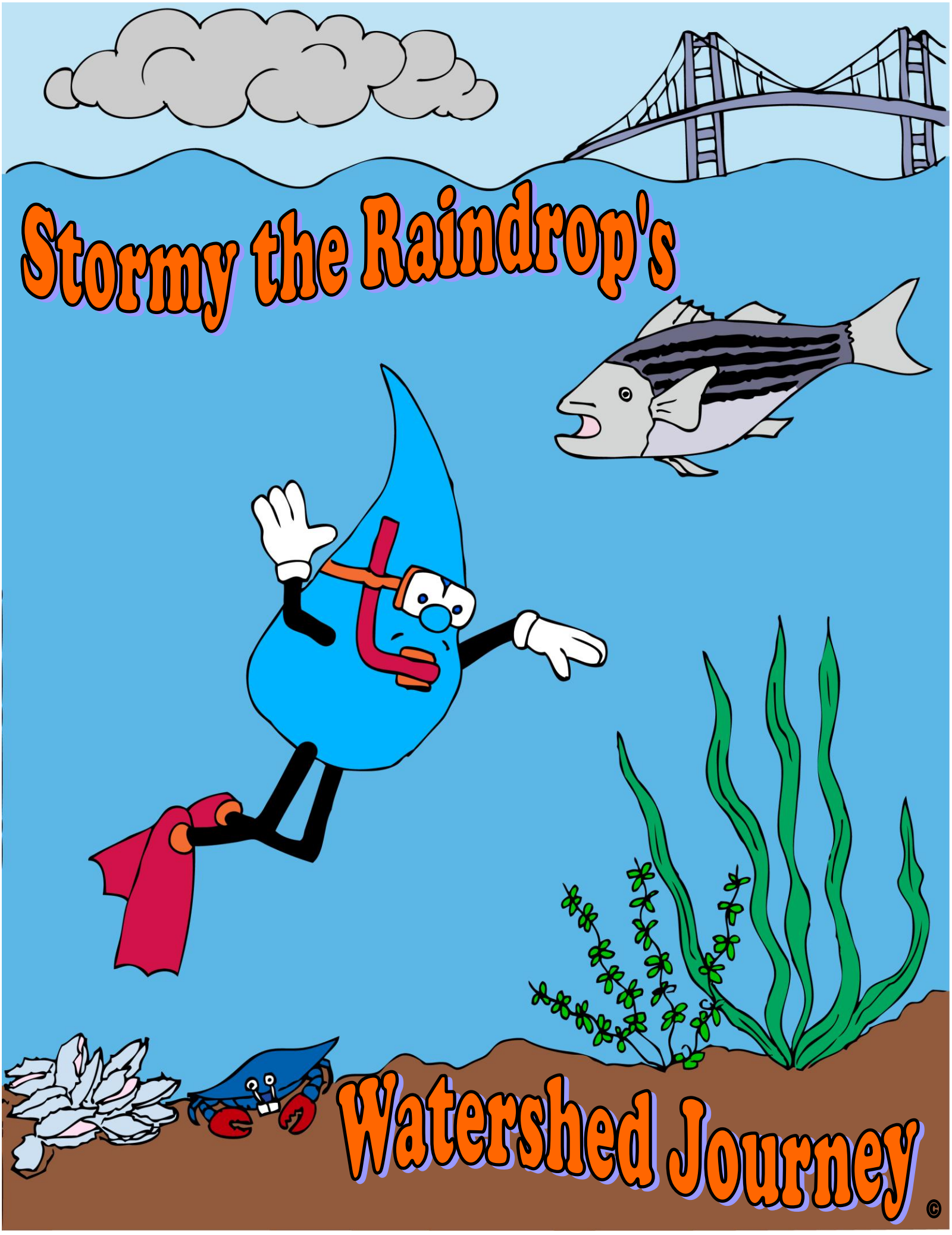
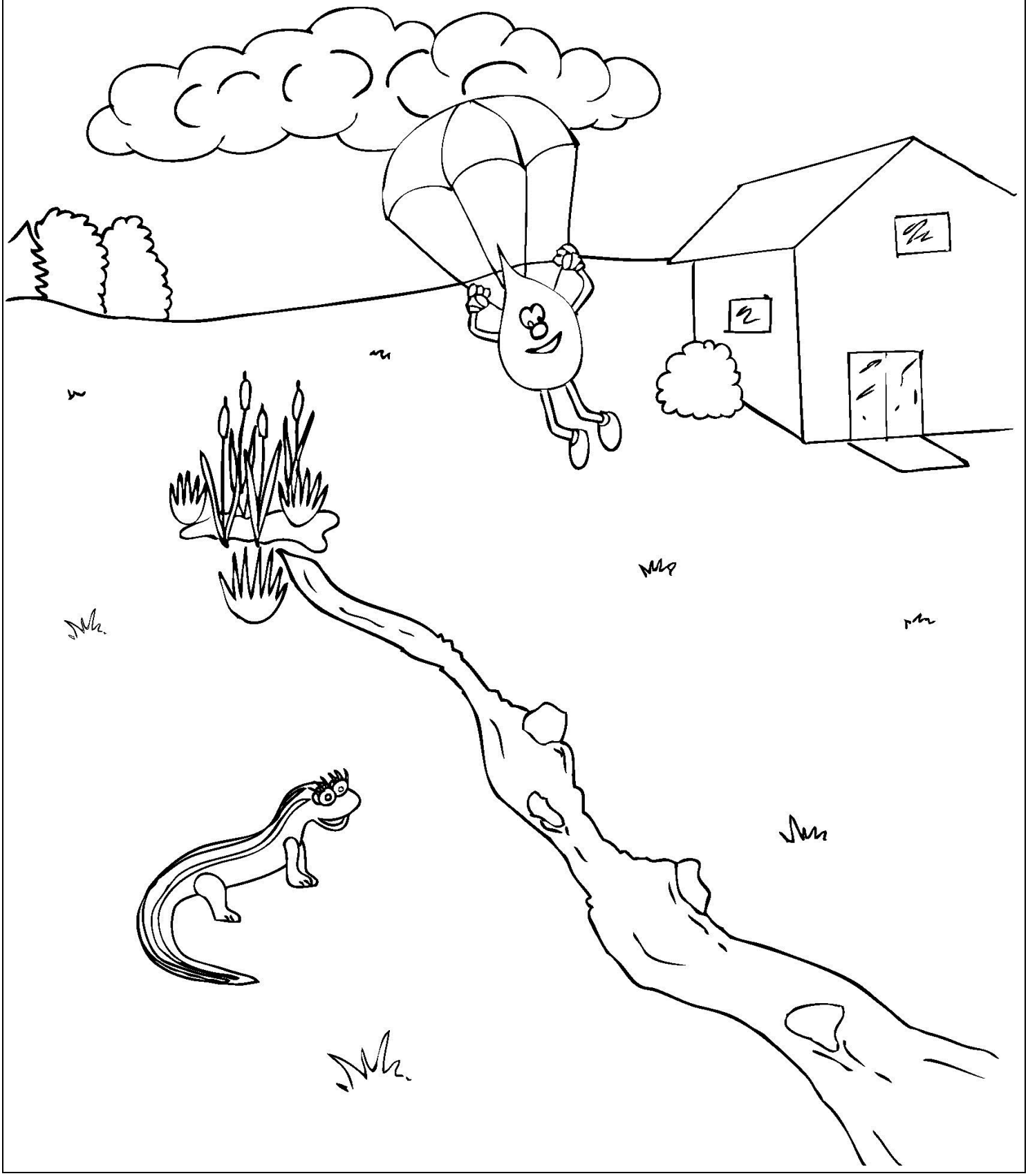
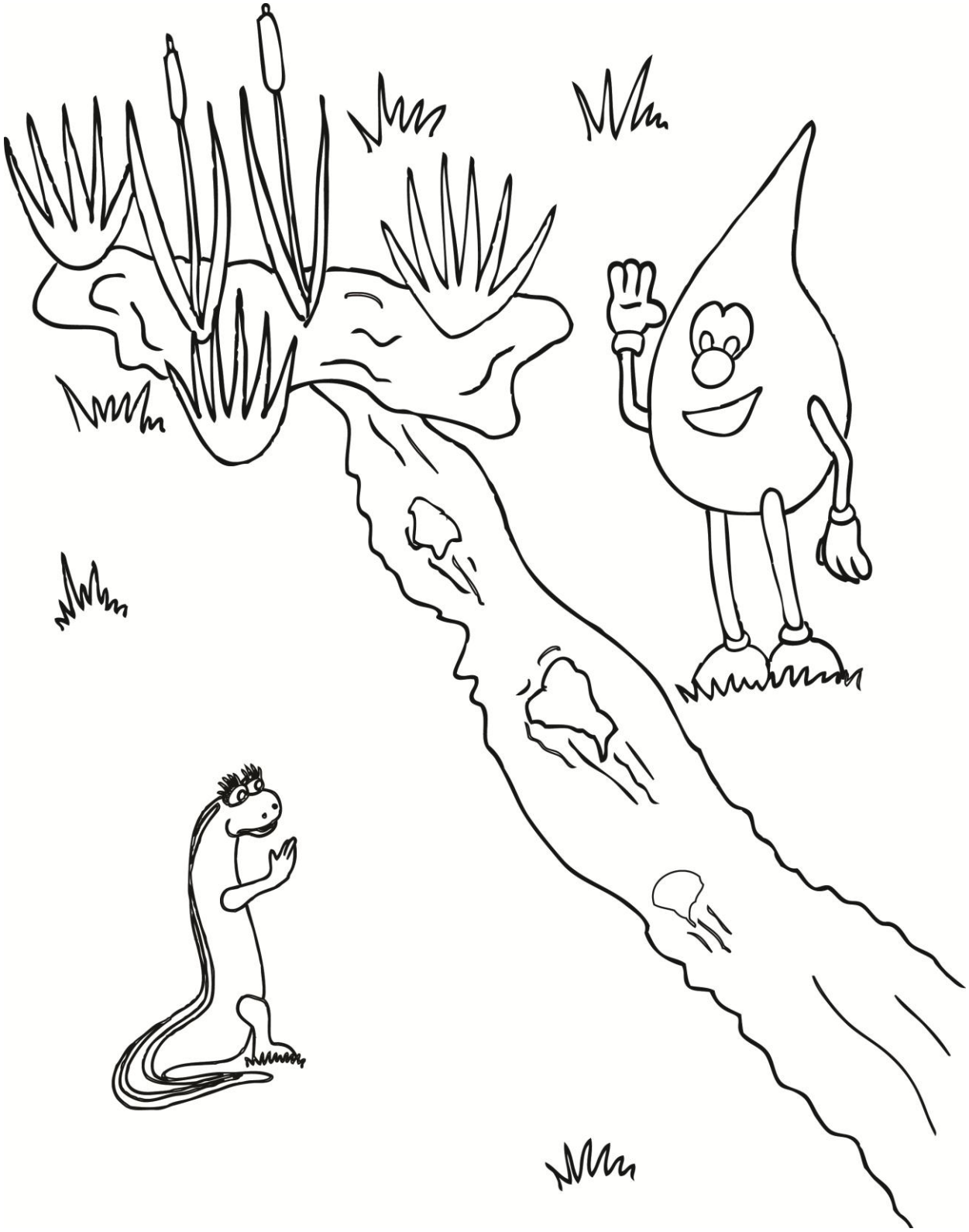

Stormy the Raindrop's
Watershed Journey
©

Stormy the Raindrop's watershed journey began when he fell from a storm cloud to the ground. He landed beside a spring in a back yard and saw a salamander sitting there.

