



Department of  
**Environment &  
Conservation**



environmental  
education  
initiative

Educating Tennessee for a More Sustainable Future  
knowledge • action • change

# Environmental Education Activity Booklet

**Office of Sustainable Practices**

312 Rosa L. Parks Avenue, 2nd Floor  
Nashville, TN, 37243  
615-253-1729



# What is Sustainability?

**Sustainability is taking steps to avoid depleting natural resources in order to maintain an ecological balance.**

**In this booklet, you will find several topics directly related to sustainability:**

- 1. Pollinators, pages 1-8**
- 2. Food Waste and Composting, pages 9-16**
- 3. General Environmental Stewardship, pages 17-29**
- 4. Radon, pages 31-34**

## If you are sustainable:

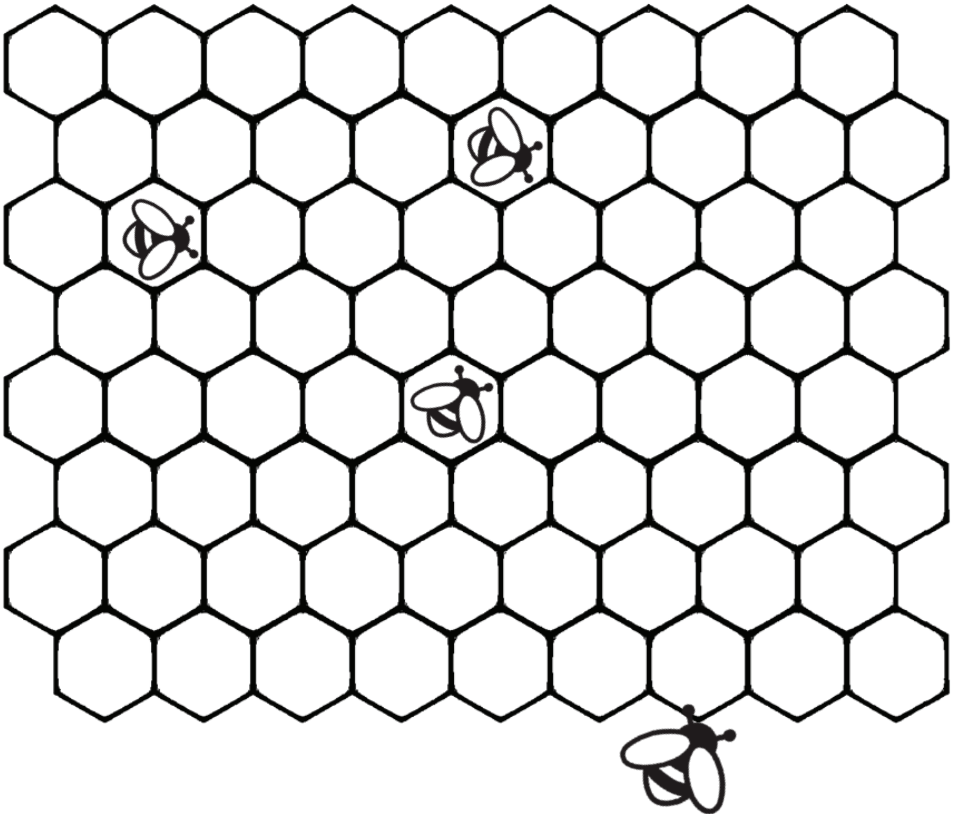
**"You leave the world better than you found it. You take no more than you need. You try not to harm life or the environment, and you make amends if you do."**

**- Paul Hawken, *The Ecology of Commerce***





Color the honeycomb!



**Bees pollinate flowers, which helps us grow food!  
They also produce honey from the nectar and pollen they  
collect and take back to their hive. The honey is stored in a  
structure called a honeycomb.**

# What is all the BUZZ about?

Honey bees can flap their wings around 200 times per second.  
The average worker bee lives about 5 to 6 weeks.

The queen bee can live up to 5 years. She can also lay 2,500 eggs a day during the summer. How many eggs can the queen lay during a summer week?

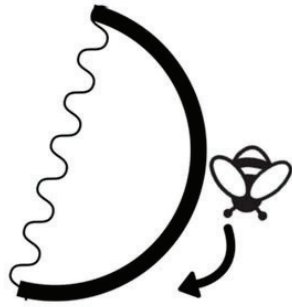
ANSWER: \_\_\_\_\_

Honey bees do a dance called the "waggle dance" to tell other members of the hive where food is located. Below is an example of a waggle dance.

1.



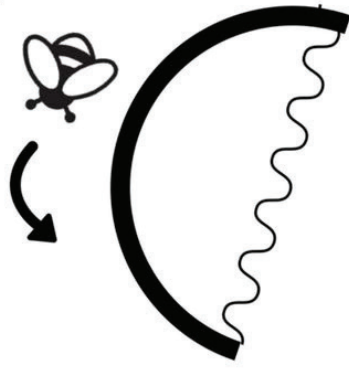
2.



