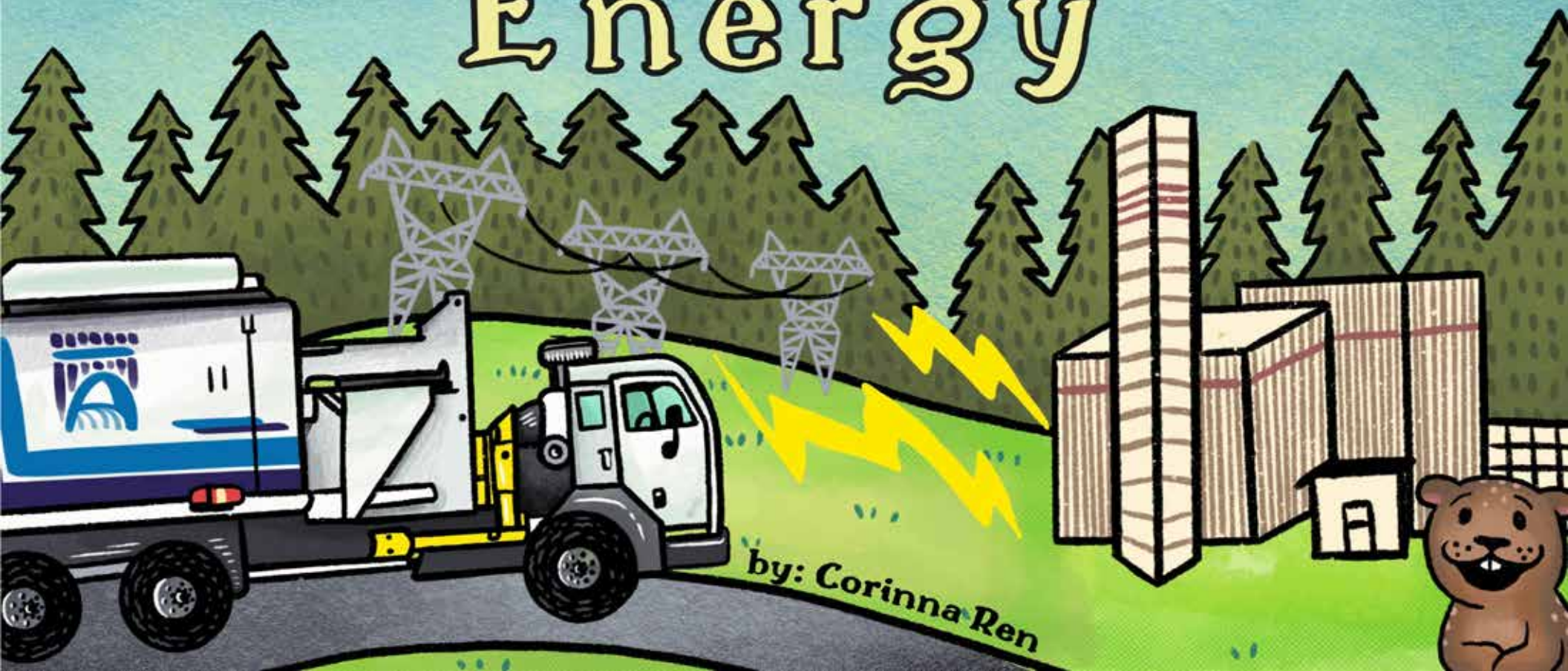
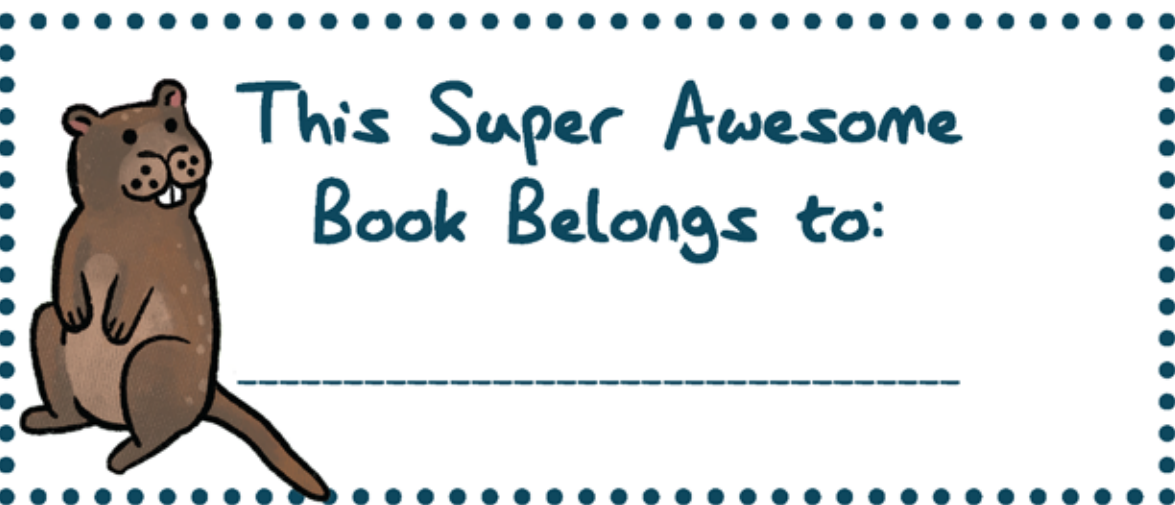


# EXPLORING SPOKANE

Turning

WASTE to  
Energy





This book is dedicated to the staff at the City of Spokane Waster to Energy Plant. Know that you are part of something pretty miraculous each and every day. A special thanks to the author and artist, Corinna Ren for this collaboration. Copyright 2022 by the City of Spokane.

Oliver is making his lunch for school. Jules came over to ask him if he wanted to walk to school together.

Then she noticed how much plastic and single use materials Oliver was using for his meal.

These two have been learning how important it is to take care of our planet.

"Everything in your lunch is wrapped in plastic!" said Jules.