"Hi, my name is Stormy the Raindrop! Who are you, and where are we?" Stormy asked.

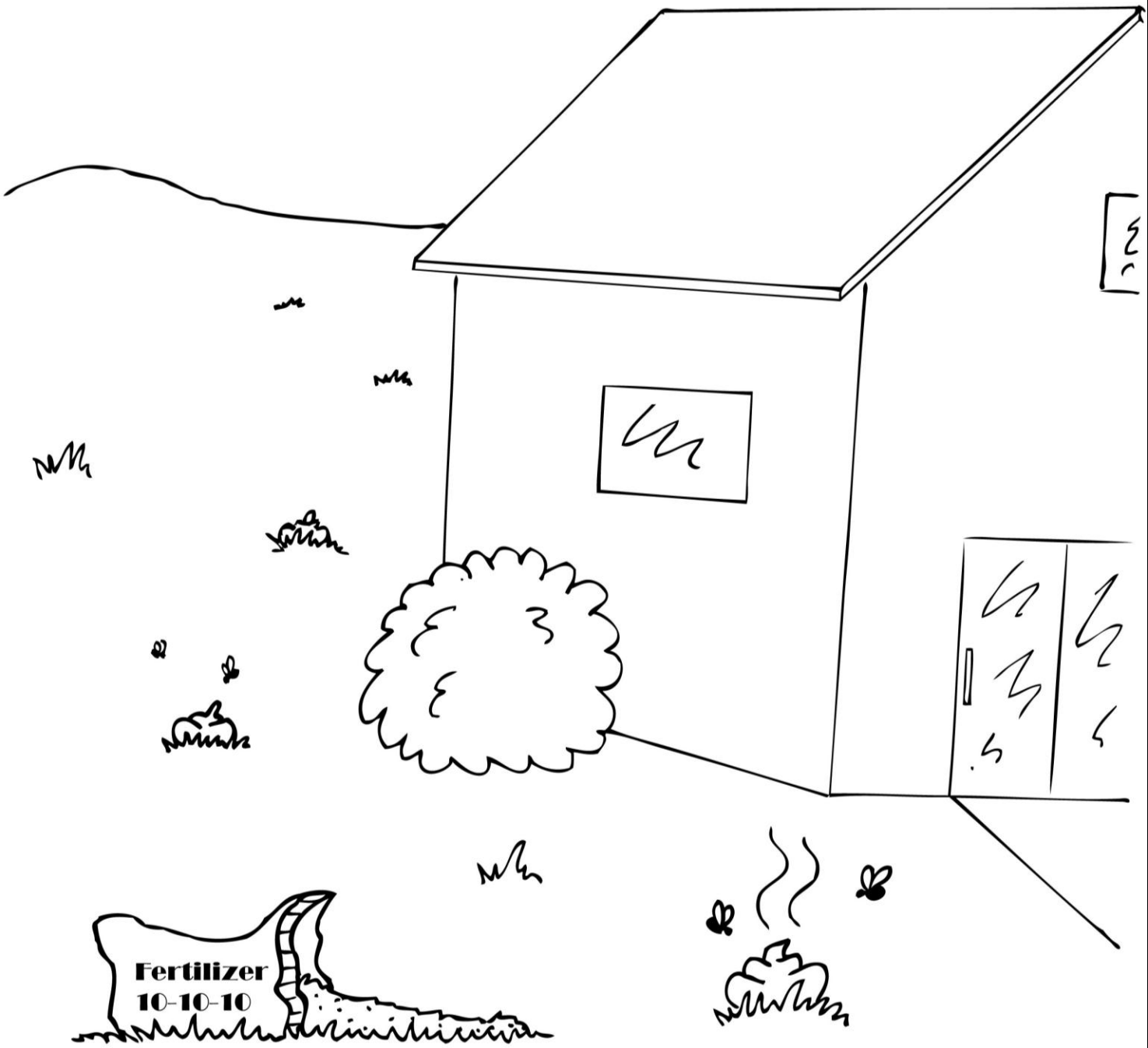


"My name is Sally Mander, and this is my home," she replied. "Some people call springs and the streams that flow from them headwaters because they're the upstream sources of water in watersheds."



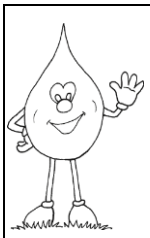
Stormy said, "It looks nice and clean. Is that because the water flows under the ground before it comes to the surface?"

"Well, most of the time the groundwater is nice and clean," answered Sally. "But sometimes the rain washes pollutants off the lawn and into my home."



Stormy noticed piles of pet waste and mounds of grass fertilizer scattered around the yard. He exclaimed, "Pet poop and fertilizer drain into the headwaters? That's disgusting!"

"I know, and not just for me, but for everyone who lives <u>downstream</u>, too," Sally said. "You should go talk to Old Mr. Turtle. He can tell you more." Stormy waved goodbye to Sally and set off downstream.