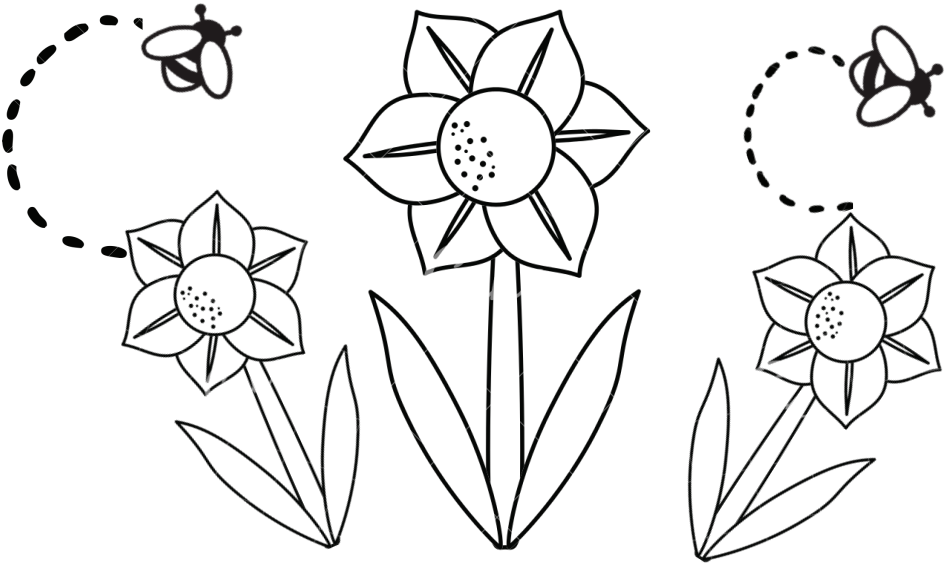
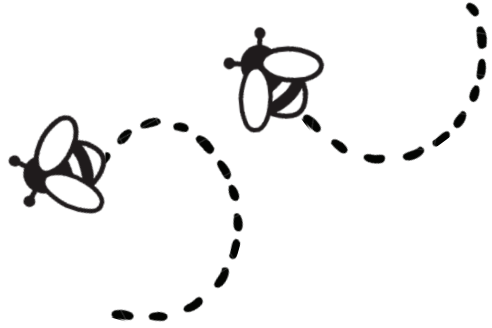
3.



4.



Can you do the waggle dance?



## What is pollination?

When a female worker bee collects nectar and pollen from the flower of a plant, some pollen sticks to the hairs of her body. When she visits the next flower, some of this pollen is rubbed off onto that flower. This is pollination.

# What is all the BUZZ about?

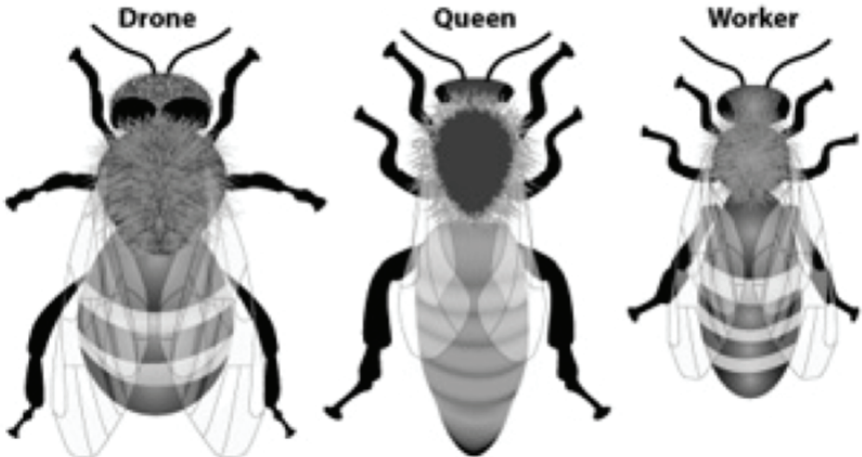
**Honey bees live in groups called hives or colonies. The members of the hive are divided into three types:**

**Queen** - The queen runs the whole hive. Her job is to lay the eggs that will become the hive's next generation.

**Workers** - The worker bees are all female and their roles are to forage for food (pollen and nectar from flowers), build and protect the hive, and clean and circulate air by beating their wings. Workers are the bees you see flying around outside the hive.

**Drones** - These are the male bees, and their purpose is to mate with the new queen. When winter comes, the hive goes into survival mode and kick the drones out!

