

Recycling Lessons and Activities for Students

**America Recycles Day Washington
November 15**

For more information contact:

**Jo Meints
Solid Waste Education and Outreach
Kitsap County Public Works
614 Division St, MS-27
Port Orchard, WA 98366
360-337-5777**

jmeints@co,kitsap.wa.us or www.kitsapgov.com/sw

Teachers!

Get your students involved in America Recycles Day Washington!

This booklet contains activities involving:
waste reduction, reuse, recycling, composting, and buying
recycled content products.

Resources, Lessons, and Recycling Activities

Reference Materials

- Reading List
- Vocabulary Words
- Web Page Resource Information
- Gee Whiz Facts
- To Make A Ton, You Would Need...

Activity Pages

- I Think...
- Break the Code
- Math Problems
 - Sum It Up! – Easy
 - Math the Coded Message – Moderate
 - You Do the Math - Hard
- Is It Renewable?
- Uncle Sam Needs You!
- Word Jumble
- Crossword Puzzle
- Word Search-easy
- Word Search-moderate
- Answers to activities



Reading List

There are many great books available for students to read on recycling, composting, and worm bins. These are just a few. This list is not meant as an endorsement.

Teacher Guides

Arnold Grummer's Complete Guide to Easy Papermaking. *Arnold Grummer.* Krause Publications. Published 1999. Creative guide to papermaking. Directions to make necessary equipment and paper from household items. Variety of recipes and techniques.

Compost Critters. *Bianca Lavies.* Dutton Children's Books. Published 1993. Describes what happens in a compost pile and how creatures, from bacteria and mites to millipedes and earthworms, aid in the process of turning compost into humus.

Compost! Growing Gardens From Your Garbage. *Linda Glaser.* Millbrook Press. Published 1996. Aimed at young children, this picture book describes what composting is, what it does, and how to go about it.

Crafts from Recyclables: Great Ideas from Throwaways. *Colleen Van Blaricom.* St. Martin's Press. Published 1992. Instructions for making a variety of objects from household discards. Items to reuse include egg cartons, plastic soda bottles, paper bags, and more.

Earth Friendly Holidays: How to Make Fabulous Gifts and Decorations From Reusable Objects. *George Piffner.* John Wiley & Sons. Published 1995. Thirty activities with step by step instructions and illustrations to ensure success. From Halloween to Kwanza, Earth Day to Mother's Day create your own holiday magic. Important facts and tips to save our environment through recycling.

Ecoart! Earth Friendly Art and Craft Experiences for 3-9 Year Olds (Kids Can Series). *Laurie Carlson.* Williamson Publishing. Published 1992. Presents art and craft projects that benefit the environment through such activities as recycling.

Use Less Stuff: Environmental Solutions for Who We Really Are. *Robert M. Lilienfeld, William L. Rathje.* Fawcett Books. Published 1998. Examines the case that recycling has its limits and will not truly solve all the problems of waste production and resource depletion. Guide to reduce consumption coupled with creative reuse of materials.

Worms Eat My Garbage. *Mary Appelhof.* Flowerfield Press. Published 1997. How to set up and maintain a worm composting system.



Kid's Books

Garbage. Robert Maass. Henny Holt & Company. Published 2000. Photo essay about garbage from its creation and curbside collection to transportation and treatment. Explanations are short, clear, and simple.

Garbage Collectors (In My Neighborhood). Paulette Bourgeois. Kids Can Press. Published 1998. Garbage collectors answer children's questions as they work their daily route. A discussion of the role children can play in caring for the environment and gives simple examples of conservation efforts.

Herman and Marguerite: An Earth Story. Jay O'Callahan. Peachtree Publishing. Published 1996. An earthworm and a caterpillar become friends and work together to bring a neglected orchard back to life.

Inch by Inch. Leo Lionni. Mulberry Books. Published 1995. To keep from being eaten, an inchworm measures a robin's tail, a flamingo's neck, a toucan's beak, a heron's leg, and a nightingale's song in this picture book.