"Yea, it's a lot of garbage isn't it? How do you make your lunch" Oliver asked.

"I'd love to show you! Want to come over to my house?"



"Sure thing," said Oliver, "but I forgot to put the bin out last night, and it has to be out by 7am, the garbage collector should be here any minute to empty it! Could you run out with me while I take it to the curb?"

"Okie dokie!" Jules replied. As the two of them walked outside to take the garbage bin to the curb, Oliver started to think about where all this garbage goes.

"I've always loved watching the garbage trucks. Watching the big arm grab the bin and dump it is so much fun. Sometimes I wonder though-what happens to all that garbage? One time-I heard that they just dump it into a big hole in the ground. Do you think that's true?" asked Oliver.

Do you know what each color bin is for?  
How about what goes inside  
each of them?



GARBAGE

Can you match the type of waste to each cart?

RECYCLE

YARD WASTE



3

Oliver was really interested about what Jules had learned, so she started to share with him, "we used to dump ALL our garbage into a big hole in the ground. BUT, here in Spokane, we have a waste to energy plant! My class just did a tour of the building and it was so much fun. But, I was pretty shocked to learn just how much garbage we throw away every day!

If we have a waste to energy plant, does that mean we don't have to worry about our garbage?

4



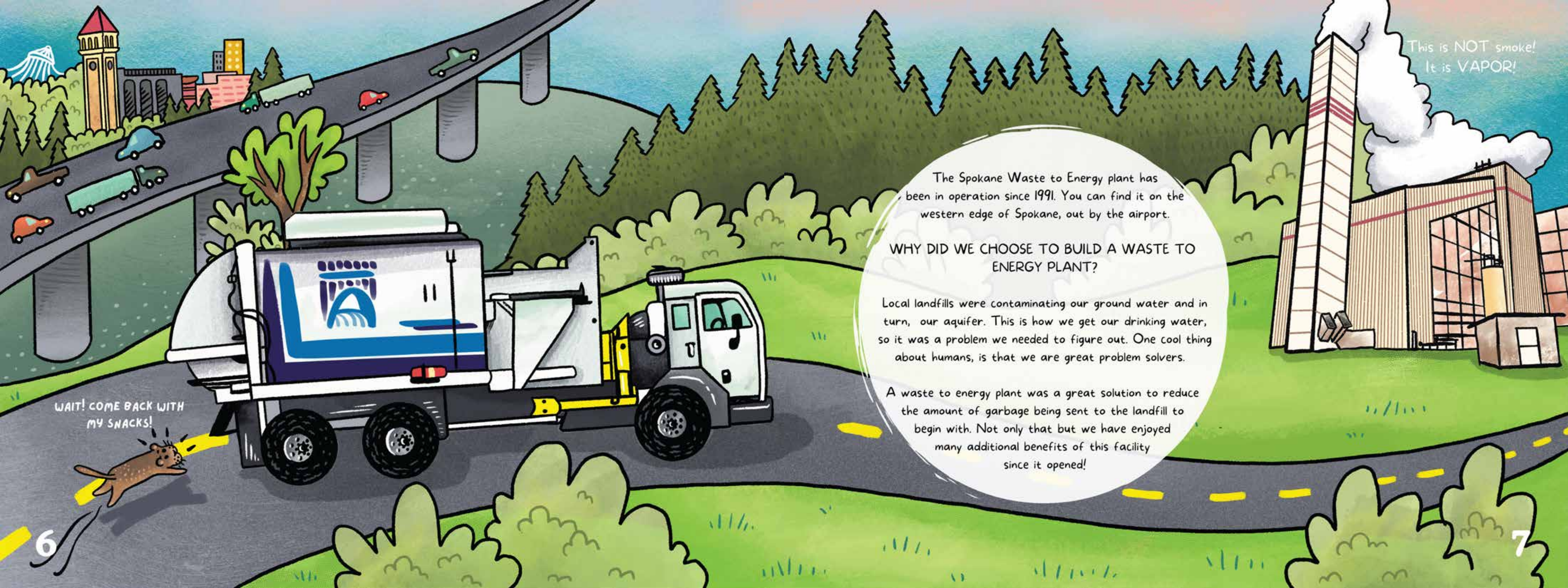
WHERE IS THAT TRUCK  
TAKING MY FOOD?

"Waste to  
Energy plant?"

The fact that Spokane had a Waste to Energy plant was new information for Oliver. He had so many questions for his friend. What does "waste to energy" mean?

How many Waste to Energy plants are there?  
Why do we still dump into a hole in the ground if we have a waste to energy plant?  
What do we use the energy from the plant for?

5



WAIT! COME BACK WITH  
MY SNACKS!