**Honey bee colonies consist of a single queen, hundreds of male drones, and 20,000 to 80,000 female worker bees.**



Picture courtesy of New Jersey Dept. of Environmental Protection  
<https://www.state.nj.us/dep/parksandforests/forest/bees.html>

**Bees and other pollinators are very important for agriculture. It is estimated that one out of every three things we eat each day relies on pollination, mainly by bees.**

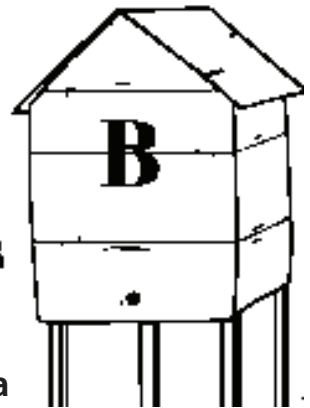


**Activity: Fill the farm with crops that bees help pollinate!**

# Pollinator Health

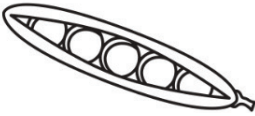
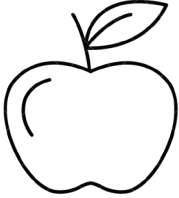
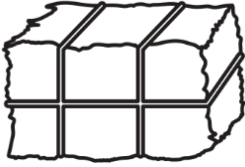
On a separate sheet of paper, create a graph to answer the question. What is the total amount of honey that both hives produced between April and September?

Bee hive "A" makes 3 pounds of honey every month from April through August, and 1 pound in September.

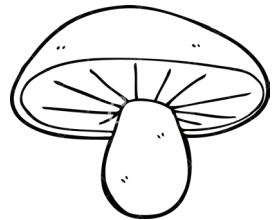
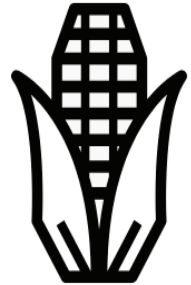


Bee hive "B" makes 2 pounds of honey a month from April through June, and 3 pounds of honey per month from July through September.





**Soybeans  
Cotton  
Corn  
Wheat  
Hay  
Tomatoes  
Green beans  
Apples  
Peaches  
Mushrooms**



These are the most common agricultural products grown in Tennessee.  
Can you match the word to the picture? Color the picture too!

Name: \_\_\_\_\_

## Honey Bee Word Search

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

Find the following words in the puzzle.

Words are hidden → ↓ and ↘ .

GREEN BEANS  
APPLES  
COLONY  
HIVE  
SQUASH  
CUCUMBERS  
WINGS  
FLOWERS

FOOD  
AGRICULTURE  
HAY  
CORN  
HONEY  
MUSHROOMS  
WORKER  
PEACHES

POLLEN  
DRONE  
TOMATOES  
POLLEN  
SOYBEANS  
WAGGLE  
QUEEN  
WHEAT

WORKER  
COTTON  
SOY

# Don't Waste Food!



**Try not to throw food in the trash. When it goes to landfills, it can't break down and return to soil.**

**It is best for food to be eaten or composted!**

**You can always donate food that you are not going to eat!**





The Food Recovery Hierarchy is meant to be a guide to help people figure out what to do with their food waste.

## Fill in the Blank

Use page 10 to help fill in the blanks! You will not use all of the words in the word bank.

Reduction  
Composting  
Trash

Soil  
Donated  
Animals

Food Waste  
Canning  
Plants

1. The best way to stop food waste from occurring is source \_\_\_\_\_.
2. If food waste can't be reduced, it should be \_\_\_\_\_.
3. Feeding \_\_\_\_\_ is the next best way to handle food waste, if it can't be donated to people.
4. \_\_\_\_\_ is better than landfilling, because it creates a soil amendment.
5. There are a number of different ways to handle \_\_\_\_\_ that are better than landfilling.

**Write a short paragraph about how you will help reduce food waste.**

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# Compost!

Composting is a natural decomposition process that breaks down organic materials. To compost, combine "brown" and "green" matter, and then let it breakdown. The resulting mixture can then be used to add nutrients back into soil.



My friends and I help break down things you put into compost!



Take this page home with you so you and your family members can compost!