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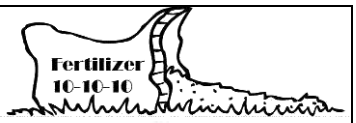
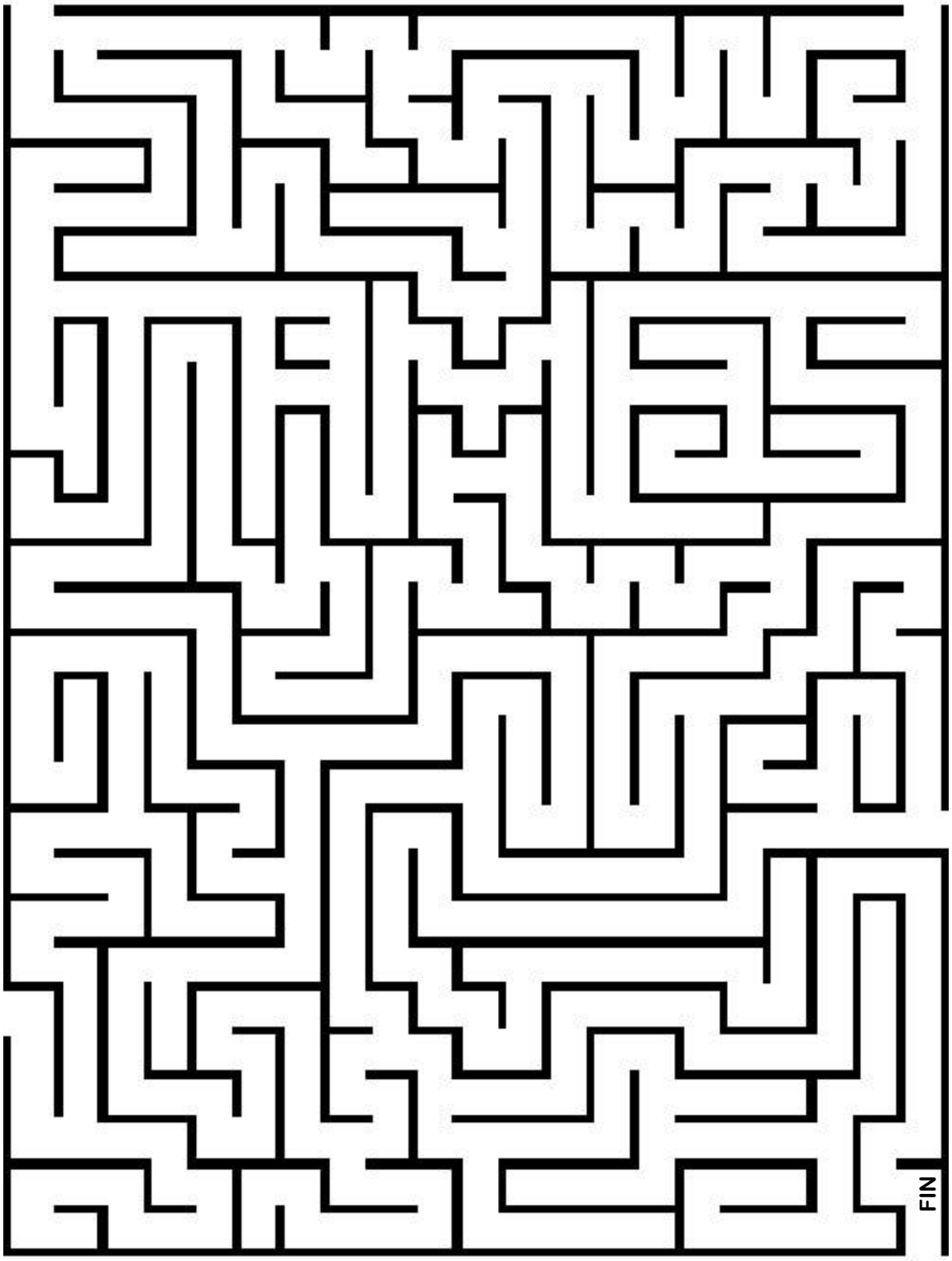
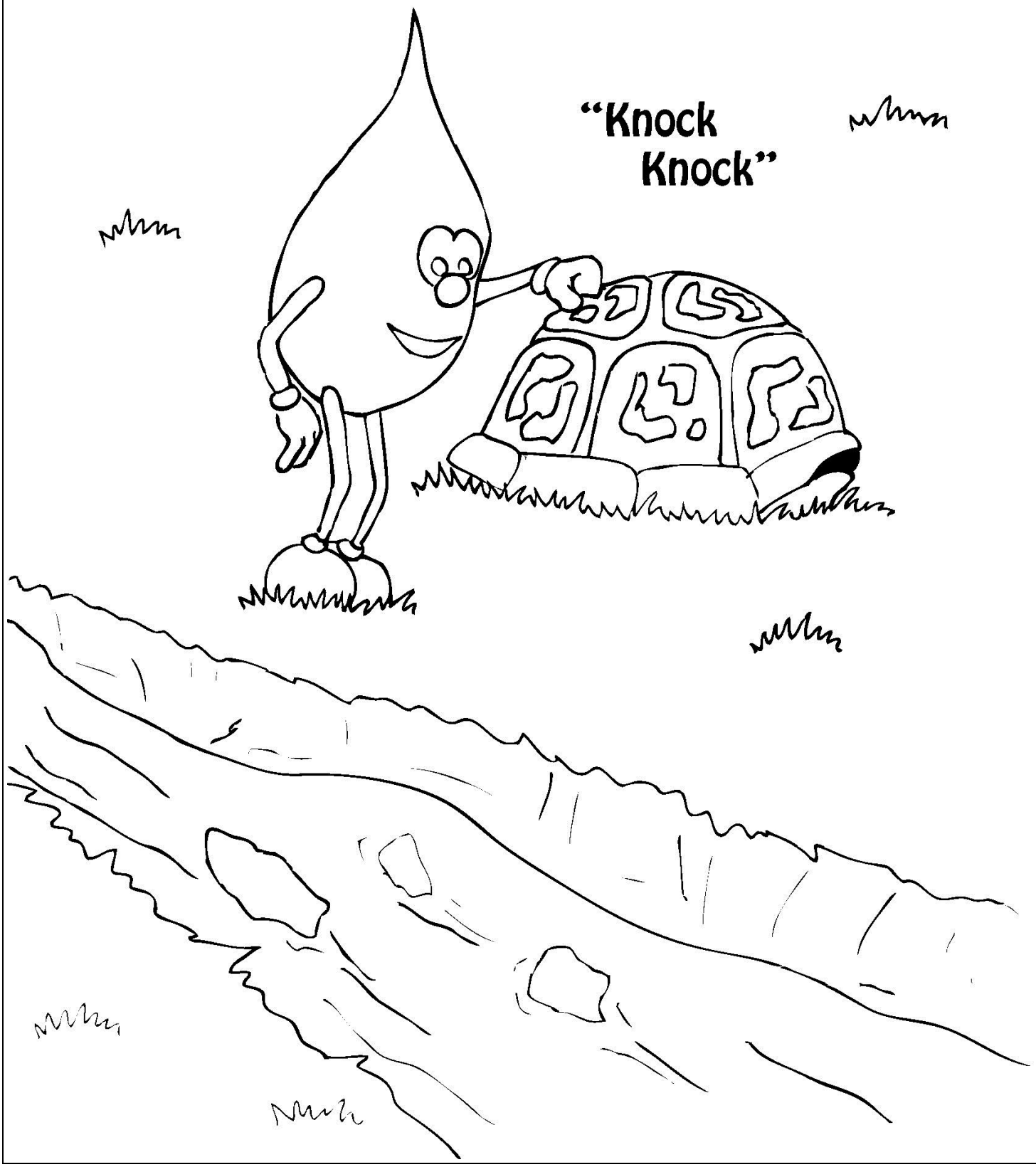
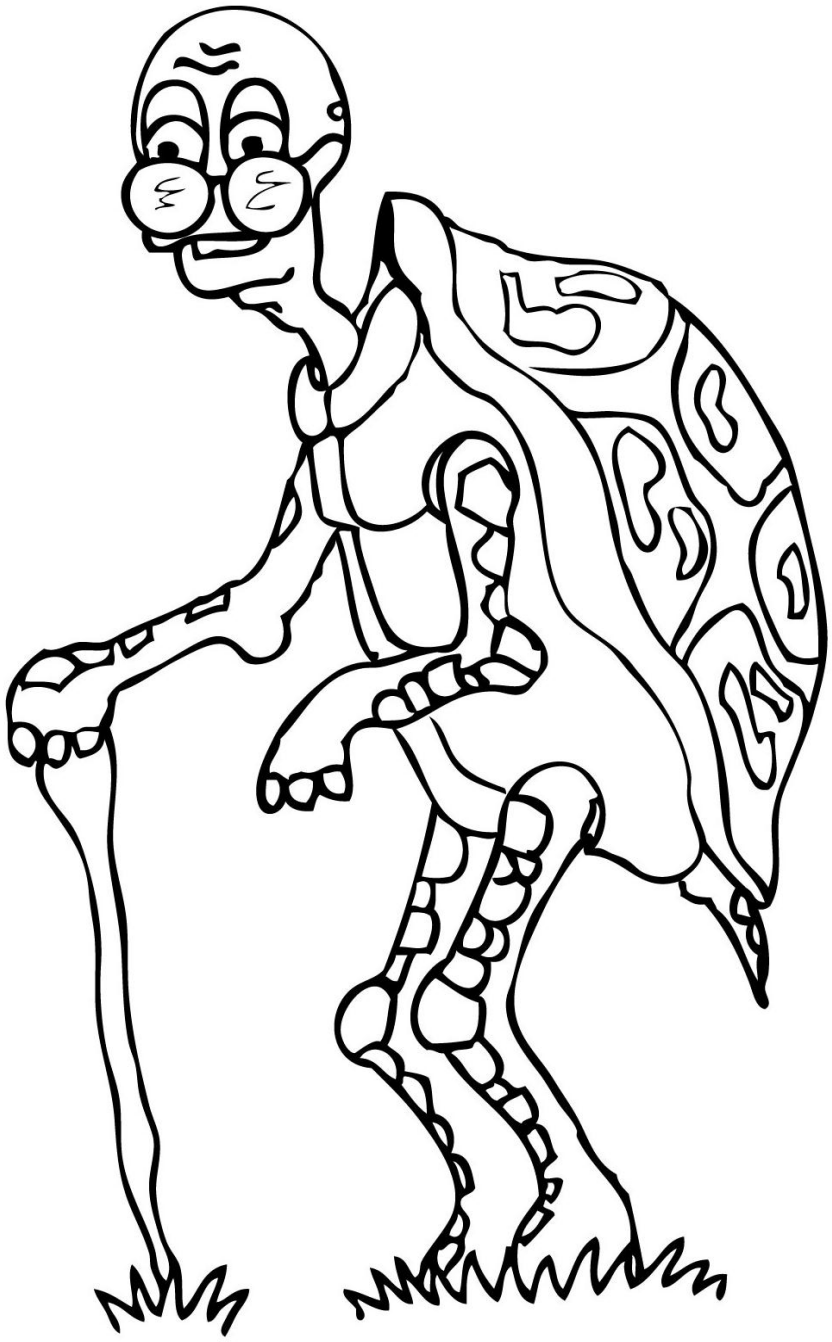




Help Stormy avoid the pollutants and find his way to Old Mr. Turtle.

When Stormy reached the stream, he saw a high domed shell sitting beside the bank. "That must be Old Mr. Turtle's house," he thought. He knocked on the front of the shell. "Hello, is anyone home? I'm Stormy the Raindrop. Sally Mander told me to ask you what it's like to live downstream."

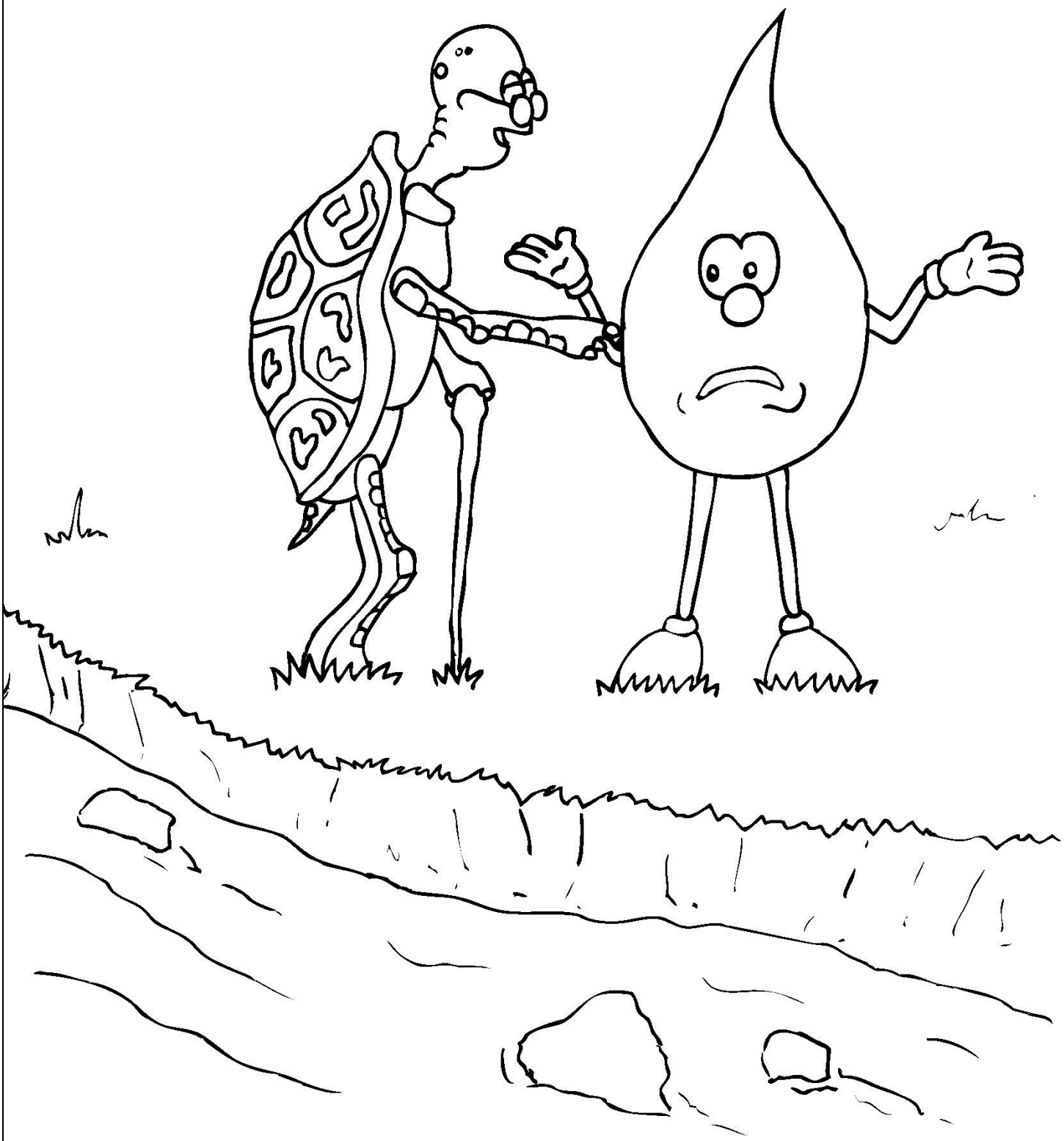




Suddenly a wrinkled head and limbs poked out from beneath the shell. It wasn't a house, but Old Mr. Turtle himself! He stood and blinked at Stormy.