Just A Dream. Chris VanAllsburg. Houghton Mifflin. Published 1990. A little boy couldn't care less about the environment until a nightmare about the future with landfills buying neighborhoods drastically changes his viewpoint on his behaviors.

The Lorax. Dr. Seuss. Random House. Published 1971. This book shows what happens when we deplete our natural resources.

Recycle: A Handbook for Kids. Gail Gibbons. Little Brown and Company. Published 1996. Explains the process of recycling from start to finish and discusses what happens to paper, glass, aluminum cans, and plastic when they are recycled into new products.

Where Does The Garbage Go? (Let's-Read-And-Find-Out Science, Stage 2). Paul Showers, et al. Harpercollins. Published 1994. Follow the garbage truck to the landfill and the incinerator. Visit the recycling center to see how materials are recycled.

Wonderful Worms. Linda Glaser. Millbrook Press. Published 1992. Describes the physical characteristics, behavior, and life cycle of the common earthworm in beautiful pictures and easy to read print.



Vocabulary Words

Air (n) – an odorless, colorless, tasteless mixture of gases that surround the earth. Every form of life is dependent on air for survival.

Aluminum (n) – lightweight, silver-white metallic element that makes up about 7% of the earth's crust. Used to manufacture soft drink cans.

America Recycles Day Washington (proper n) - a time to celebrate and learn about waste reduction, reuse, recycling, composting, and buying recycled products and packaging. An earth day for recycling.

Ash (n) – solid residue that remains after something has been completely burned

Bauxite (n) – a rock in which aluminum is found in high concentration

Biodegradable (adj) - material that can be broken down naturally by microorganisms into simple, stable compounds

BTU (British Thermal Unit) - measurement of the amount of heat needed to raise the temperature of one pound of water by one degree Fahrenheit at or near 39.2° F

Buy Recycled (concept) - purchasing products and packaging made from post-consumer materials, also known as Closing the Loop

Cardboard (n) – a thin stiff material made of paper pulp used in making cartons and other forms of packaging

Compost (n) – decomposed organic material used to enrich or improve the soil for growing

Conservation (v) – protection of or wise use of natural resources such as forests, rivers, and fuels to ensure their continuation

Contaminate (v) – to make impure or unsafe

Curbside recycle (n) – the process of placing items to be recycled at the street for pick up

Decompose (v) - to break down into component parts or basic elements by the action of living things or microorganisms

Drop-off facility (n) – refers to a method of collection where recyclable or compostable materials are taken by individuals to a collection site to be placed in designated containers

Dump (n) – common name for an unlined landfill or place to dispose of trash, a site used to dispose of solid waste, replaced with regulated sanitary landfills



Ecosystem (n) – the study of the relationships of living things

Energy (n) – capacity for an object or a system to do work. Coal and oil are sources of energy because the heat given off when they are burned can be used to perform work.

Environment (n) - the natural world around us including the air, water, land, animals, plants, etc.

Fuels (n) – substances consumed to produce energy such as wood, coal, gas, or oil

Garbage (n) – any material considered worthless, unnecessary, or offensive usually thrown away

Glass (n) – hard brittle, usually transparent material. Most commercial glass is made from a liquid mixture of soda ash, sand, and lime.

Global warming (n) – the progressive gradual rise of the Earth’s surface temperature reportedly caused by the burning of fossil fuels and industrial pollutants. Global warming may be responsible for changes in global climate patterns

Landfill (n) - secure site for the environmentally sound burial of solid waste

Litter (n or v) - is unsightly, unsanitary, unappealing, can be hazardous and degrades the quality of our lives by degrading the environment. Litter is generated by many sources including:

- improper garbage collection - blowing garbage and spillage during collection
- uncovered or inadequately covered trucks and other vehicles transporting materials
- illegal disposal of solid waste
- pedestrians discarding trash
- motorists discarding trash

Metal (n) – an element that usually has a shiny surface, is a good conductor of heat and electricity, and can be melted down, fused, or hammered. This includes iron, tin, and aluminum.