# 3 parts BROWN + 1 part GREEN + air + water = COMPOST

Browns (Carbon Rich)	Greens (Nitrogen Rich)
Dead Leaves	Green Leaves
Shredded Cardboard	Fruit Scraps
Shredded Paper	Vegetable Scraps
Paper Towels	Bread and Grains
Straw and Hay	Tea Grounds/Leaves
Wood Shavings	Coffee Grounds
Wood Chips	Fresh Grass Clippings
Sticks and Branches	Plant Prunings
Wood Ash	Hair (from hairbrush)
Dry Pine Needles	Pet Fur (from shaving or shedding)
Nut Shells	Algae and Aquarium
Corn Stalks	Water (fresh water)
Egg Shells	Manure (herbivore animals only)

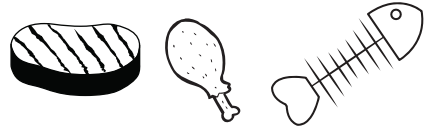
# Backyard Composting

## Do Compost!

## Don't Compost!



Fruit and Vegetable Scraps



Meat, Bones, and Fish



Coffee Grounds and Tea Bags



Dairy



Grass, Leaves, and Sticks



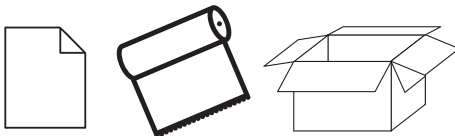
Weeds



Egg Shells and Stale Bread



Whole Eggs



Paper and Cardboard (Shred)



Feces from Other Animals



Manure and Bedding from Cows,  
Horses, Goats, Sheep,  
Chickens, and Rabbits



Fats, Oils, and Grease



# What is the Problem?

**1. Assuming the average elementary school student wastes  $1 \frac{1}{4}$  pounds of food per 5 day school week, how much does he or she waste in a day?**

**2. Christina started composting! She needs to know how many buckets of "brown" materials to add to her 4 buckets of "green" materials. If she needs 3 times the volume of "brown" material as "green" material to make proper compost, how many buckets of "brown" material does she need?**

# Compost Uses

Four of the most common uses for compost are:

1. Mulching material - When compost is used as a mulch around trees, shrubs, and landscaping, it helps the ground underneath it retain moisture. When it rains, the water will also carry nutrients from the compost down to the soil below it.
2. Soil amendment - When compost is used as a soil amendment, it is added into the soil at planting time by digging anywhere from 2 to 4 inches down. The compost is then mixed in with the soil. This will provide nutrients to plants at the root-level.
3. Compost tea - Compost tea refers to the liquid matter released by the compost. Sometimes, compost produces the tea naturally, but it can also be produced conveniently and easily by steeping a shovel full of compost in a 5 gallon bucket for a few days. When it is ready to go, simply just pour it on the flowers or plants you wish to use it on.
4. Lawn top dressing - When compost is used as a top dressing, anywhere from 1 to 3 inches of compost is added to the lawn. It can then be raked and watered. The compost will eventually settle into the soil and disappear, leaving much healthier soil that also holds water better. Adding compost to lawns reduces the need to use fertilizers, which can be harmful if they make their way to bodies of water.

<https://www.compostinstructions.com/how-to-use-compost-in-your-yard-and-garden/>

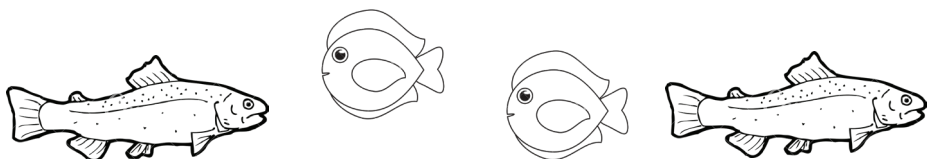
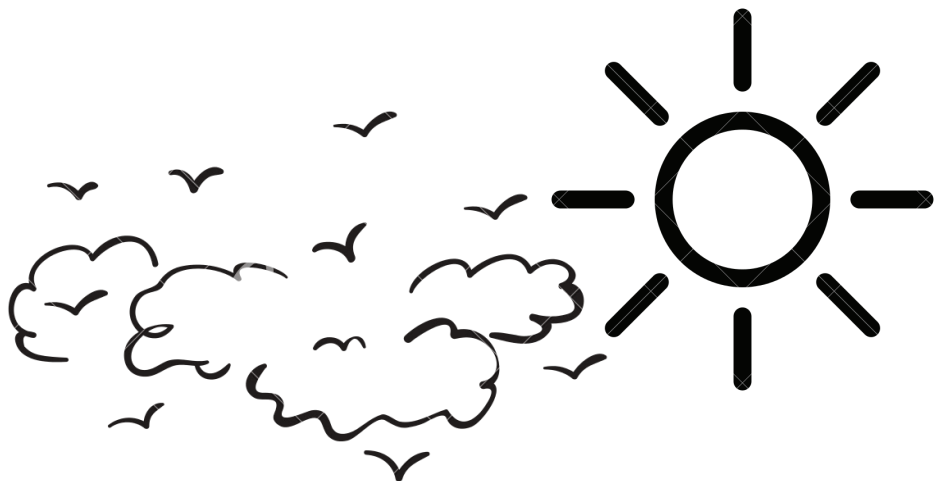
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## True or False

1. True or False - Compost can add nutrients to soil
2. True or False - Compost can be added to lawns, gardens, and landscaping
3. True or False - Compost should be fed to animals
4. True or False - Compost can help soil hold more water
5. True or False - Compost and fertilizer are the same thing

# You can help take care of Tennessee's environment!

Color this healthy environment and/or draw yourself in it!