"Well, sonny, it's not like the good old days," he said. "Back then the stream was clean, even after it rained. I had lots of aquatic invertebrates for neighbors. Then the floods started, and they washed out the stream bottom and banks. The banks got steep and hard to climb. The water got muddy, and the stream bottom became covered in silt from all the erosion. Most of my neighbors have moved away."

Old Mr. Turtle explained that people were paving more and more of the watershed, building roads and parking lots, and how this kept rain and melting snow from soaking slowly into the ground. All the runoff rushed into the stream, causing erosion and carrying in more silt and pollutants.



Stormy had many questions, so Mr. Turtle said, "You should go downstream to the Sunfish School. They can tell you more."

"Thanks, Mr. Turtle, I will!" answered Stormy.

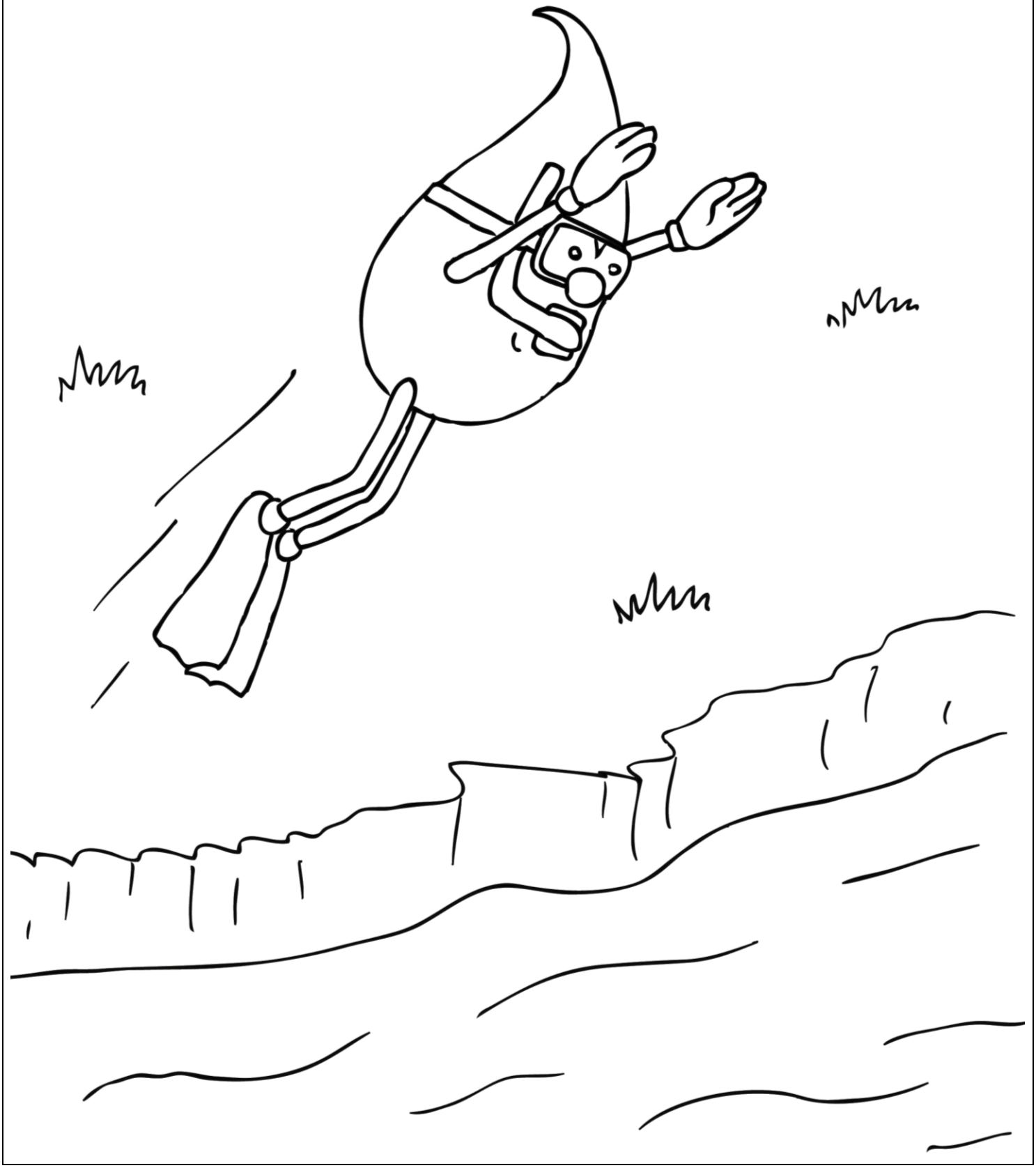
S Y O H S G O T S G E O S
R A C H E T N R D H C E Y
E B E D H A R I A T O T O
T O A C N S D E R M S R S
A P N N R U A W A P Y E E
W N A K K P O E A M S V P
D I N R G S R S E T T I P
N O I T A T I P I C E R P
U D E H S R E T A W M R R
O D L N D E S T U A R Y S
R T W A D A M A N A M E T
G O R H K M T R M N T N E
D N A L T E W D S W E S N

BANKS	BAY	DOWNSTREAM
ECOSYSTEM	GROUNDWATER	HEADWATERS
LAKE	OCEAN	PRECIPITATION
RIVER	SOUND	SPRING
STREAM	UPSTREAM	WATERSHED
ESTUARY	WETLAND	SHORE

Find the watershed words

Stormy dove into the water and continued downstream. As he swam, he noticed that there was less erosion where trees, shrubs and other plants grew on the stream bank.

"Hmm," he thought, "It looks like the plant roots hold onto the soil and help keep the stream banks from washing away."



When Stormy reached the Sunfish School, he asked the students to describe how things that happened upstream affected them. Parvati Pumpkinseed replied, "Sometimes silt from runoff and erosion makes the water muddy, and it gets hard to breathe."

"Pet waste and fertilizer affect the water quality, too. They contain lots of nutrients," added Bobby Bluegill.

"Nutrients?" asked Stormy. "That's like nutrition, right? Isn't that a good thing?"

Gloria Bluespot answered, "Too much of anything isn't always good. Lots of nutrients make lots of slimy algae grow."

"Yeah, nobody wants to swim in yucky algae!" added Ramiro Redbreast.

"That's not all," Ramiro went on. "Sometimes people throw things in the stream, or drop litter or spill stuff on the ground where it washes into streams."

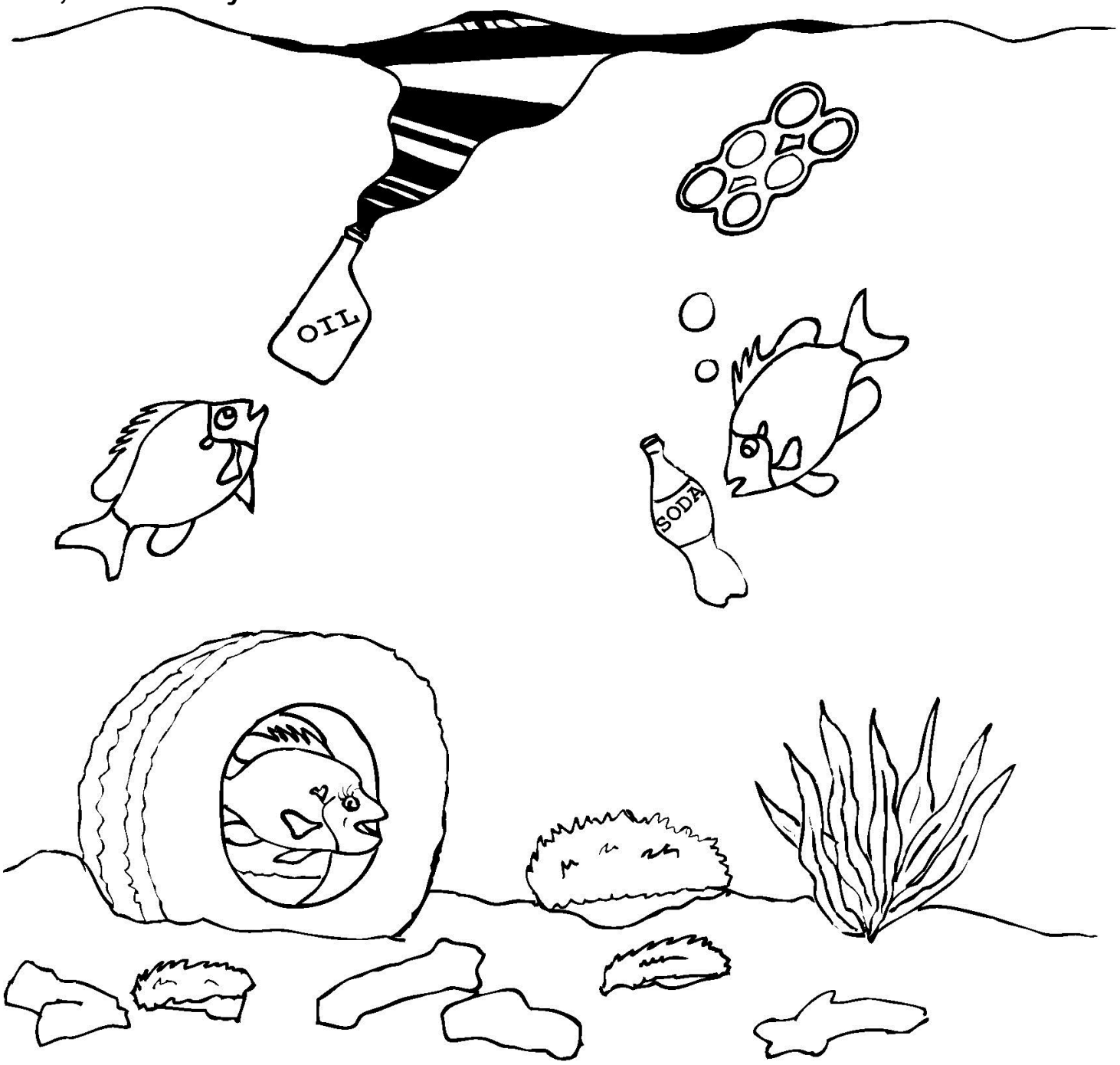
"What kind of things?" Stormy asked.

"Motor oil!" cried Parvati.

"Soda bottles!" shouted Bobby.