Microorganism (n) - organisms that are too small to be seen with the naked eye

Natural Resources (n) - naturally occurring items such as plants, animals, minerals, water, air, etc. which can be used to help make things for people

Nonrenewable Resources (n) – natural materials that are considered finite or exhaustible because of their scarcity, the great length of time required for their formation, or their depletion



Ore (n) – collection of minerals or rock that contains a high concentration of a metal or mineral

Organic (adj) - derived from living organisms or having a carbon base

Paper (n) – thin material made from the pulp of wood, rag, or other fibrous material used for writing, printing, or wrapping

Petroleum (n) – dark, oily, flammable liquid found in the earth crust. Gasoline is made from petroleum.

Plastic (n) – material made from petroleum capable of being molded. There are many different kinds of plastic made from different combinations of organic or petroleum compounds.

Pollution (n) – contamination of soil, water, or air by the discharge of potentially harmful substances

Post-Consumer (adj) - describing materials that are collected for recycling after having been purchased by a consumer, that would have otherwise gone to a landfill or incinerator

Pre-Consumer (adj) - describing materials that are diverted from the waste stream that are generated during the manufacturing process

Raw Material (n) – unprocessed natural substances such as wood and metals used in the manufacture of products

Recycle (v) – process of collecting materials from the waste stream and separating them by type, remaking them into new products and marketing and reusing the materials as new products

Reduce (v) - preventing or not making waste

Red wigglers (redworms) (n) – these worms, deep maroon in color, thrive only in manure compost or garbage and are rarely found in ordinary soil

Renewable Resource (n) – naturally occurring raw material from an endless source such as the sun, wind, falling water (hydroelectric), trees. With proper management and wise use, these resources can be replaced by natural or human-assisted systems.

Reuse (v) - using something over and over again for the same or different purpose

Steel (n) – strong durable material made of iron and carbon. Often used to make cans coated with tin and construction materials

Tin (n) – soft silver-white metallic element capable of being easily molded. Typically used with other metals to make cans.

Transfer station (n) – refers to the facility where solid waste is transferred from collection vehicles to larger trucks or rail cars for longer distance transport



Trash (n) – material considered worthless, unnecessary, or offensive that is usually thrown away

Vermicompost (n) – the process of having redworms and other decomposer organisms process our organic waste and turn it into a great natural fertilizer

Waste (n) – garbage, material that has been discarded because it has worn out, is used up, or is no longer needed

Waste Stream (n) - the entire process that solid waste goes through from generation to disposal or recycling

Yard Waste (n) - leaves, grass clippings, and other organic materials that are collected from yards



Web Page Resource Information

This list does not imply any official endorsement of products or information contained on these sites.

Air Quality	www.pscleanair.org
Aluminum	www.consrv.ca.gov/dor/rre/index.htm
America Recycles Day	www.americarecyclesday.org
Compost	www.mastercomposter.com www.howtocompost.org/
Environmental Education	www.eeaw.org
Garbage	www.learner.org/exhibits/garbage/intro.html
General Recycling	www.kitsapgov.com/sw/default.htm www.consrv.ca.gov/dor/rre/index.htm
Glass	www.gpi.org
Kitsap County Solid Waste	www.kitsapgov.com/sw
Paper, Etc.	www.afandpa.org
Plastics	www.plasticsresource.com
Steel and Tin	www.recycle-steel.org www.recycleroom.org
USEPA	www.epa.gov/kids www.epa.gov/recyclecity/first.htm
Waste Reduction	www.pbs.org/kcts/affluenza/ www.use-less-stuff.com
Worms	http://yucky.discovery.com/flash/worm/



Gee Whiz Facts

These savings are based on the use of recycled materials over raw materials

Recycling Steel Saves...