# Sustainable Vocabulary

Use the words in the word bank to complete the sentences.

Nonrenewable  
Carbon dioxide  
Extinct  
Conservation  
Donated

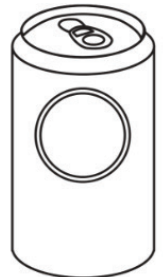
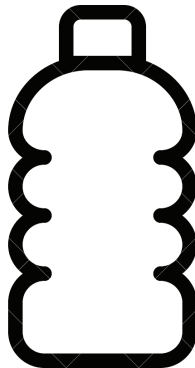
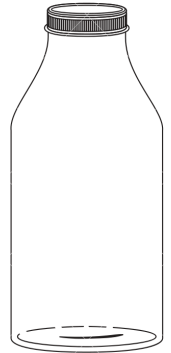
Habitats  
Natural Gas  
Resources  
Composted  
Coal  
Oil

Food chain  
Ecosystem  
Renewable  
Pollutant  
Oxygen

1. \_\_\_\_\_ resources, like \_\_\_\_\_, nuclear, \_\_\_\_\_, and \_\_\_\_\_ are available in limited supplies. This is usually due to the long time it takes for them to be replenished.
2. \_\_\_\_\_ resources are replenished naturally and over relatively short periods of time.
3. Trees and plants absorb \_\_\_\_\_ and release \_\_\_\_\_ into the air.
4. Fruit and vegetable scraps can be \_\_\_\_\_ instead of thrown in the garbage.
5. \_\_\_\_\_ is the protection and preservation of natural environments and \_\_\_\_\_.
6. Uneaten or unopened food can be \_\_\_\_\_ to food pantries and homeless shelters.
7. A \_\_\_\_\_ is a substance or material that damages the natural environment.
8. Animals may become \_\_\_\_\_ if their natural \_\_\_\_\_ are destroyed.
9. The \_\_\_\_\_ is the order in which organisms in an ecosystem eat one another.
10. An \_\_\_\_\_ is the complex system of relationships between living things and their environment.

# Recycle!

Commonly recycled items include products that are made from paper, plastic, aluminum, and steel.



# Reduce, Reuse, Recycle

- \_\_\_\_\_ means to use less of something.
  - Reduce
  - Recycle
- \_\_\_\_\_ means to use something more than once.
  - Reduce
  - Reuse
- Maggie is cleaning out her desk. She should throw her old papers in the \_\_\_\_\_ bin.
  - reducing
  - recycling
  - trash
- Steve sold his toy trucks to his friend Joey at a yard sale. Joey is \_\_\_\_\_ the toy trucks.
  - eating
  - reusing
  - reducing
- Sofia is peeling carrots and potatoes. She composts these peelings. She is \_\_\_\_\_ the amount of food that ends up in the landfill.
  - reducing
  - reusing
  - increasing
- Caleb's skateboard broke. He took it to the shop and had it fixed. Caleb decided to \_\_\_\_\_ his skateboard instead of buying a new one.
  - reduce
  - reuse
  - trash
- Kelsey's family is moving into a new house. Her family has been keeping old cardboard boxes so they can use them to pack! These cardboard boxes are being \_\_\_\_\_.
  - loved
  - reused
  - reduced
- After Kelsey's family moves into their new home, they will \_\_\_\_\_ the cardboard boxes instead of throwing them in the trash.
  - recycle
  - relocate
  - reduce

# Don't Litter!

Make sure trash goes into trash cans and not on the ground.



**YES!**

Litter is bad for the environment! It can pollute land and water. It can also cause injury or death to wildlife. This table provides an estimate of how long it takes for common items to decompose.

Material	Time It Takes to Decompose
Glass Bottle	1 million years
Fishing Line	600 years
Plastic Bottles	450 years
Disposable Diapers	450 years
Aluminum Cans	80-200 years
Boot Sole	50-80 years
Styrofoam Cup	50 years
Tin Can	50 years
Leather	50 years
Nylon Fabric	30-40 years
Plastic Film Canister	20-30 years
Plastic Bag	10-2000 years
Cigarette Filter	1-5 years
Wool Sock	1-5 years

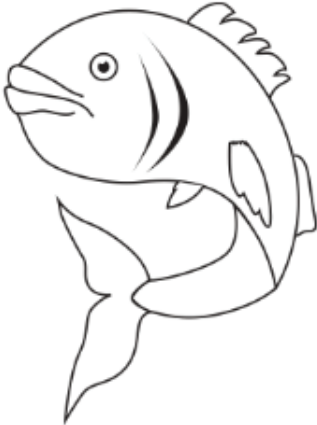
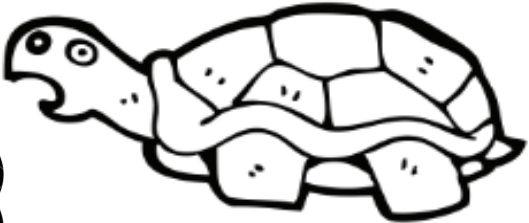


# Keep Water Clean!

If you litter, it can make its way to ponds, rivers, lakes, and oceans. This can kill fish and other creatures that live in or near the water.