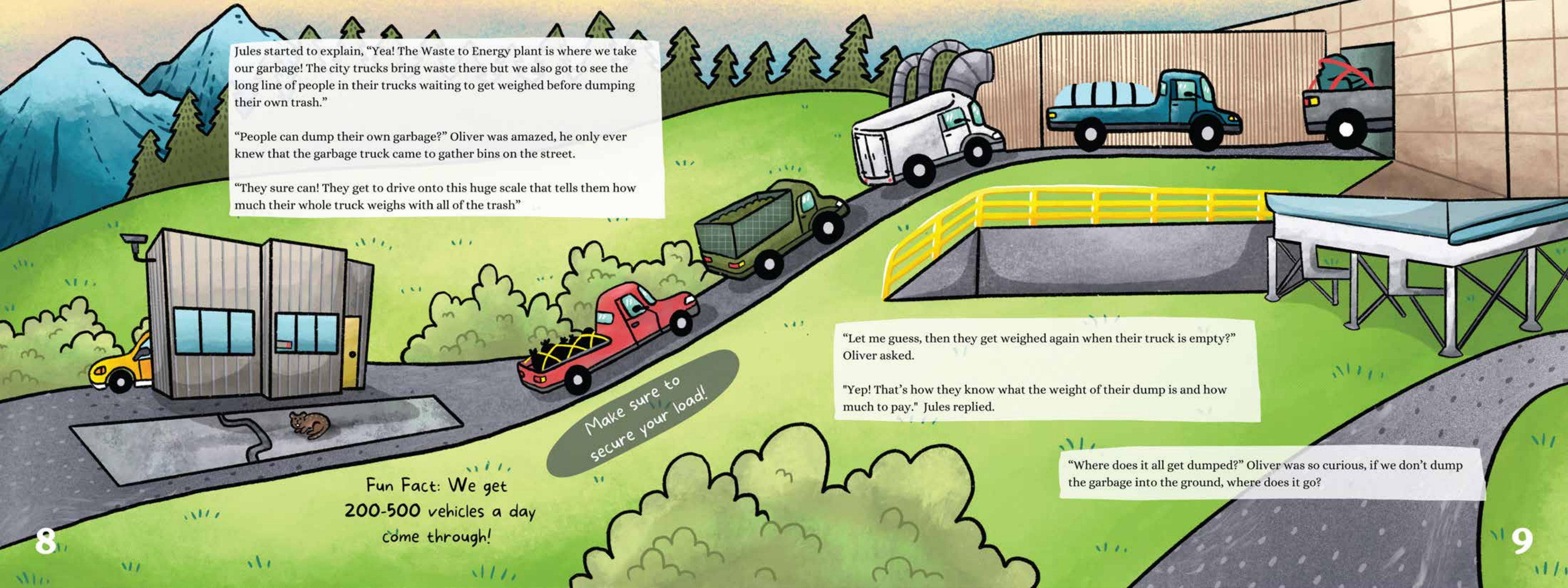
The Spokane Waste to Energy plant has  
been in operation since 1991. You can find it on the  
western edge of Spokane, out by the airport.

#### WHY DID WE CHOOSE TO BUILD A WASTE TO ENERGY PLANT?

Local landfills were contaminating our ground water and in  
turn, our aquifer. This is how we get our drinking water,  
so it was a problem we needed to figure out. One cool thing  
about humans, is that we are great problem solvers.

A waste to energy plant was a great solution to reduce  
the amount of garbage being sent to the landfill to  
begin with. Not only that but we have enjoyed  
many additional benefits of this facility  
since it opened!

This is NOT smoke!  
It is VAPOR!



Jules started to explain, "Yea! The Waste to Energy plant is where we take our garbage! The city trucks bring waste there but we also got to see the long line of people in their trucks waiting to get weighed before dumping their own trash."

"People can dump their own garbage?" Oliver was amazed, he only ever knew that the garbage truck came to gather bins on the street.

"They sure can! They get to drive onto this huge scale that tells them how much their whole truck weighs with all of the trash"

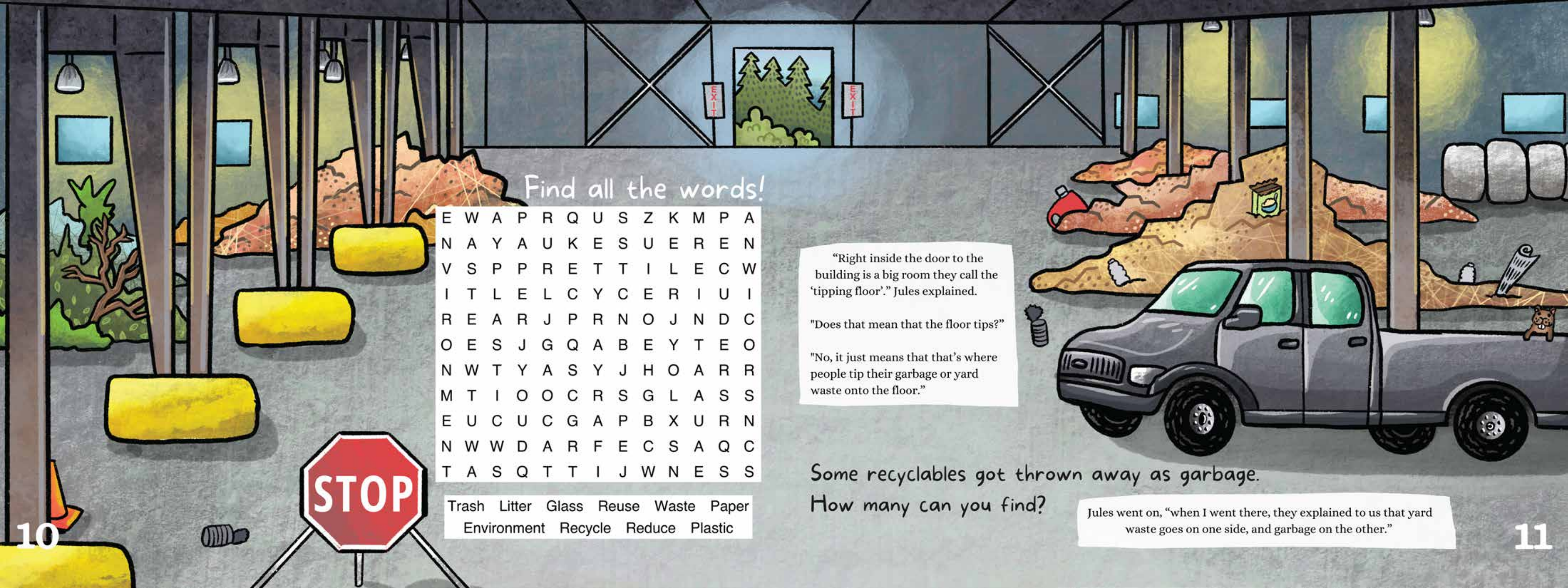
"Let me guess, then they get weighed again when their truck is empty?" Oliver asked.

"Yep! That's how they know what the weight of their dump is and how much to pay." Jules replied.

"Where does it all get dumped?" Oliver was so curious, if we don't dump the garbage into the ground, where does it go?

Fun Fact: We get  
200-500 vehicles a day  
come through!

Make sure to  
secure your load!



Find all the words!