- Recycling one pound of steel saves enough energy to light a 60-watt light bulb for 26 hours
- Recycling one ton of steel saves 2,500 pounds of iron ore, 1,000 pounds of coal, and 40 pounds of limestone
- Recycling steel saves 40% of the water used to make steel from ores
- Recycling steel reduces air pollution by 86%
- Recycling steel reduces water pollution by 76%
- Steel cans take 80-100 years to decompose
- All steel products are 100% recyclable

Recycling Aluminum Saves...

- Recycling aluminum reduces energy use by 90%
- Energy saved from recycling one aluminum can will run a TV for 3 hours
- Recycling one aluminum can saves the energy equivalent of one cup of gasoline
- Recycling aluminum reduces air pollution by 95%
- An aluminum can takes 200-500 years to decompose
- Each pound of aluminum makes 32 cans

Recycling Paper Saves...

- Every ton of paper recycled saves 380 gallons of oil
- Recycling one ton of paper saves 17 trees
- Recycling paper reduces air pollution by 74%
- Recycling paper reduces water pollution by 35%
- You use on average 580 pounds of paper each year
- The typical office worker throws away 180 pounds of high grade recyclable paper every year
- Over 500,000 trees are used to supply Americans with their Sunday newspaper every week
- Paper takes about 1 month to decompose



Recycling Plastic Saves...

- Five recycled 2-liter PET bottles make 1 square foot of carpet
- PET bottles and containers are actually a form of polyester which is why it is easy to recycle bottles into T-shirts, sweaters, and socks
- Thirty-five 2-liter recycled PET bottles make the soft filling inside a sleeping bag called fiberfill
- About 1,200 soda bottles could carpet the average living room
- Plastic makes up 8% of our trash by weight, but is 24% of the volume

Recycling Glass Saves...

- Approximately 41 billion glass containers are produced in the US each year
- For glass companies, recycling extends furnace life and reduces energy costs
- Recycling one glass bottle saves enough energy to light a 100 watt bulb for 4 hours
- Recycling a ton of glass saves the equivalent of 9 gallons of fuel oil
- Since glass does not degrade, a bottle thrown in a landfill today will still be around in the year 3000
- Each glass container produced in the US contains about 30% recycled glass
- Glass is 100% recyclable

Composting Saves...

- Yard waste make up about 20% of the waste stream, nearly 230 pounds per person a year
- Food waste makes up about 9% of the waste stream, nearly 100 pounds per person a year
- Composting improves the soil
- Composting prevents fertilizer runoff

Reducing, Reusing, Recycling, and Composting Saves...

- Energy
- Landfill space
- Natural resources
- Clean air by making less pollution (than if using raw, virgin materials)

Buying Recycled...

- Closes the Loop so that we actually use the products and packaging that are made from recycled materials



To Make A Ton, You Would Need....

Making a ton of something (2,000 pounds) takes a lot of materials. Many times we can use raw materials or recycled materials to make the same items. By looking at the difference between two ways of making something, we learn how our environment is helped or hurt by our decisions.

To Make a Ton of Paper...

We Use These Raw Materials

3,688 pounds of wood
216 pounds of lime
360 pounds of salt cake
76 pounds of soda ash
24,000 gallons of water
28 million BTUs of energy

We Would Have to Treat and Dispose of:

84 pounds of air pollutants
36 pounds of water pollutants
176 pounds of solid waste

Resources Saved by Recycling One Ton of Newspaper...

- The equivalent of 17 trees
- Conserves 2 - 3 cubic yards of landfill space

To Make a Ton of Glass...

We Use These Raw Materials

1,330 pounds of sand
433 pounds of soda ash
433 pounds of limestone
151 pounds of feldspar
15.2 million BTUs of energy

We Would Have to Treat and Dispose of:

384 pounds of mining wastes
8 pounds of air pollutants

Resources Saved by Recycling Glass...

If we use a mixture of ½ recycled glass and ½ raw materials we reduce:

- Water consumption by 50%
- Mining wastes by 79%
- Air pollutants by 14%



I Think....