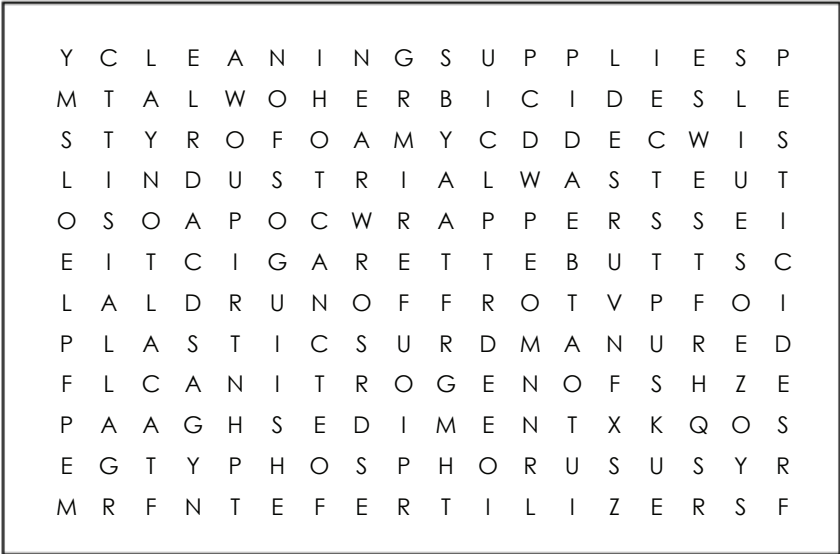


We sure do appreciate it when you help keep our home clean!