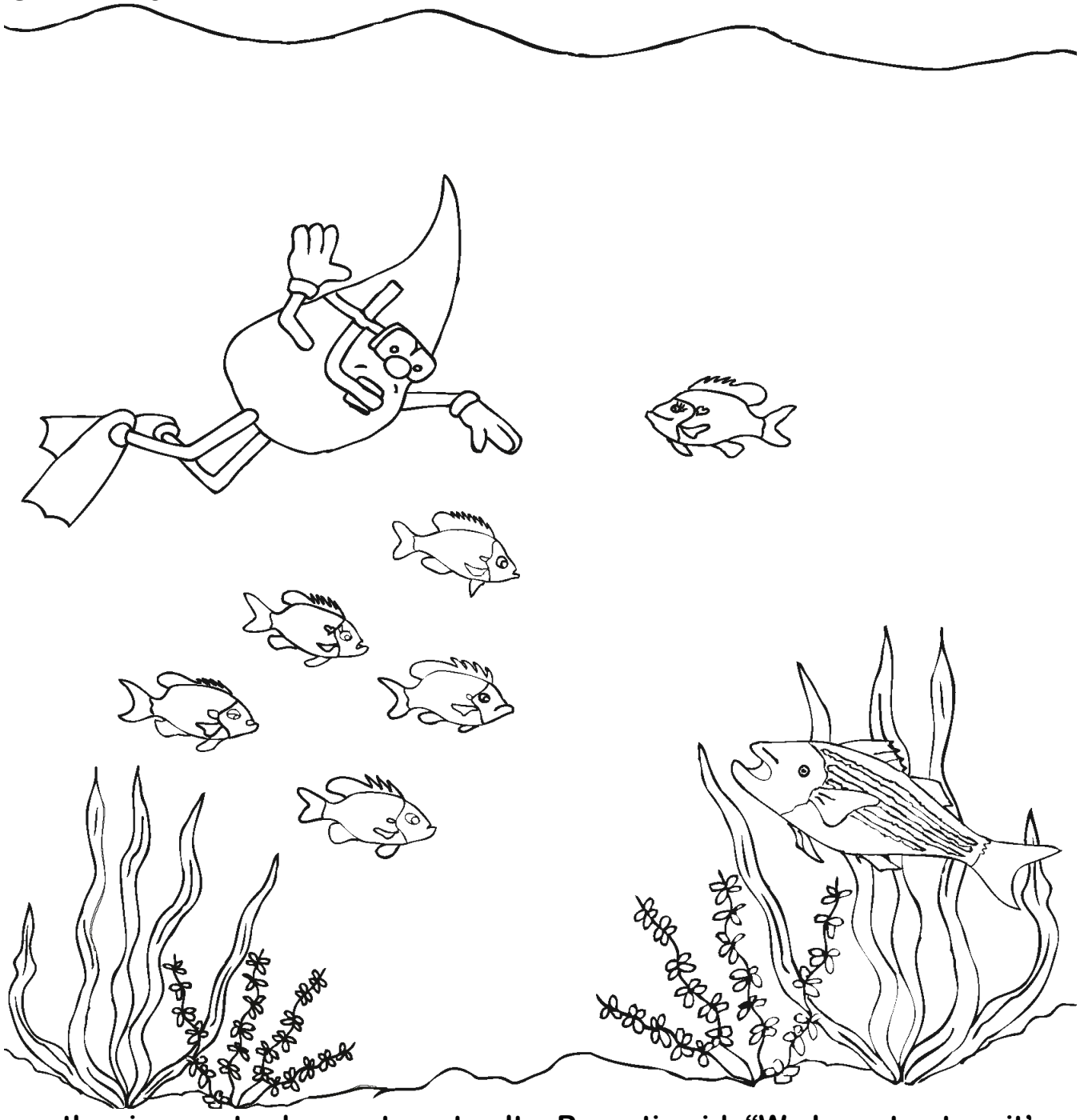
"Tires!" Gloria yelled.

"And everything gets carried downstream to the river," said Ramiro. "Come on, we'll show you!"



The sunfishes led Stormy down the stream and into the river. They saw many people enjoying the river, but also lots of litter in the water and on the shore. "How can people let this stuff get in their water?" Stormy exclaimed.

"I guess they need to be educated," said Gloria.



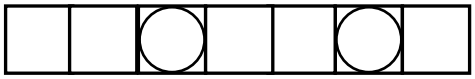
Soon the river water began to get salty. Parvati said, "We have to stop, it's too salty for us."

Bobby said, "Hey, there's Mama Bass! She'll tell you more about what it's like to live downstream."

"'Bye, Stormy!" Gloria, Ramiro, Bobby and Parvati called as they swam back to school.

REFRIETIZL 

TEP WEATS 

SIONERO 

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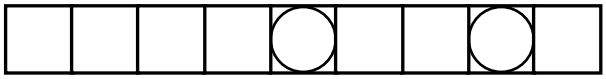
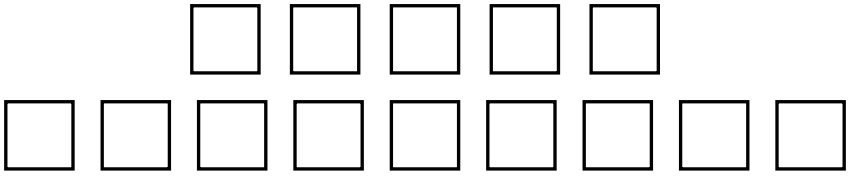
CILHEMSAC 

TIUSETNRN 

TETRLI 

Unscramble each of the clue words.

Then take the letters that appear in ◯ boxes and unscramble them for the final message.



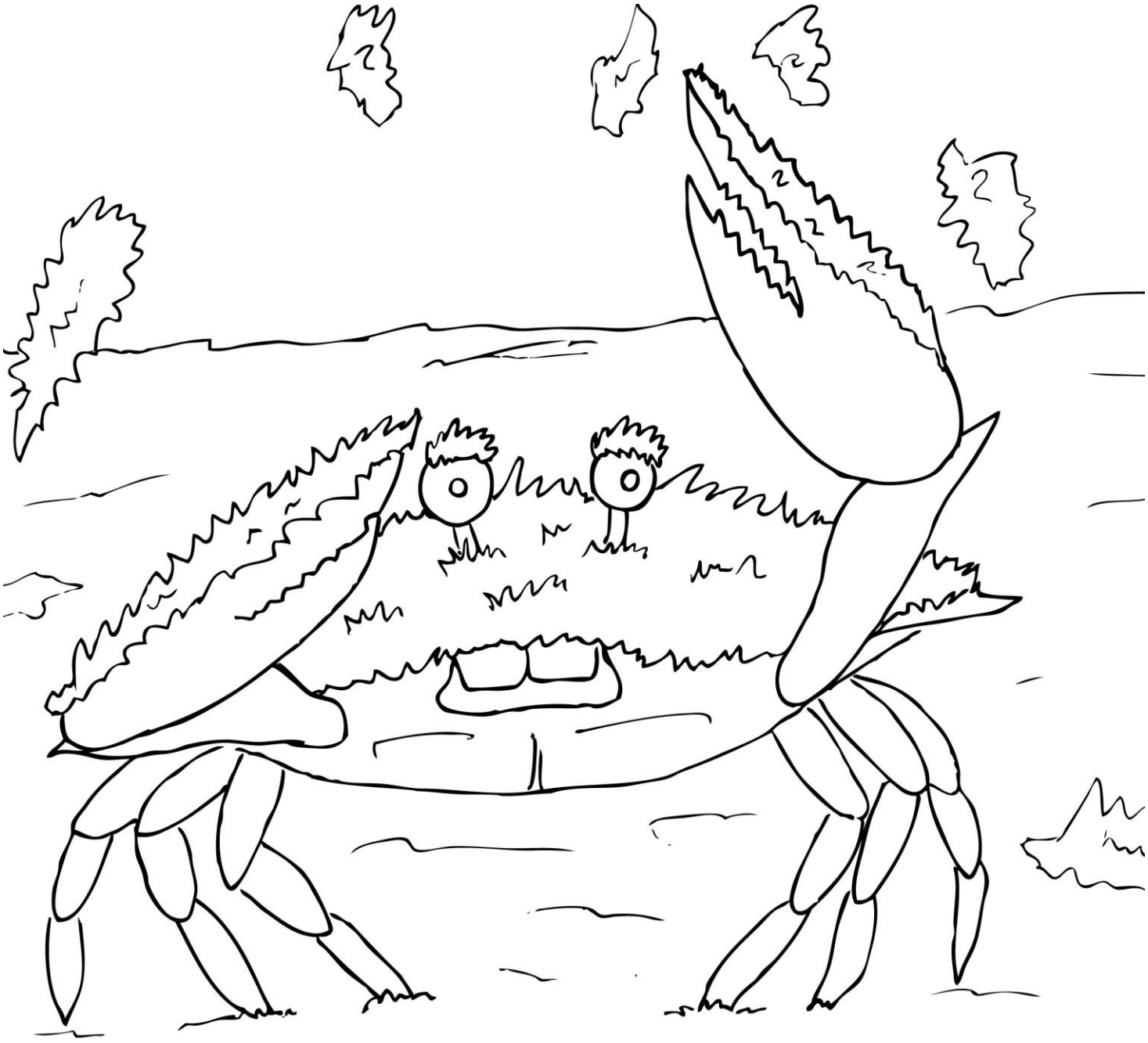
“Why is the water salty here?” Stormy wondered.

“This estuary is where fresh water from the river and salt water from the Chesapeake Bay mix,” answered Mama Bass. “The Bay connects to the Atlantic Ocean. I’m about to go visit my babies in the nursery; why don’t you come along and see.”

They swam into the Bay and stopped at a patch of underwater plants. "This is where my babies stay while they grow up,” she told him. “Other parents like Mr. Flounder keep their children in this nursery, too. The plants hide and protect them. But silt in the water and algae on the surface block the sunlight that plants need to grow. Sometimes the silt covers the plants up! If the plants die, we have no place to raise our children.”