The best thing about recycling is _____

I recycle _____

I wish I could recycle _____

Throwing away recyclables _____

My favorite thing to recycle is _____

My school recycles _____

I promise not to litter because _____

Other things I do to help my environment are _____



Sum It Up

Solve the problems and put the right letter in the blank.
What is the message

$4 + 3 = \underline{\hspace{2cm}} \text{ R}$

$5 - 3 = \underline{\hspace{2cm}} \text{ T}$

$7 + 2 = \underline{\hspace{2cm}} \text{ C}$

$10 - 6 = \underline{\hspace{2cm}} \text{ L}$

$6 - 1 = \underline{\hspace{2cm}} \text{ Y}$

$9 - 8 = \underline{\hspace{2cm}} \text{ I}$

$4 + 2 = \underline{\hspace{2cm}} \text{ K}$

$2 + 6 = \underline{\hspace{2cm}} \text{ E}$

$8 - 5 = \underline{\hspace{2cm}} \text{ O}$

1 4 1 6 8 2 3
7 8 9 5 9 4 8 !



Math – The Coded Message

Can you decode the message?

Solve the problems then find the letter in the key that matches the answer in the message.

$24 + 34 = \underline{\hspace{2cm}} i$

$53 - 38 = \underline{\hspace{2cm}} l$

$16 + 7 = \underline{\hspace{2cm}} k$

$91 - 39 = \underline{\hspace{2cm}} d$

$33 + 32 = \underline{\hspace{2cm}} n$

$77 - 65 = \underline{\hspace{2cm}} e$

$19 + 3 = \underline{\hspace{2cm}} o$

$91 - 15 = \underline{\hspace{2cm}} p$

$42 + 21 = \underline{\hspace{2cm}} c$

$34 - 15 = \underline{\hspace{2cm}} r$

$11 + 7 = \underline{\hspace{2cm}} f$

$88 - 41 = \underline{\hspace{2cm}} s$

$17 + 22 = \underline{\hspace{2cm}} g$

$52 - 25 = \underline{\hspace{2cm}} a$

$53 + 39 = \underline{\hspace{2cm}} t$

$72 - 31 = \underline{\hspace{2cm}} b$

$47 + 26 = \underline{\hspace{2cm}} u$

$63 - 47 = \underline{\hspace{2cm}} y$

$\frac{\hspace{1cm}}{52}$ $\frac{\hspace{1cm}}{22}$ $\frac{\hspace{1cm}}{65}$ $\frac{\hspace{1cm}}{92}$ $\frac{\hspace{1cm}}{18}$ $\frac{\hspace{1cm}}{22}$ $\frac{\hspace{1cm}}{19}$ $\frac{\hspace{1cm}}{39}$ $\frac{\hspace{1cm}}{12}$ $\frac{\hspace{1cm}}{92}$ $\frac{\hspace{1cm}}{92}$ $\frac{\hspace{1cm}}{22}$

$\frac{\hspace{1cm}}{41}$ $\frac{\hspace{1cm}}{73}$ $\frac{\hspace{1cm}}{16}$ $\frac{\hspace{1cm}}{19}$ $\frac{\hspace{1cm}}{12}$ $\frac{\hspace{1cm}}{63}$ $\frac{\hspace{1cm}}{16}$ $\frac{\hspace{1cm}}{63}$ $\frac{\hspace{1cm}}{15}$ $\frac{\hspace{1cm}}{12}$ $\frac{\hspace{1cm}}{52}$

$\frac{\hspace{1cm}}{76}$ $\frac{\hspace{1cm}}{19}$ $\frac{\hspace{1cm}}{22}$ $\frac{\hspace{1cm}}{52}$ $\frac{\hspace{1cm}}{73}$ $\frac{\hspace{1cm}}{63}$ $\frac{\hspace{1cm}}{92}$ $\frac{\hspace{1cm}}{47}$!



You Do the Math

The reasons to recycle really add up.
Crack the code to figure out why.