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

Trash Litter Glass Reuse Waste Paper  
Environment Recycle Reduce Plastic

"Right inside the door to the building is a big room they call the 'tipping floor'." Jules explained.

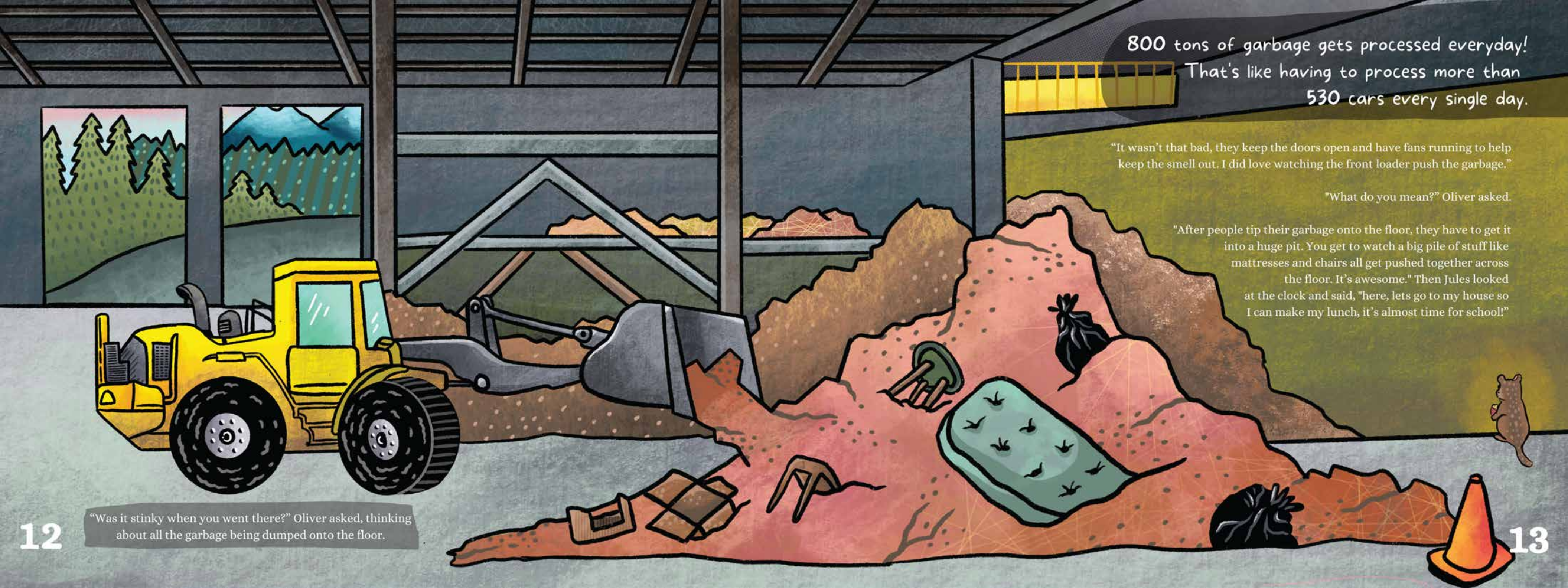
"Does that mean that the floor tips?"

"No, it just means that that's where people tip their garbage or yard waste onto the floor."

Some recyclables got thrown away as garbage.

How many can you find?

Jules went on, "when I went there, they explained to us that yard waste goes on one side, and garbage on the other."



800 tons of garbage gets processed everyday!  
That's like having to process more than  
530 cars every single day.

"It wasn't that bad, they keep the doors open and have fans running to help keep the smell out. I did love watching the front loader push the garbage."

"What do you mean?" Oliver asked.

"After people tip their garbage onto the floor, they have to get it into a huge pit. You get to watch a big pile of stuff like mattresses and chairs all get pushed together across the floor. It's awesome." Then Jules looked at the clock and said, "here, lets go to my house so I can make my lunch, it's almost time for school!"

"Was it stinky when you went there?" Oliver asked, thinking about all the garbage being dumped onto the floor.

