by sticking your finger into the cold ice water, could you survive in that temperature water? What temperature is just right for you?

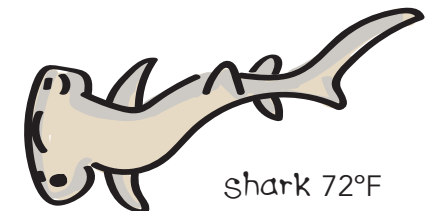


You can use me
Pippi Pippette to
help you mix warm
or cold water



Orca 33°F

- Can you make your water the
temperature that Orca's like?



shark 72°F

-Can you make your water the
temperature that sharks like?



- What is the water temperature
that you could swim in?

The STEMTaught Method

Show what you know

Once they have had the wonderful experience of working at a hands-on lab they will have a lot they want to write and draw. It is important for the developing science mind to write their own entries that are not scripted but come from their own observations. Let them know not to worry if they can't spell the word perfectly, just sound it out and try their best to write about their experiences. Some teachers do a specific science journal while some like to include the entries in their daily classroom journal. The entries below came from students in their first month of Kindergarten.