$6/8 - 9/12 =$ _____ a
 $106 - 99 =$ _____ d
 $3 \times 4 =$ _____ g
 $7 + 7 + 8 =$ _____ i
 $77 \div 7 =$ _____ y
 $5 + 7 + 3 + 8 =$ _____ v
 $4 \times 4 =$ _____ s
 $84 \div 42 =$ _____ r
 $2 + 5 + 6 + 4 =$ _____ o

$75 \div 3 =$ _____ c
 $32 \div 4 =$ _____ e
 $75 \div 15 =$ _____ h
 $36 \div 12 =$ _____ l
 $36 \times \frac{1}{2} =$ _____ w
 $31 - 18 =$ _____ u
 $42 \div 2 =$ _____ t
 $91 - 87 =$ _____ n
 $3 \times 3 =$ _____ p

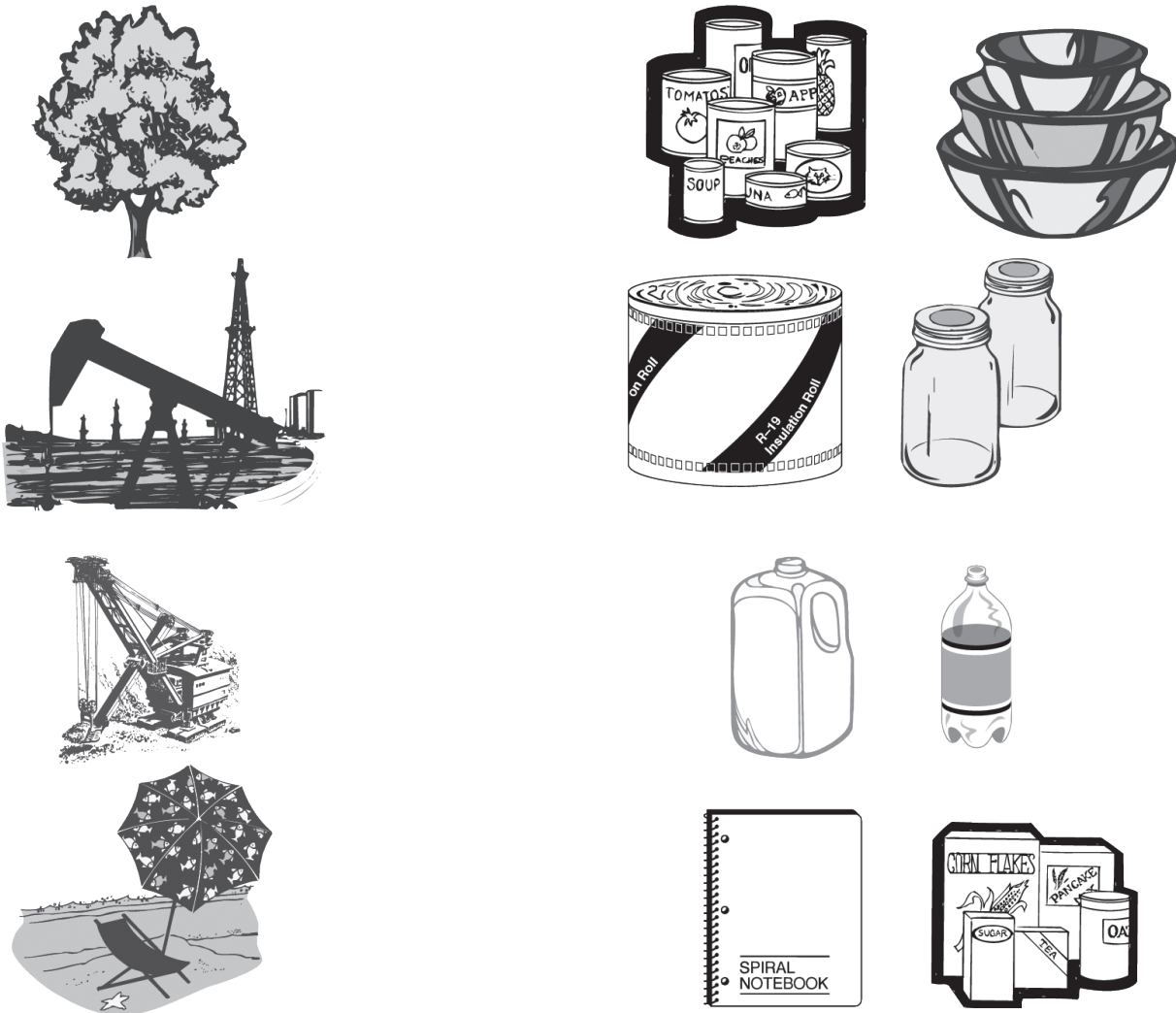
16 0 23 8 8 4 8 2 12 11 0 4 7
 4 0 21 13 2 0 3 2 8 16 17 13 2 25 8 16
 2 8 7 13 25 8 0 22 2 0 4 7
 18 0 21 8 2 9 17 3 3 13 21 22 17 4
 2 8 25 11 25 3 22 4 12 22 16 21 15 8
 2 22 12 15 21 21 15 22 4 12 21 17 7 17 !