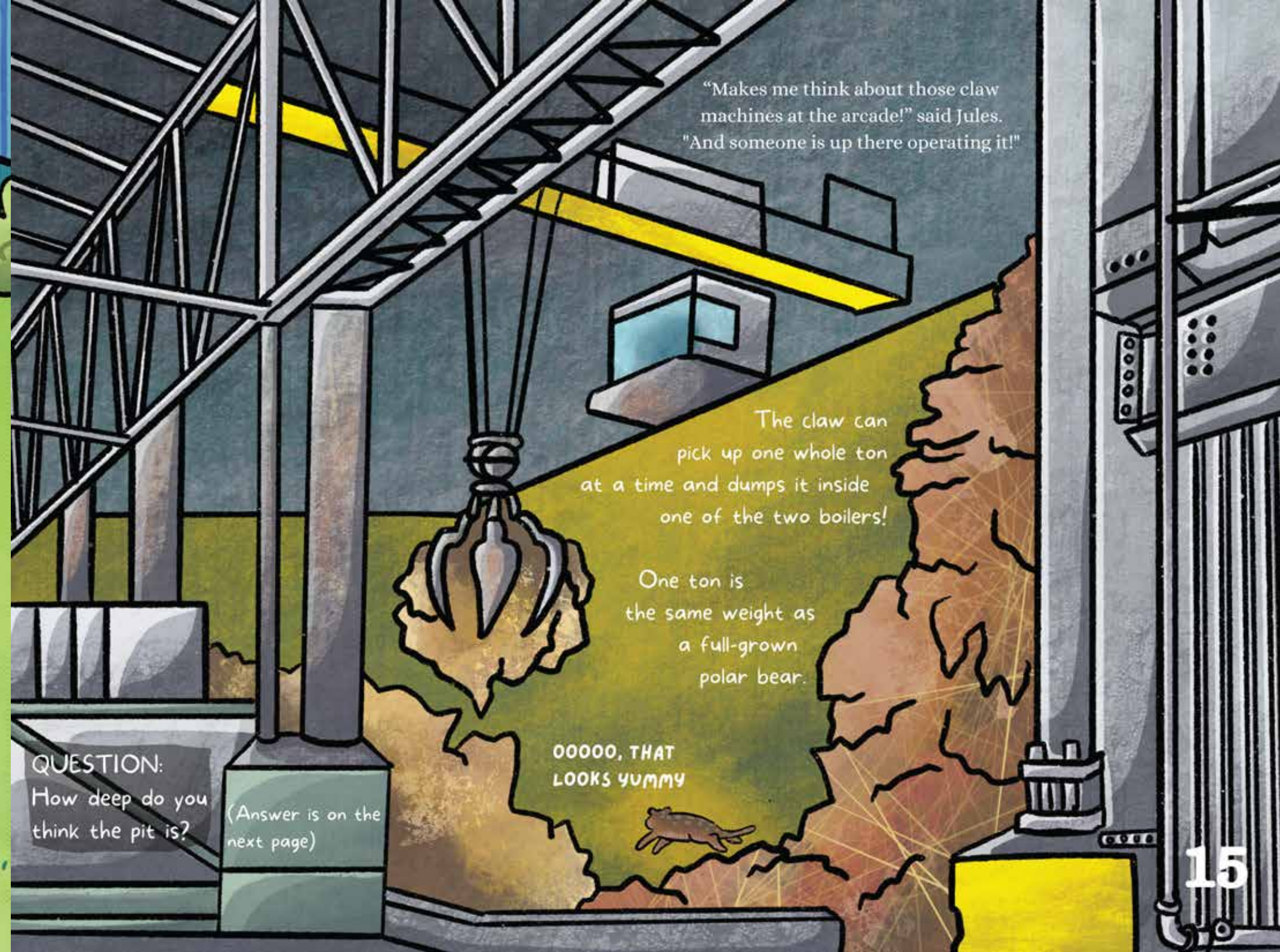




"What do they do with all the garbage in that huge pit" Oliver asked as Jules opened the door to her house.

"That's the best part!" Jules got excited, "they have a HUGE claw that can lift a whole TON of garbage at a time. They use it to lift the garbage and drop it into one of the boilers. That's where they burn it."

WOAH!  
Way cool!



"Makes me think about those claw machines at the arcade!" said Jules. "And someone is up there operating it!"

The claw can pick up one whole ton at a time and dumps it inside one of the two boilers!

One ton is the same weight as a full-grown polar bear.

OOOOO, THAT LOOKS YUMMY

QUESTION:  
How deep do you think the pit is?

(Answer is on the next page)

"I can't believe that someone actually gets to do that all day for their job!" Oliver exclaimed.

"It's way cool! It's also a huge responsibility. They have to make sure there aren't any fires on the floor. They also have to keep an eye out for things that can't go in the boiler." said Jules.

ANSWER:  
40 feet deep!

WHAT IS HAPPENING??

We make so much garbage,  
that this Waste to Energy  
plant runs 24/7

While they were talking, Jules started to get her lunch supplies together. "Check out my new stainless steel lunch kit my dad bought me for school! I can fit all kinds of things like my sandwich, fruit, veggies and even yogurt into them. What's cool, is that we just have to wash them and I can use them again tomorrow! No garbage."

"You have a cool thermos there too" Oliver noted.

"Thanks!" Jules said.

Let's take a look at the whole process inside the Waste to Energy plant!



Woah! HOT! The boiler gets up to 2000°F!

We condense the same water to do it again.

Warm air coming out collides with colder outer air and creates vapor

There's a lot going on inside the WTE Plant!

These cylinders work just like a vacuum or air purifier, it captures the particles from the air.

The air gets treated with lime to help clean it

Ferrous metals contain iron that attracts them to magnets!

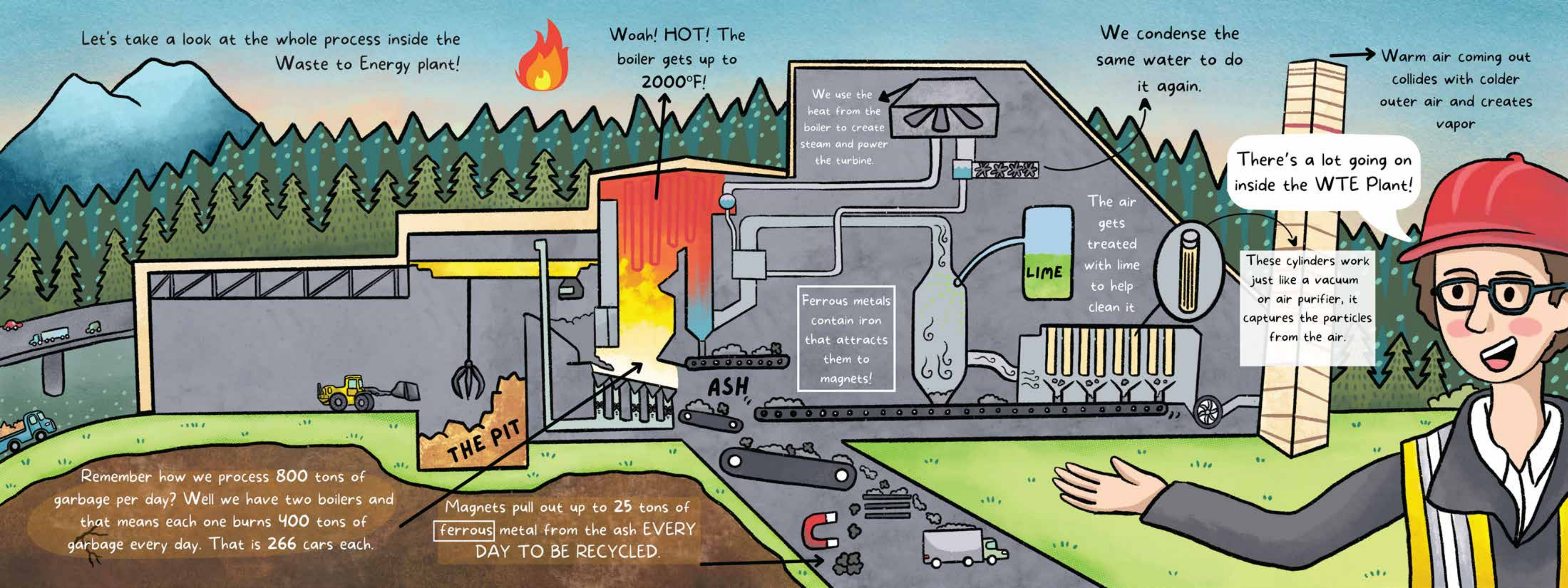
We use the heat from the boiler to create steam and power the turbine.