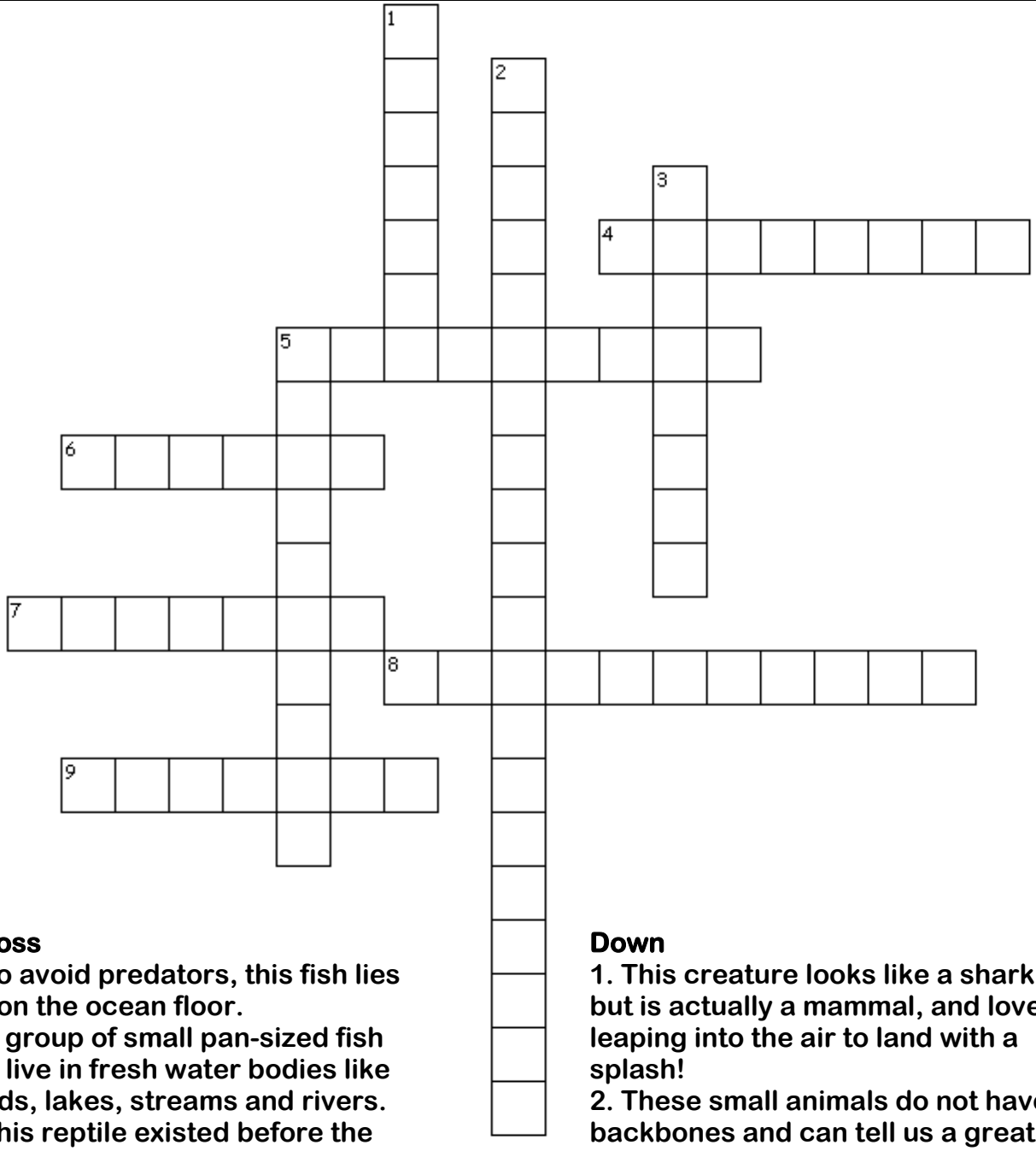
Mama Bass led Stormy toward the lower part of the Bay. He noticed a stinking pile of rotten algae on the bottom that was jumping and twitching. Suddenly, a red claw poked through the gooey mess and a blue crab popped out. "DRAT!" the crab hollered, causing Stormy to jump.

Mama Bass smiled. "Oh, that's Mr. Crabby. He can tell you more about the Bay."



Stormy asked the crab why he was upset. "BAH!" Mr. Crabby grumped. "There's too much algae! They grow like crazy because of the nutrients running off upstream. When the algae die, they sink to the bottom and rot! That uses up the oxygen in the water! I have to keep searching for places where I can breathe! PHOOEY!"

The crab stamped his claws, stirring up clouds of silt and decaying plant bits. A nearby cluster of oysters began coughing and sputtering. "See that?!" shouted Mr. Crabby. "My friends the oysters can't move someplace else to find more oxygen! And the silt in the water settles out and covers the bottom. It's hard to breathe, there's almost nothing to eat, and the oysters' beds are full of silt! Lots of them get sick!" He waved a claw at Stormy and scuttled off, still grumbling.



Across

4. To avoid predators, this fish lies flat on the ocean floor.
5. A group of small pan-sized fish that live in fresh water bodies like ponds, lakes, streams and rivers.
6. This reptile existed before the dinosaurs…some species can live to be over 100 years old!
7. An excellent swimmer, this bird has webbed feet and a large pouch in its throat for catching fish.
8. The state fish of Maryland, named for the horizontal markings along the length of its body.
9. These shellfish feed by filtering particles from the water… each one can filter up to 50 gallons a day!

Down

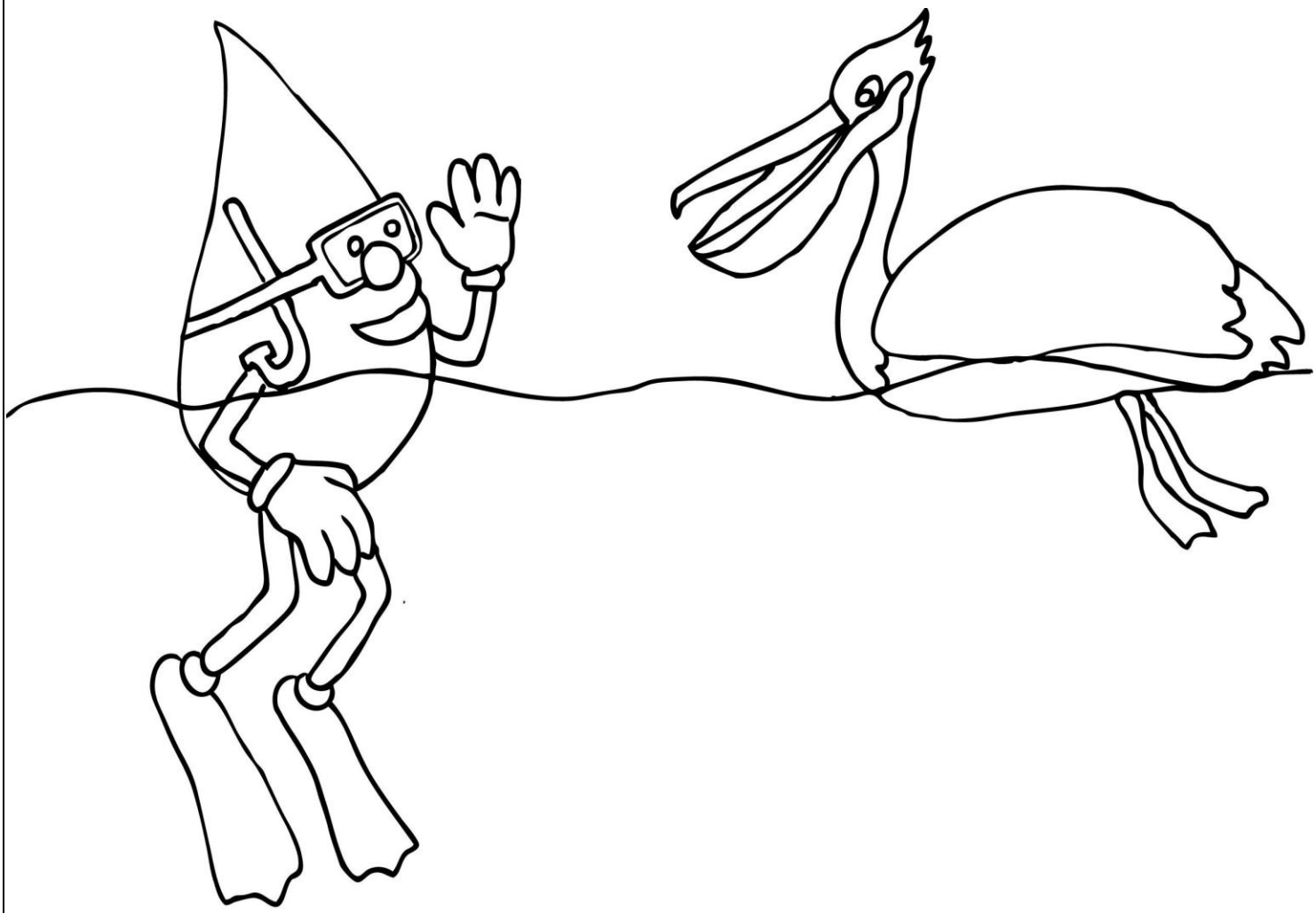
1. This creature looks like a shark but is actually a mammal, and loves leaping into the air to land with a splash!
2. These small animals do not have backbones and can tell us a great deal about stream health.
3. This clawed creature's scientific name means "delicious beautiful swimmer."
5. Related to frogs and toads, this animal prefers to live in groundwater springs and small streams.

Critter Crossword

Fill in the names of the creatures Stormy met or learned about on his journey

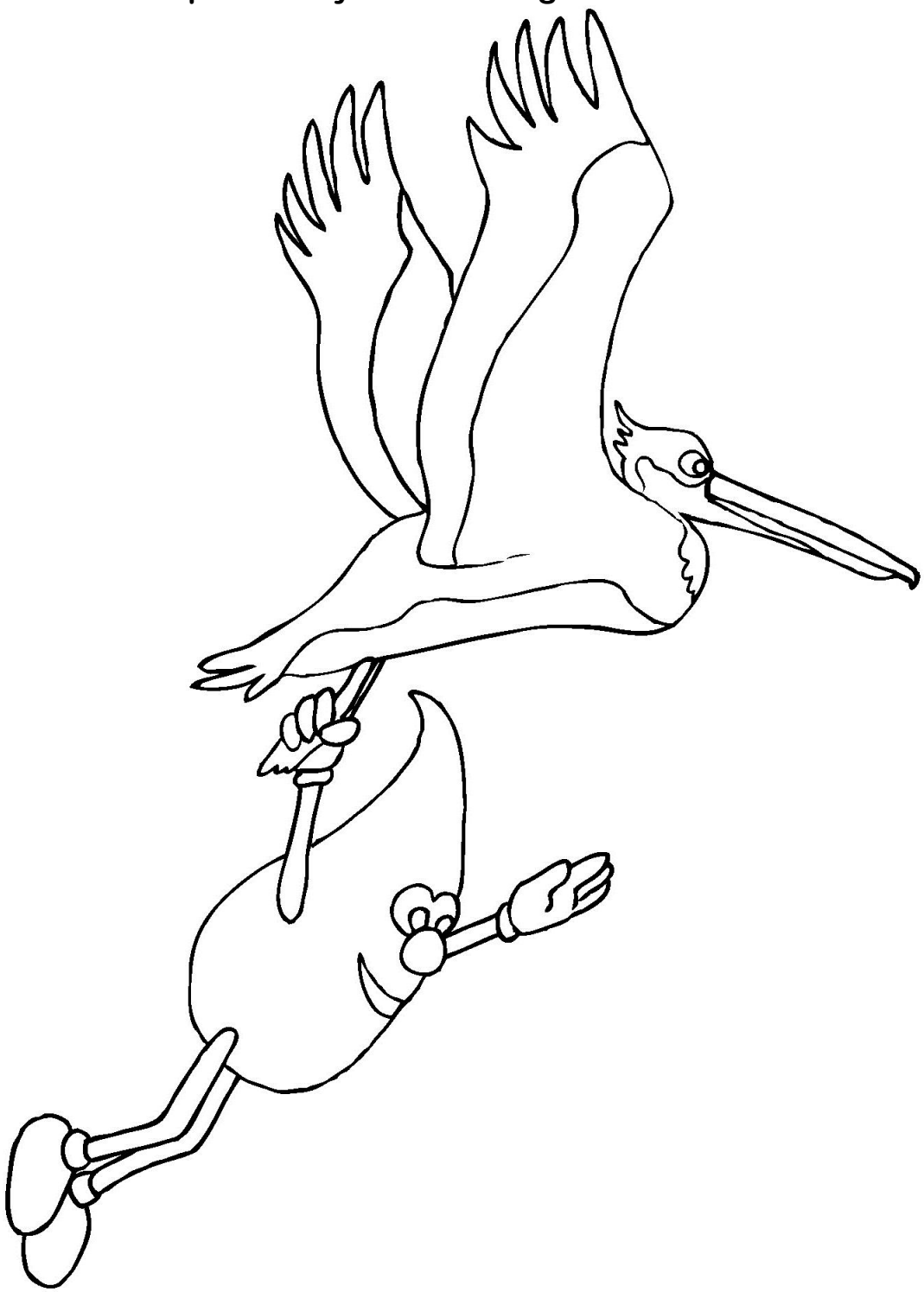
“Whew!” thought Stormy. “It is hard to breathe down here. I need some air after all that excitement!” He swam to the surface. There he saw a pelican swimming nearby. “Excuse me, could you please tell me the way to the Atlantic Ocean?” Stormy asked him.