Is It Renewable?

Natural resources are anything supplied by nature. They can be animals, minerals, or plants. Some natural resources can be recreated or made again so they are considered renewable. Other resources are in limited supply and once they are used up they are gone forever. These are considered nonrenewable. Some resources take so long to make (like oil) they are considered nonrenewable because they are not easily replaced or renewed.

Draw a line from the raw material to the product it makes. Put an R or N next to the raw material to show it is renewable or nonrenewable.



Remember...

- ☺ Paper can come from recycled paper
- ☺ Plastics can come from recycled plastic containers
- ☺ Steel and aluminum cans can come from recycled metals
- ☺ Glass can come from recycled glass

Recycling saves our natural resources!



Uncle Sam Needs You!

What does Uncle Sam want? Decode the message to find out.
Write down the letter that comes before the letter in the mixed up
message to solve the puzzle.

HINT: The letter M in the mixed up message would be the letter L in
the answer.

**Sfnfncfs up sfevdf,
sfvtf, sfdzdmf,
dpnqptu boe cvz
sfdzdmfe qspevdut
boe qbdlbhloh!**



**{ AMERICA
RECYCLES DAY
NOV. 15 }**

Word Jumble

Unscramble the words. Put the bolded boxed letters into the spaces at the bottom to find the message!

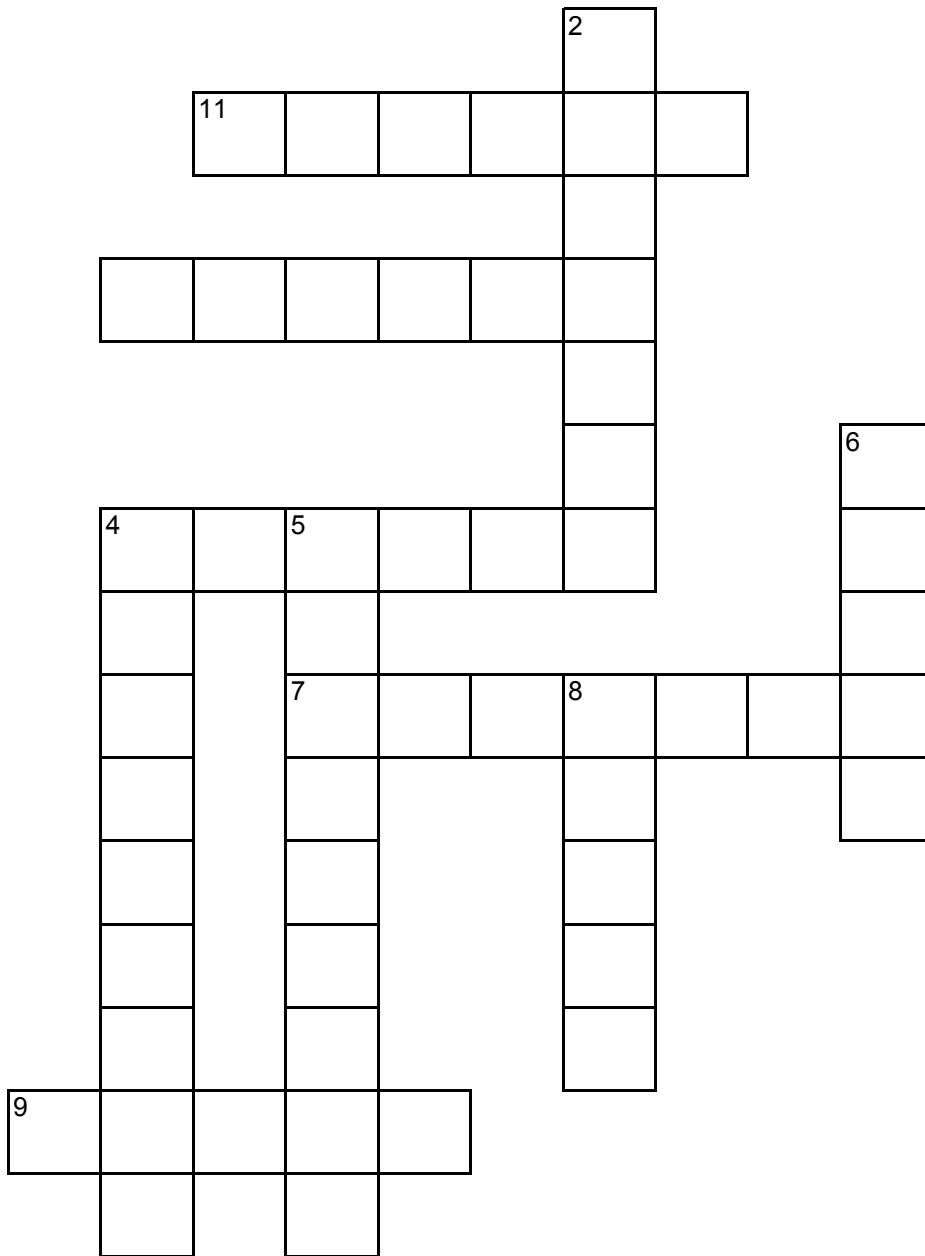
DECUER	□	□	□	□	□	□				