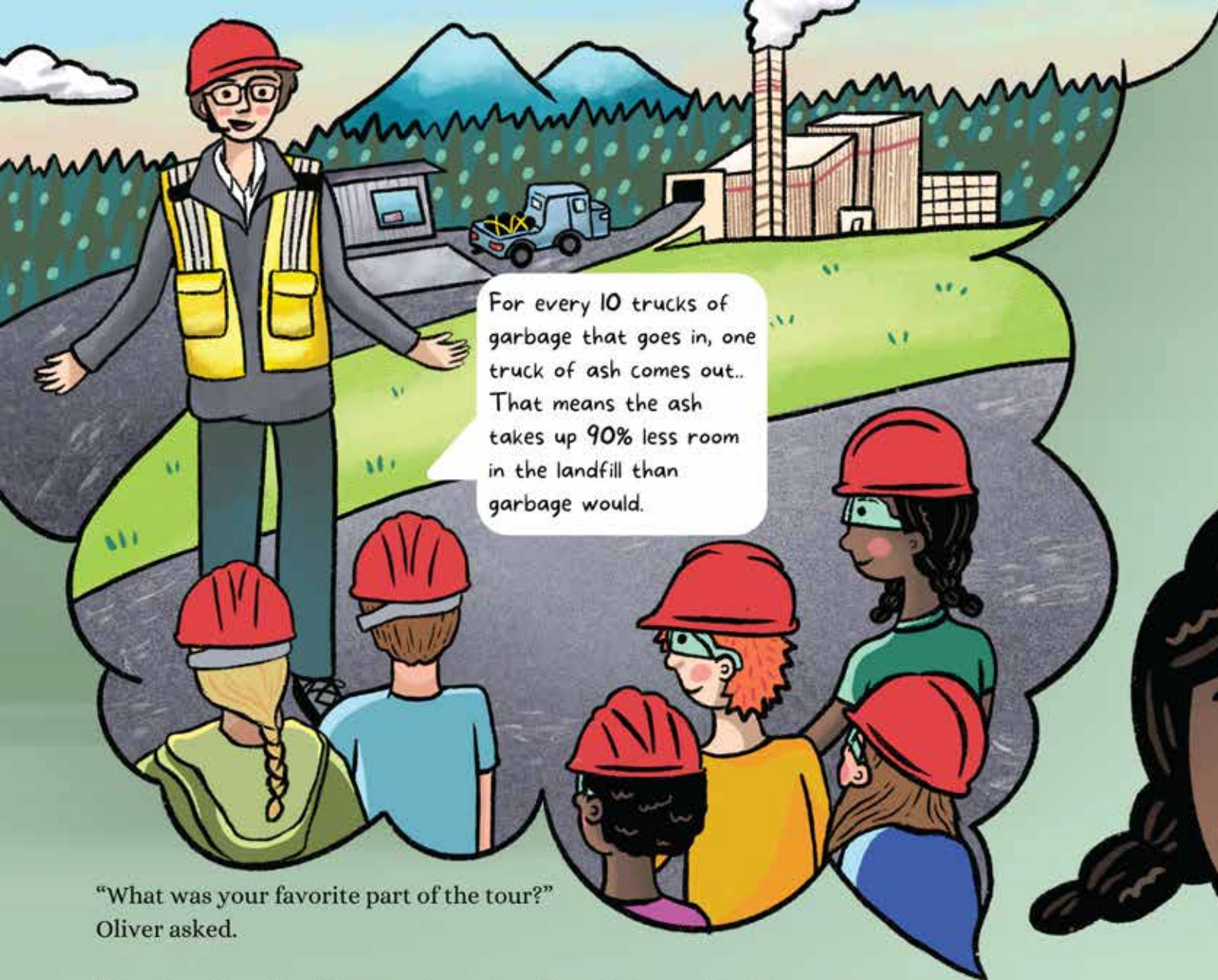
ASH

THE PIT

Remember how we process 800 tons of garbage per day? Well we have two boilers and that means each one burns 400 tons of garbage every day. That is 266 cars each.

Magnets pull out up to 25 tons of ferrous metal from the ash EVERY DAY TO BE RECYCLED.