“I’m on my way there,” replied the pelican. “Grab my foot and I’ll take you!”



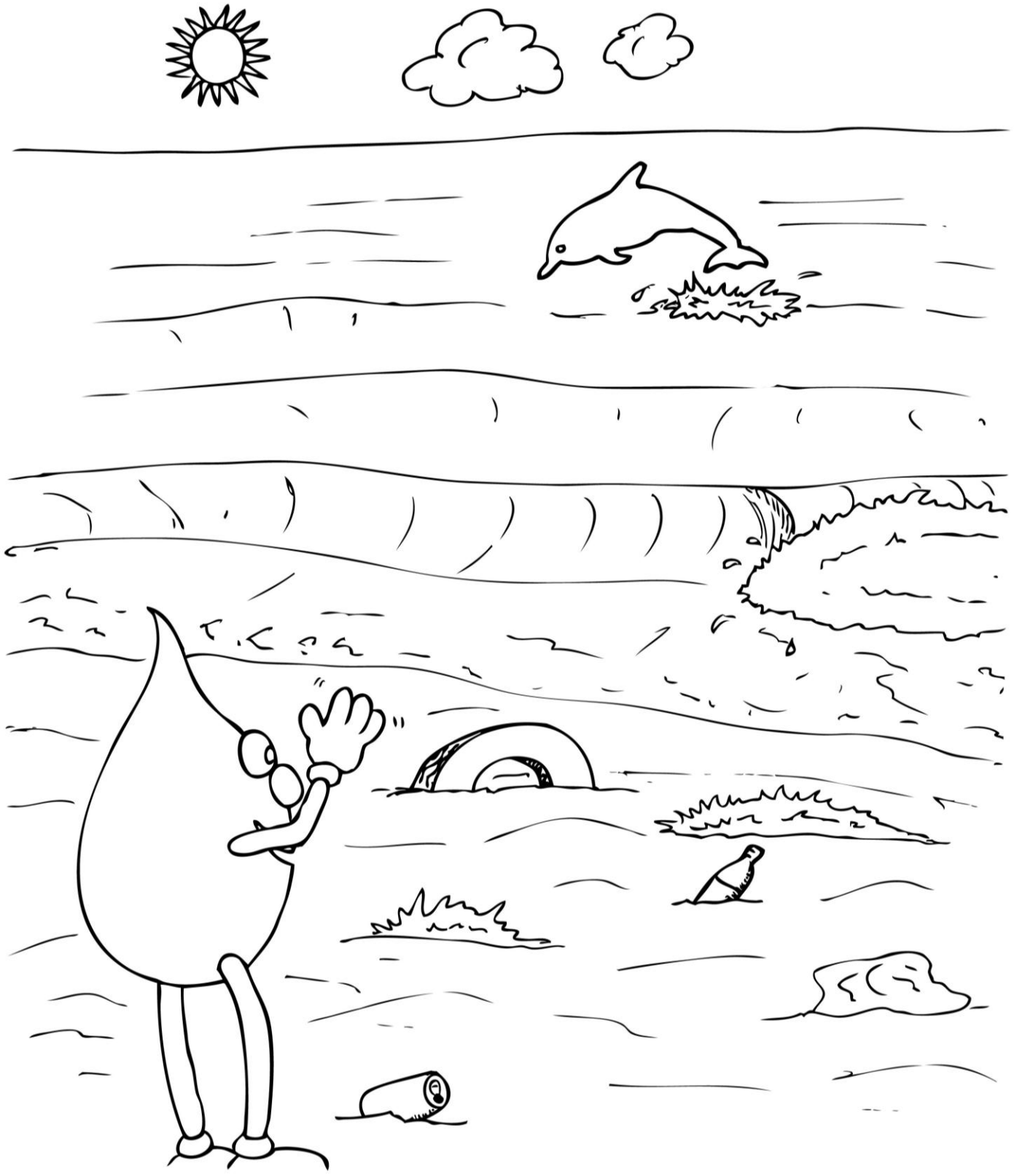
Stormy held on tightly as the bird's powerful wings lifted them high in the air. As they soared above the water, Stormy shouted, "Whee! This is fun! And the Bay looks so pretty from up here!"

"Yes, it is beautiful," the pelican replied. "People need to appreciate how special the Chesapeake Bay is and take good care of it."



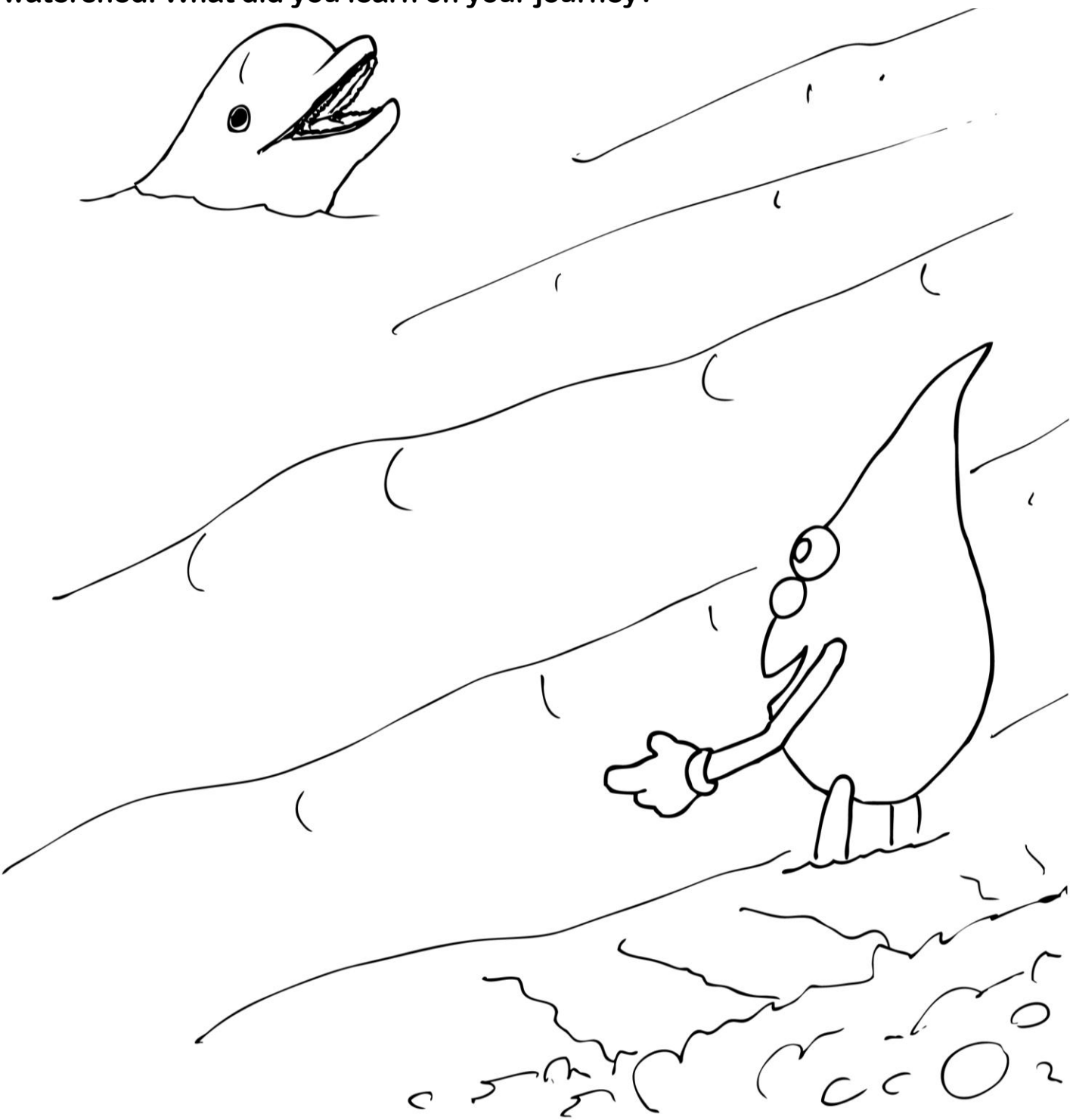
"Look below, we're coming to the ocean," the pelican told Stormy as he swooped down over a sandy beach. "You might want to jump off here."

"Thanks!" called Stormy as he let go.

