



Energy From Trash

Did you know that in Spokane County, we the WTE, there is only one truck of ash that is taken to a landfill. And, the ash does not create leachate. In fact, we have the only Waste to Energy (WTE) plant in Washington State.

Before the WTE plant was built in 1991, all of Spokane's garbage went to landfills located inside the county. This caused a big problem. The dirty juices leaking out of all that garbage, called **leachate**, began seeping into the **aquifer** where we get our drinking water. That had to stop and another way of dealing with garbage was studied. Instead of sending our garbage away to someone else's landfill, the solution was to build a WTE plant that would burn the garbage and make electricity.

If you have seen *Toy Story 3*, you know how part of this works. Tons of garbage are hauled to WTE every day and pushed into a pit. A claw then picks it up and feeds it into two boilers where it burns until there is nothing but ash. For every ten trucks of garbage that go to

So how is energy generated from the garbage? The heat from burning the garbage (over 2,000 degrees Fahrenheit) is used to boil water and make steam. The steam is pushed through a small pipe under high pressure (think blowing through a straw) and used to turn a **turbine**. As the turbine turns from the steam, it is connected to a **generator** that produces electricity.



Did you know? The WTE plant burns 800 tons of garbage a day and makes enough electricity for 13,000 homes across Spokane County! Wow!



Waste Water Energy

Another kind of waste is used to make energy. Wastewater treatment plants use bacteria to eat the solids we flush down the toilet. As they digest their food they produce methane, also called natural gas. Most treatment plants burn the natural gas to heat water they use to keep the bacteria warm and working hard. Other plants burn the natural gas to produce electricity, while also heating the water to keep the bacteria warm. The energy in the natural gas is used two ways at once.

Harness the Wind

Using the wind to create electricity has been around for a long time. You've probably seen windmills on farms. When the wind turns the blades of a windmill, it spins a turbine inside a small generator to produce electricity. Wind mills are like giant pinwheels!



A windmill on a farm can make only a small amount of electricity, enough to power a few farm machines. To make enough

electricity to serve lots of people, power companies build "wind farms" with dozens of wind turbines.

Wind farms are built in flat, open areas where the wind blows at least 14 miles per hour. When it comes to size, bigger is better - the bigger the wind turbine, the more wind it reaches and the more electricity it produces.

Wind farms can have as few as five wind turbines or as many as 5000. In Washington, there are several wind farms. One of the largest can be seen from I-90 east of Ellensburg and it's called the Wild Horse Wind Farm. It has 127 turbines. It is also one of the largest solar arrays in the state!

Community Calendar

10/24— **Fall Leaf Festival & Compost Fair**—Finch Arboretum 11am—2pm
FREE

11/15— **America Recycles Day**— **FREE**

Water Power

Dams are some of the largest structures ever built. Throughout history, big dams have prevented flooding, irrigated farmland, and generated tremendous amounts of electricity. Without



dams, modern life as we know it would simply not be the same. Washington has over 1100 dams, most of which generate hydro-electric power. Dam engineers have developed various types of dams to withstand the forces of a raging river. Here are a few:

Arch dams are good for narrow, rocky locations. They are curved, and the natural shape of the arch holds back the water in the reservoir. There are not very many of these in Washington, but one such arch dam is the Mossyrock Dam on the Cowlitz River, south of Olympia.

Embankment dams are the most commonly built dams in Washington and around Spokane County, like the Newman Lake Dam. They are made of earth and rock. They rely on their heavy weight to resist the force of the water.

Gravity dams are massive dams that resist the thrust of water entirely by their own weight. Most gravity dams, like the Grand Coulee Dam, are expensive to build because they require so much concrete, like buttress dams.

Fun Fact: Washington state is the leading producer of hydro-electric power. Grand Coulee Dam is the largest hydroelectric power producer in the country!



Make a Pinwheel! Email us a picture! You can earn 5 points!

Make a Pinwheel

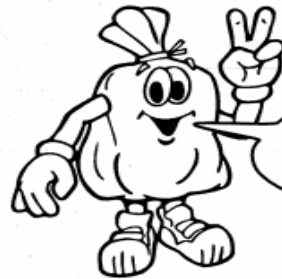


www.firstpalette.com

- * Construction paper
 - * Scissors
 - * Pencil with eraser
 - * Push pin
 - * Small beads
 - * Crayons
1. Cut construction paper into squares.
 2. Decorate each side of the paper
 3. Cut along the 4 diagonal lines—stopping about halfway from the center
 4. Gather the 4 corners to center without creasing
 5. Insert a push pin at the center. Add a bead and then push into a pencil's eraser. (Keep push pins out of young children's reach)
 6. Finally, try blowing at the edges of the pinwheel to make it spin. Enjoy!