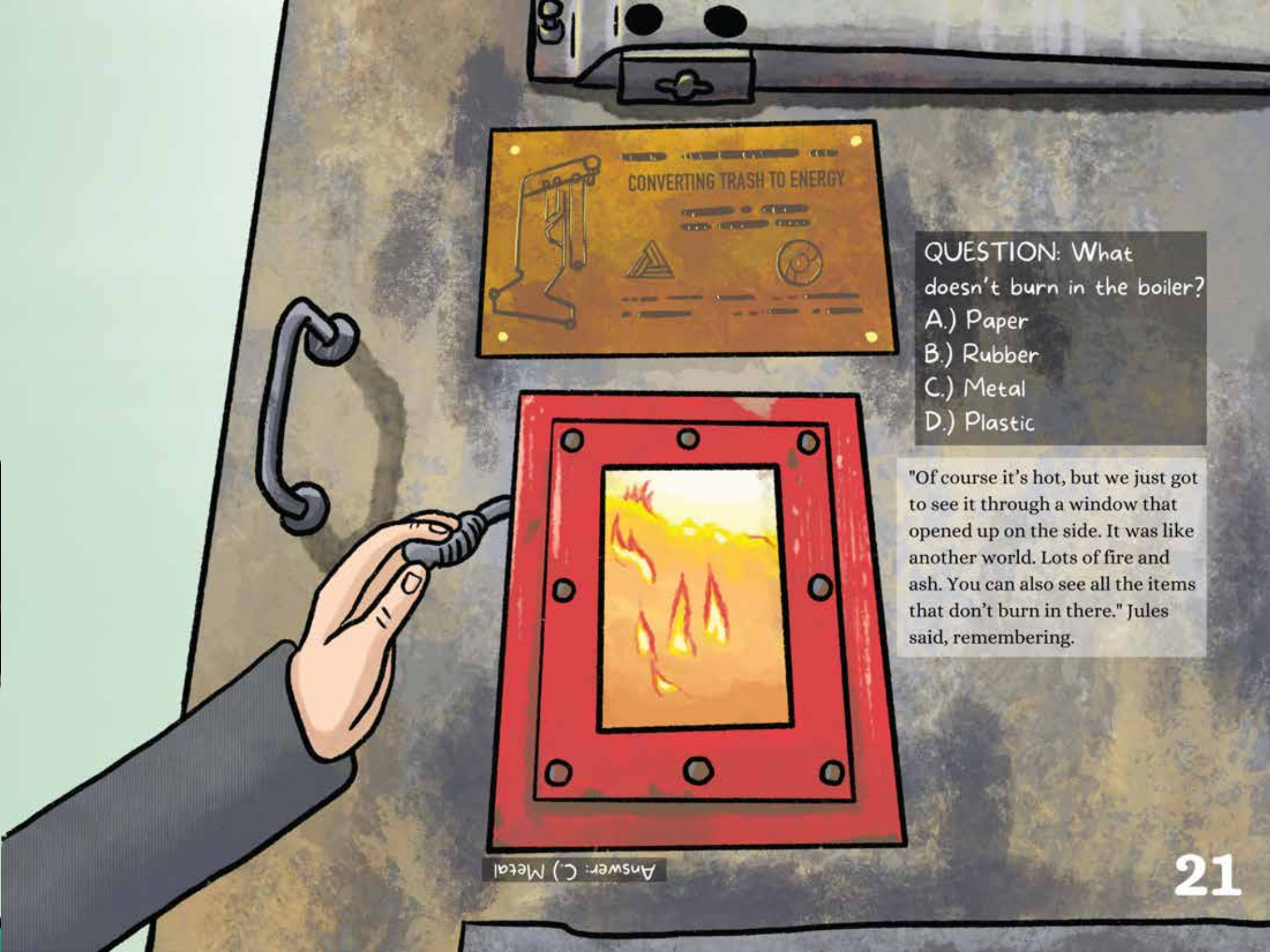


For every 10 trucks of garbage that goes in, one truck of ash comes out.. That means the ash takes up 90% less room in the landfill than garbage would.

"What was your favorite part of the tour?" Oliver asked.

"I had two favorites. One was the cool red hard hats we all got to wear, which made me feel very official. But I have to say, the coolest part was getting to see inside the boiler," said Jules.

"You got to see inside? Isn't it hot?" Oliver was surprised.