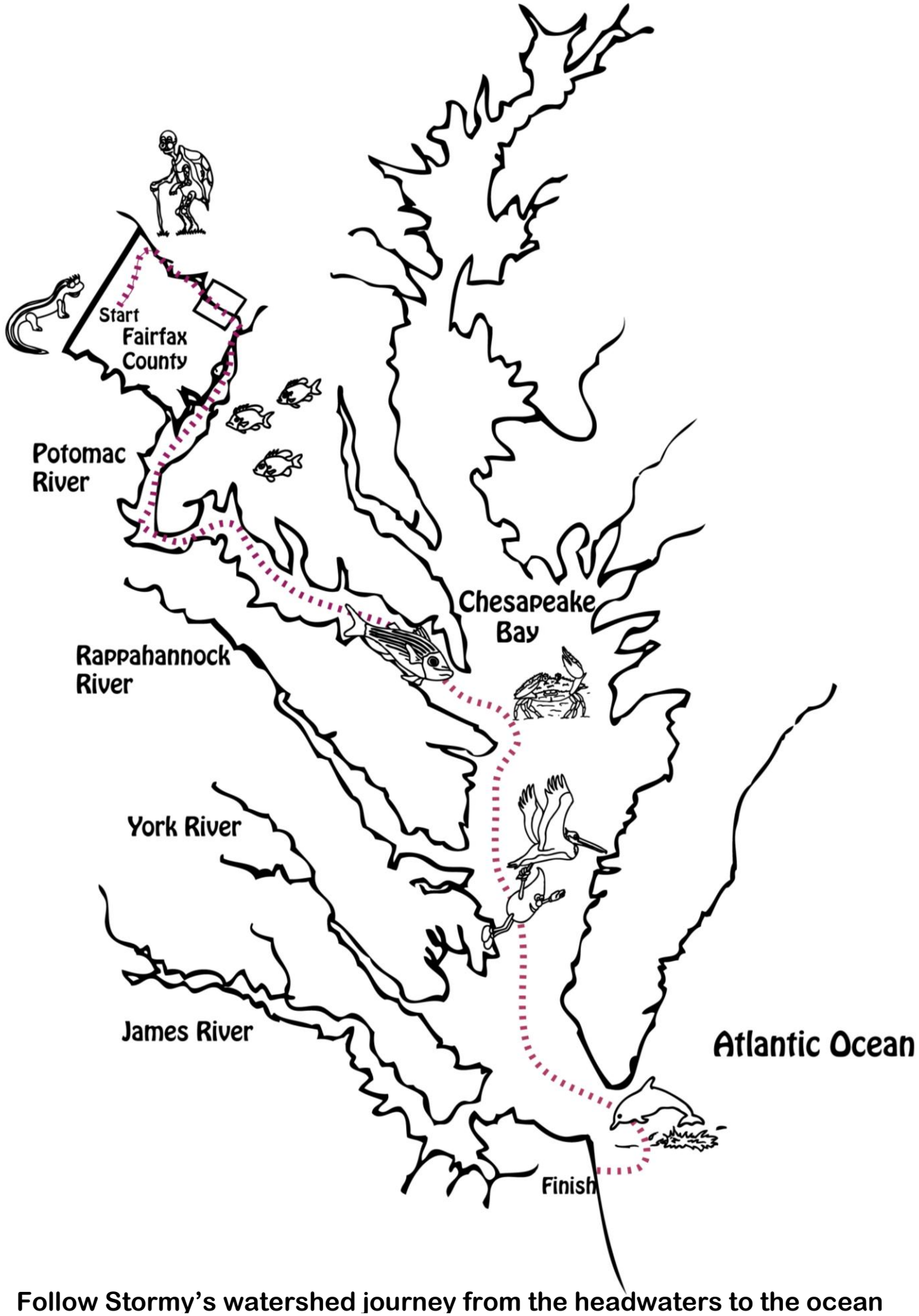


Stormy landed and looked around. He saw many people enjoying the beach - lying in the sun, playing on the sand and swimming in the ocean. He also noticed many things that he had seen upstream. Litter and mounds of algae were scattered here and there. Breaking waves stirred up silt and muddied the clear blue water. Looking out to sea, Stormy saw a dolphin leap out of the ocean and waved to it. The dolphin waved its fin back and swam to the shore.

Stormy described his watershed journey to the dolphin. "That's amazing!" the dolphin said. "You travelled all the way from the headwaters to the end of the watershed. What did you learn on your journey?"



Stormy answered, "All the springs, streams and rivers in the Bay watershed flow to the Chesapeake Bay estuary and finally to the Atlantic Ocean. And everything living in the water and on the land needs a healthy watershed and clean water. But all the pollutants that run off or get thrown or dumped into the water end up here, too. And that affects everything living downstream. That's the most important thing I learned: from the headwaters to the ocean, we ALL live downstream!"



Follow Stormy's watershed journey from the headwaters to the ocean

Word List

Algae – Plantlike organisms that live in water or other wet places. In small amounts in natural environments, algae are an important food source for many animals.

Aquatic invertebrates – Insects and other animals without backbones that live in water for part or all of their life cycle.

Atlantic Ocean – The second largest ocean on the planet, the Atlantic lies off the east coast of North and South America. The Chesapeake Bay flows into the Atlantic Ocean at Virginia Beach in the Tidewater area of Virginia.

Bay – A body of water that is partially surrounded by land with a wide mouth that connects to an ocean or sea.

Chesapeake Bay – The largest estuary in North America. The Chesapeake Bay watershed covers approximately half of Virginia's land area.

Downstream – In, at or toward the end of a stream where it flows into a larger body of water.

Erosion – The wearing away of the land by water, ice or wind.

Estuary – A place where fresh water from streams and rivers mixes with salt water from the ocean.

Groundwater – The water that flows beneath the ground, and comes to the surface as seeps or springs.

Headwaters – All of the upstream sources of water within a watershed.

Nutrients – Chemicals like nitrogen and phosphorous that plants and animals need to live and grow. They occur naturally in streams, but unnatural increases of nutrients can cause overgrowth of plants and algae.

Pollutant – A harmful chemical or waste material that contaminates water, soil or air.

River – A wide, natural flowing body of water.

Runoff – Stormwater that does not soak into the ground and "runs off" into the nearest water body.

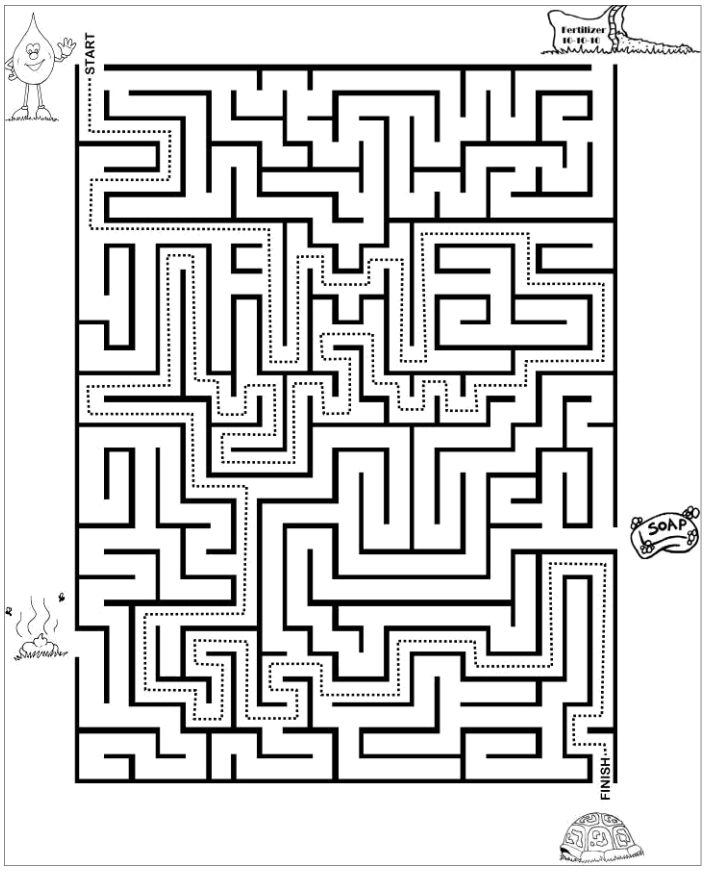
Silt – Soil particles carried by runoff from unstable stream banks, construction sites, logging sites, plowed fields and residential areas.

Spring – A place where water naturally flows from the ground.

Upstream – In, at or toward the source of a stream.

Water quality – Refers to the characteristics of water that make it suitable for specific human and ecological uses. Examples of human uses are drinking and bathing. An example of an ecological use is maintaining healthy fish populations.

Watershed – An area that drains to a particular water body such as a river, bay or ocean.



S Y O H S G O T S G E O S
R A C H E T N R D H C E Y
E B E D H A R I A T O T O
T O A C N S D E R M S R S
A P N N R U A W A P Y E E
W N A K K P O E A M S V P
D I N R G S R S E T T I P
N O I T A T I P I C E R P
U D E H S R E T A W M R R
O D L N D E S T U A R Y S
R T W A D A M A N A M E T
G O R H K M T R M N T N E
D N A L T E W D S W E S N

BANKS BAY DOWNSTREAM
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LAKE OCEAN PRECIPITATION
RIVER SOUND SPRING
STREAM UPSTREAM WATERSHED
ESTUARY WETLAND SHORE

REFRIETIZL FERTILIZER

TEP WEATS PET WASTE

SIONERO EROSION

TSIL SILT

FFNOUR RUNOFF

POAS SOAP

CILHEMSAC CHEMICALS

TIUSETNRN NUTRIENTS

TETRLI LITTER

Unscramble each of the clue words.

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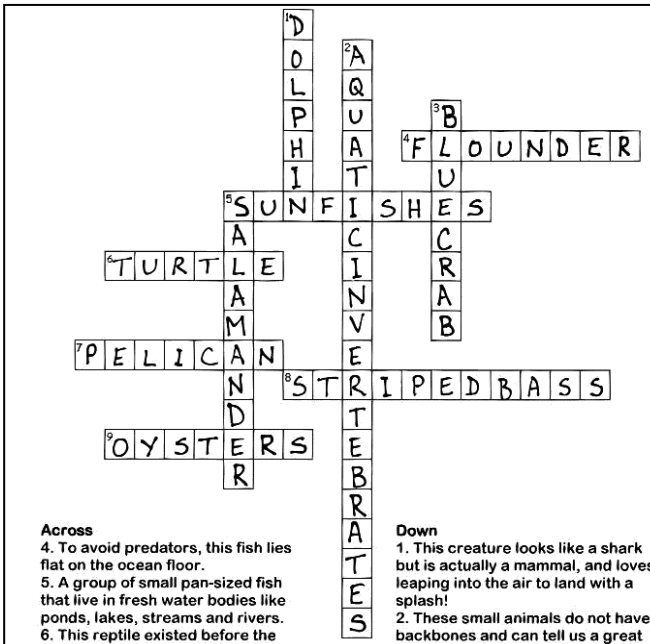
WATER

POLLUTION



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Puzzle Solutions

For more information on how you can help prevent stormwater pollution, visit the Fairfax County Stormwater Planning Division's Web site:

http://www.fairfaxcounty.gov/dpwes/stormwater/

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Stormwater Planning Division
12000 Government Center Parkway Suite 449
Fairfax, VA 22035
703-324-5500 phone TTY 711
703-802-5955 fax

A special "Thank you" to Eric Forbes (art), LeAnne Astin (story, layout & puzzles), Don Lacquement (concept) & the rest of the Stormy Team (Heather Ambrose, Takisha Cannon & Danielle Wynne)

A Fairfax County, Va., publication
Printed May 2012 on 100% recycled paper