Name: \_\_\_\_\_

## Common Water Pollutants

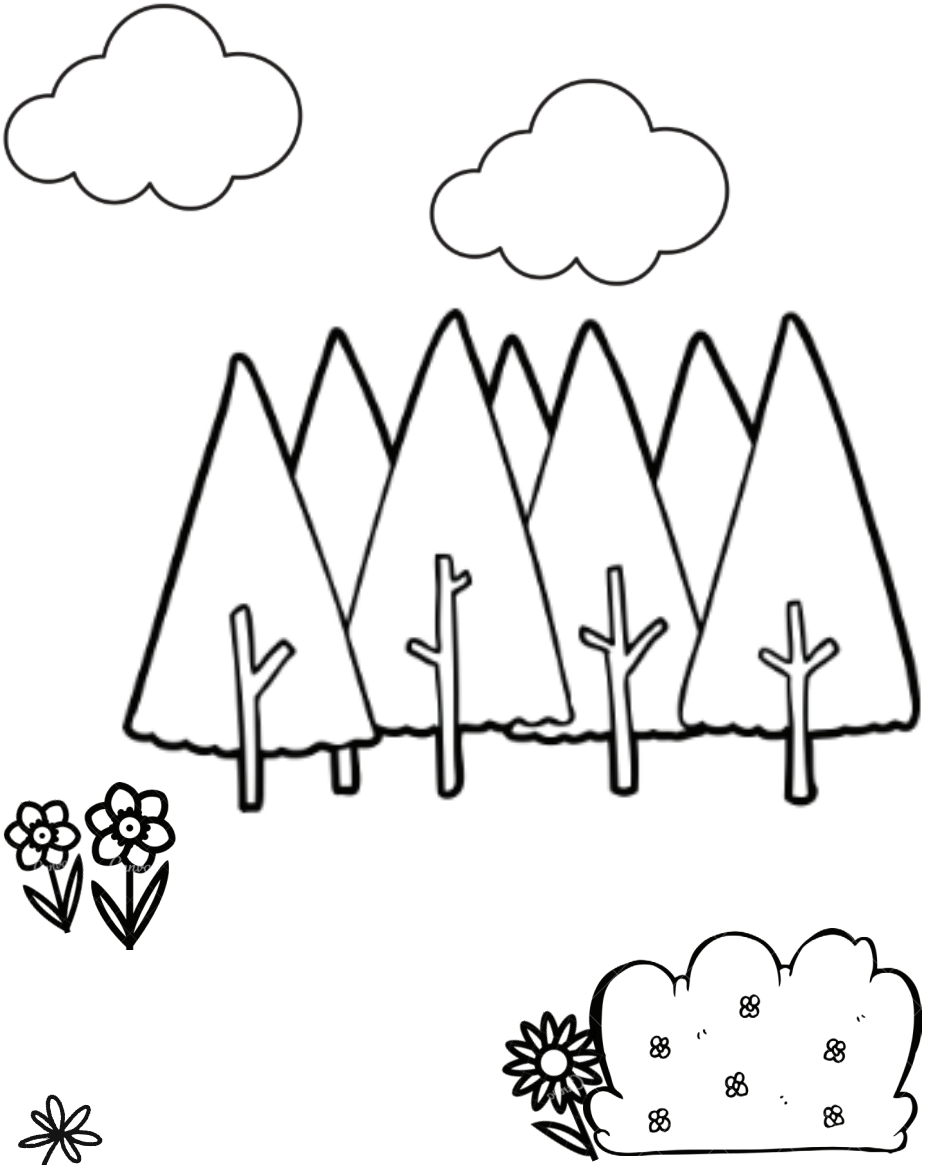


Find the following words in the puzzle.  
Words are hidden → ↓ and ↘ .