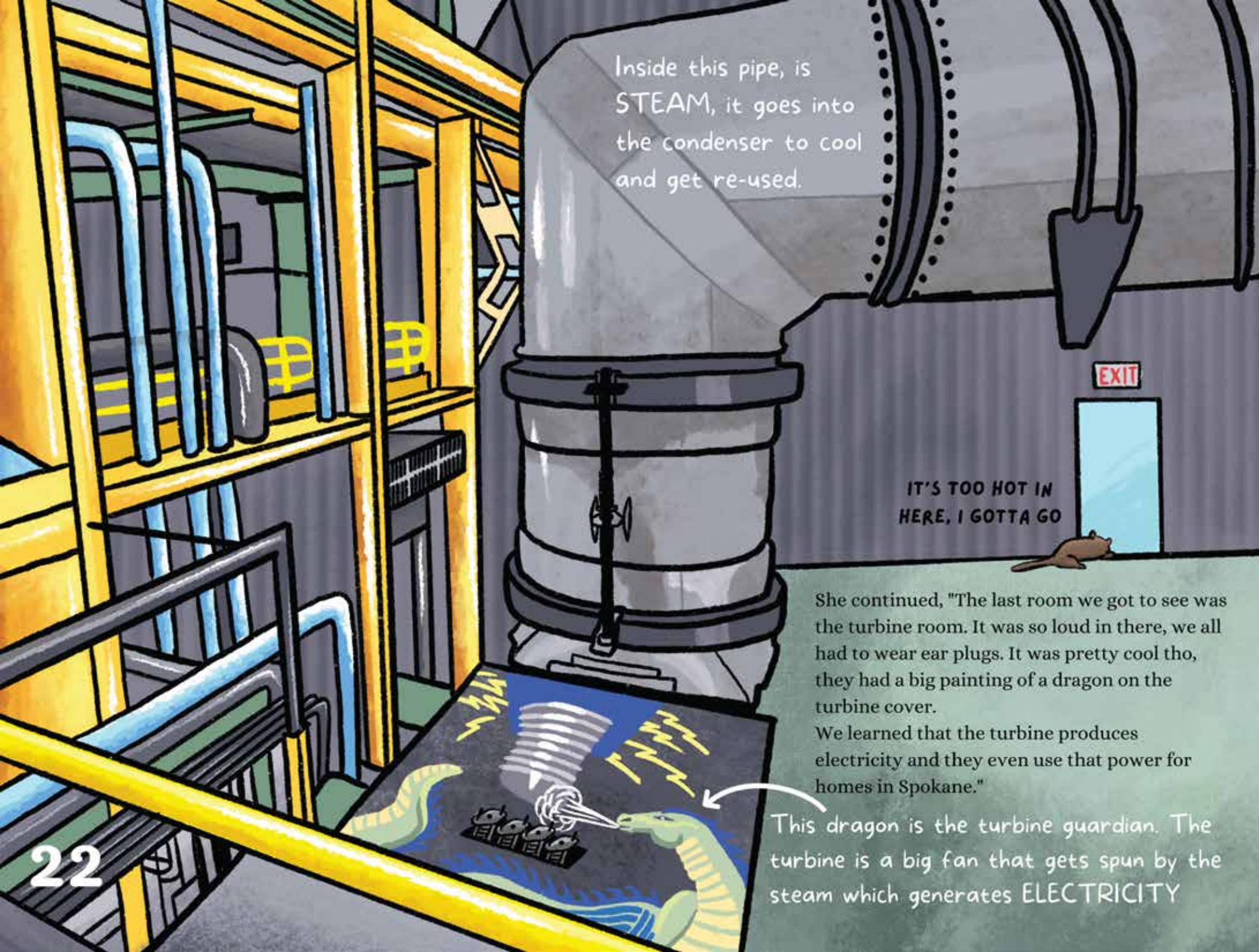


QUESTION: What doesn't burn in the boiler?

- A.) Paper
- B.) Rubber
- C.) Metal
- D.) Plastic

"Of course it's hot, but we just got to see it through a window that opened up on the side. It was like another world. Lots of fire and ash. You can also see all the items that don't burn in there." Jules said, remembering.

Answer: C.) Metal



Inside this pipe, is  
STEAM, it goes into  
the condenser to cool  
and get re-used.

IT'S TOO HOT IN  
HERE, I GOTTA GO

She continued, "The last room we got to see was the turbine room. It was so loud in there, we all had to wear ear plugs. It was pretty cool tho, they had a big painting of a dragon on the turbine cover. We learned that the turbine produces electricity and they even use that power for homes in Spokane."

This dragon is the turbine guardian. The turbine is a big fan that gets spun by the steam which generates ELECTRICITY



Our Waste to Energy  
plant actually powers  
13,000 homes a day!

"Does that mean my house is powered by garbage?" Oliver couldn't believe it!

"It might be!" Jules said matter of factly.

What items can be  
powered by garbage?

WELL, IT'S BEEN FUN!

"Do you think that our Waste To Energy plant solves our garbage problem?" Oliver asked?

"The problem is, that it isn't just how we deal with our garbage that matters, its how much of it we generate. The Waste to Energy plant still has a hard time keeping up with how much waste we throw away." said Jules.

"It's still pretty cool that we could come up with a system that helps us manage our waste locally," replied Oliver.

Jules agreed, "yes, but we have a lot of work to do yet. How we pack our lunches is just one small way we can help with our giant waste problem. Every day I try to come up with new ideas on how we can make things better."



"Me too," said Oliver thinking, "thanks for helping me today!"

"Of course!" said Jules.

"By the way," said Oliver, "I heard my class might be going to see the water department next month."

"Woah, make sure to let me know how that goes!" said Jules excitedly.

What are some other things you think we could do to produce less garbage?



# Fun Facts about the Plant!

The floor where all the trash is brought and dumped is 14 acres big. That's larger than a football field.

On the tipping floor, all the trash gets pushed into a pit that is 40 feet deep and 150 feet wide. It can hold up to 4,800 tons of garbage at one time, which seems like a lot, but is less than what Spokane generates in a week.

When burning trash, temperatures inside the boilers get up to 2,000 degrees Fahrenheit. The surface of the sun is over 9,000 degrees!

The Waste to Energy facility burns up to 800 tons of garbage a day in its two boilers. That is 1,600,000 pounds or the same weight as 182 Asian Elephants!

Each boiler uses up to 400 gallons of water per minute to make steam.

From burning that trash, 22 megawatts of electricity is produced which is enough to power more than 13,000 homes.

The stack (or chimney) where all the cleaned air from the boilers is released is 170 feet tall.

# Answer Pages

"Sure thing," said Oliver, "but I forgot to put the bin out last night, and it has to be out by 7am, the garbage collector should be here any minute to empty it! Could you run out with me while I take it to the curb?"

"Okie dokie!" Jules replied. As the two of them walked outside to take the garbage bin to the curb, Oliver started to think about where all this garbage goes.

"I've always loved watching the garbage trucks. Watching the big arm grab the bin and dump it is so much fun. Sometimes I wonder though-what happens to all that garbage? One time I heard that they just dump it into a big hole in the ground. Do you think that's true?" asked Oliver.

Do you know what each color bin is for?  
How about what goes inside each of them?

Can you match the type of waste to each cart?

**2**

Find all the words!

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

Trash Litter Glass Reuse Waste Paper  
Environment Recycle Reduce Plastic

**10**

"Right inside the door to the building is a big room they call the 'ripping floor'." Jules explained.

"Does that mean that the floor tips?"

"No, it just means that that's where people tip their garbage or yard waste onto the floor."

Some recyclables got thrown away as garbage.  
How many can you find?

Jules went on, "when I went there, they explained to us that yard waste goes on one side, and garbage on the other."

**11**

Our Waste to Energy plant actually powers 13,000 homes a day!

"Does that mean my house is powered by garbage?" Oliver couldn't believe it!

"It might be!" Jules said matter of factly.

What items can be powered by garbage?

WELL, IT'S BEEN FUN!

**23**

When Spokane, WA had a problem with water contamination from local landfills, a solution was needed. Join Oliver and Jules as they learn more about Spokane's Waste to Energy facility and the change it brought to how this city processes its waste. Follow along with our trouble making marmot friend as he explores the plant and Jules tells Oliver the story of touring the facility.

**CHALLENGE YOURSELF ALONG WITH OUR FRIENDS JULES AND OLIVER TO CONSIDER THE IMPACT OUR WASTE HAS ON OUR ENVIRONMENT AND WHAT CHANGES WE CAN MAKE TO REDUCE THAT IMPACT.**