LMATE	□	□	□	□	□					
LCYREEC	□	□	□	□	□	□	□			
STOOMCP	□	□	□	□	□	□	□			
TCPASLI	□	□	□	□	□	□	□			
EUSRE	□	□	□	□	□					
ILOTNUOPL	□	□	□	□	□	□	□	□	□	
EPRPA	□	□	□	□	□					
SAGLS	□	□	□	□	□					
YBUDECCLYR	□	□	□	□	□	□	□	□	□	□

If you _____ ,

you use less _____ !



Crossword Puzzle



Word List
Compost
Reduce
Decompose
Reuse
Energy
Recycle
Litter
Resources
Paper
Waste

Across:

1. Trash discarded along roads, shorelines, and other places
3. When we recycle, we save _____.
4. To not make garbage to begin with
7. Leaves, grass clippings, and fruit and vegetable wastes
9. To use something over and over again

Down:

2. Take materials that would otherwise be waste and turn them into something new
4. When we recycle, we save our natural _____
5. When materials compost, they _____
6. Things we throw in the garbage can
8. We recycle a lot of this everyday at school



Word Search

Find these words in the puzzle and circle them. Be sure to look from right to left and up and down

REDUCE

REUSE

RECYCLE

BIN

TREE

ME

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



{ AMERICA
RECYCLES DAY
NOV. 15 }

Word Search

Find these words in the puzzle. Be sure to look right, left, up, down, and diagonally!

environment

reduce

reuse

recycles

compost

buy recycled

paper

trees

metal

ores

glass

sand

plastic

oil

landfill

litter

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