Complete the activities and mail it back to us. Earn 5 points!

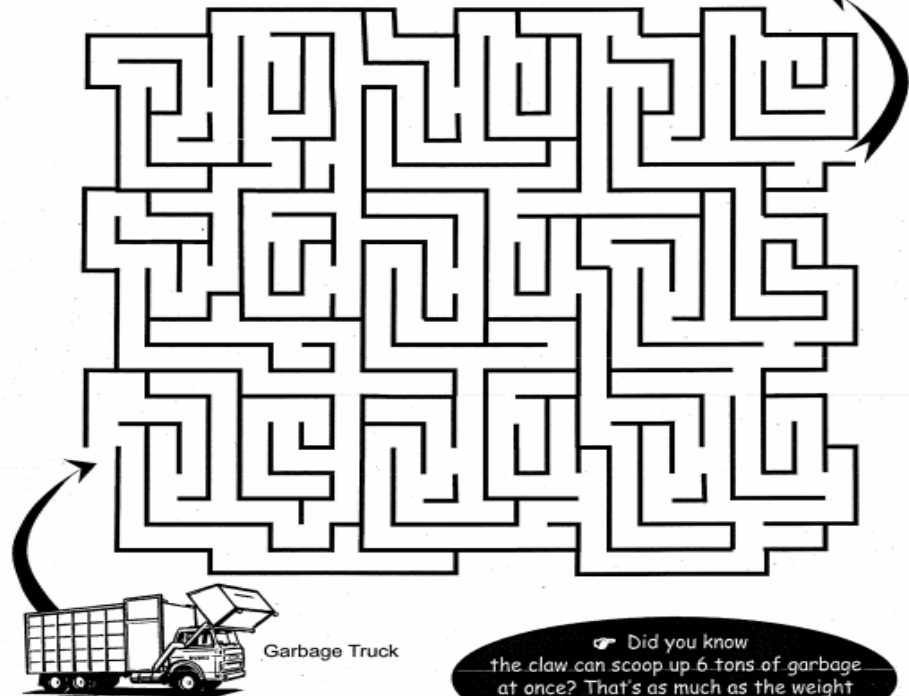
Garbage to Claw Maze



Take the garbage truck to the tipping floor at the Waste-to-Energy Plant.



Metal Claw above Tipping Floor



Garbage Truck

Did you know the claw can scoop up 6 tons of garbage at once? That's as much as the weight of two full sized pickup trucks!

Water Power



Complete the word search! Find all 11 underlined words from the Water Power article.

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



EnviroKids' Club

EnviroKids' Club
c/o City of Spokane Solid Waste Disposal Dept.
2900 S. Geiger Blvd.
Spokane, WA 99224

PRSR STD
U.S. Postage
PAID
Spokane, WA
Permit No. 722

**See inside for
Activity Details!**

Members can earn 5 points
by completing each special
EnviroKids' activity that is
marked with a gold star!

EnviroKids'... caring for the Earth

EnviroKids' Club provides its 200+ members with information and activities to explore aspects of the environment: air, water, weather, garbage and recycling, plants and animals. The Club is open to all Spokane County residents who are in grades K-6.

Club members receive a newsletter in the mail four times a year. The newsletter contains activities to complete and ideas for activities at home or in the community. Members who are interested can complete activities and/or participate in some of the events to earn points. Earned points can then be used to trade-in for prizes. **Members need to participate in at least one activity per year to receive newsletters.** For more information,

visit www.spokaneenvirokids.org.

To earn points, mail the completed activities page and this page by January 31, 2016 to:

**EnviroKids' Club c/o National Weather Service
2601 N. Rambo Rd. Spokane, WA 99224**

Complete the activities in the newsletter, fill in this form and send it back to us to earn your points! Do you have a friend or sibling who would like to join Envirokids' Club? Copy this page for them to send in and be added to our mailing list.

Name: _____ Age: _____ Grade: _____ School: _____

Home Mailing Address: _____ City: _____ Zip Code: _____

E-mail Address: _____ Phone: _____

My child has permission to participate in EnviroKids' Club activities that I accompany him/her to and permission is granted to use his/her photo that may be taken at such event, for promoting the Club (newsletter, flyers, ads, website, etc.)

Parent Signature. Please print name, then sign and date

EnviroKids' Club Partners: National Weather Service, Spokane County Water Resources, Spokane County Stormwater, Spokane Conservation District, City of Spokane Water Department, City of Spokane Solid Waste Disposal Department and Spokane County Regional Solid Waste System

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