CIGARETTE BUTTS  
CLEANING SUPPLIES  
FERTILIZERS  
HERBICIDES  
INDUSTRIAL WASTE  
MANURE

NITROGEN  
OIL  
PESTICIDES  
PHOSPHORUS  
PLASTICS  
RUNOFF

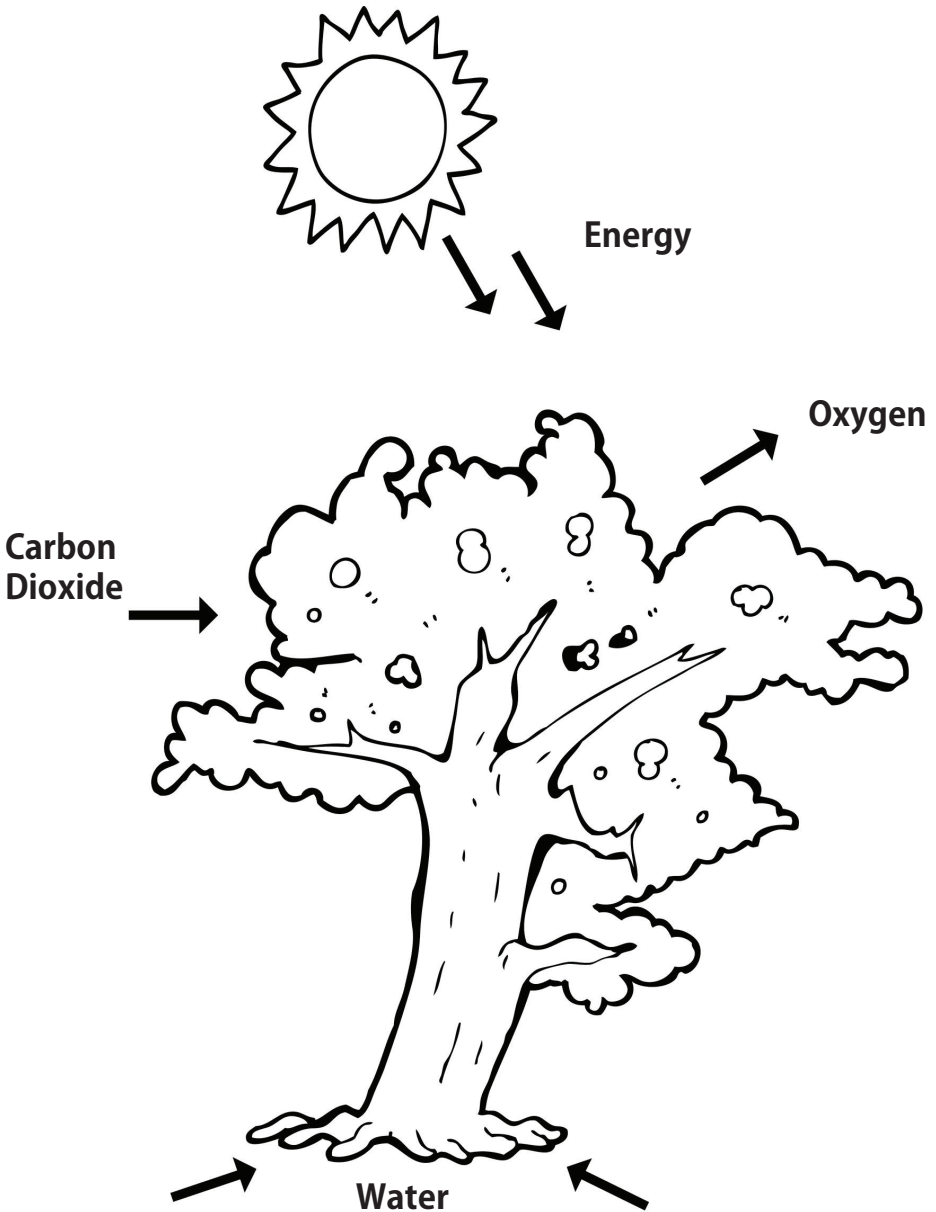
SEDIMENT  
SOAP  
STYROFOAM  
WRAPPERS



# Plant Trees and Plants!

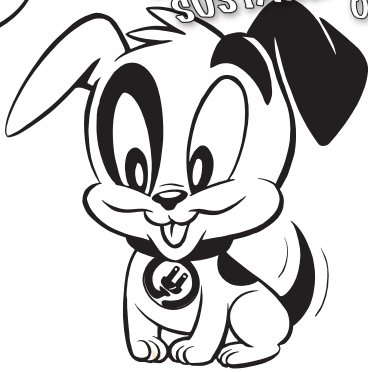
Trees, shrubs, flowers and other plants help keep our air clean and healthy for us to breathe .

Plants clean our air when they convert carbon dioxide we exhale into their food for them and release oxygen back into the air. They do this by using energy from the sun and water from their roots! This process is called Photosynthesis.



# MEET SOCKET!

NASHVILLE'S  
SUSTAINABILITY  
OUTLET



**SOCKET SINGS A HAPPY TUNE  
WHEN WE SAVE WATER  
AND REDUCE WASTE.**



**HELP SOCKET SAVE ENERGY.**



**NOW IT'S YOUR TURN!**

**CAN YOU THINK OF ALL THE WAYS YOU  
CAN HELP SOCKET BE SUSTAINABLE?**

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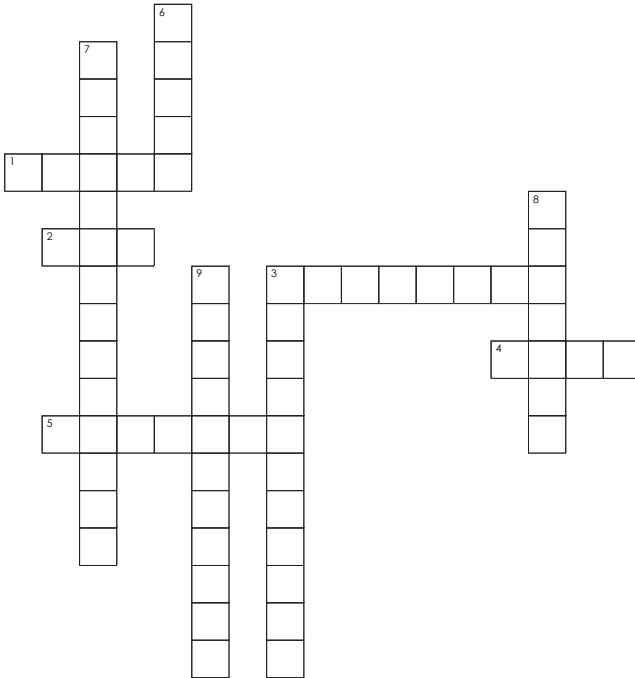
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Socket is the interactive sustainability education program of the Division of Sustainability for Metro Nashville's Department of General Services. Visit [socket.nashville.gov](http://socket.nashville.gov) to learn more.

Name: \_\_\_\_\_

## Crossword Puzzle



**Across:** →

1. drink it and swim in it
2. take a deep breath of this
3. coke cans are made from this
4. can be donated or composted
5. don't use these bags at the grocery store

**Down:** ↓

3. farming industry
6. read it, draw on it, recycle it
7. protecting & helping the world as a whole
8. good for soil
9. most light bulbs work because of this

**Word Bank:**

AGRICULTURE

COMPOST

PAPER

WATER

AIR

ELECTRICITY

PLASTIC

ALUMINUM

FOOD

SUSTAINABILITY

Created by TDEC - OPSP using the Crossword Puzzle Generator on Super Teacher Worksheets ([www.superteacherworksheets.com](http://www.superteacherworksheets.com))

# Circle all the things you can do to help the environment!

Throw Trash Into  
Ponds, Rivers,  
Lakes, and Oceans

Recycle Used  
Printer Paper  
and Aluminum  
Cans!

Waste Food

Chop Trees Down

Donate Food

Compost Fruit  
and Vegetable  
Scraps

Plant Trees, Shrubs, and  
Flowers

Pick Up Litter and Make  
Sure It Goes Into the  
Trash!

## Sustainability: Write a Story



On a separate sheet of paper, write a short story about something you learned from this activity booklet. You can use this sheet to map your story!



**Characters:**

**Setting:**

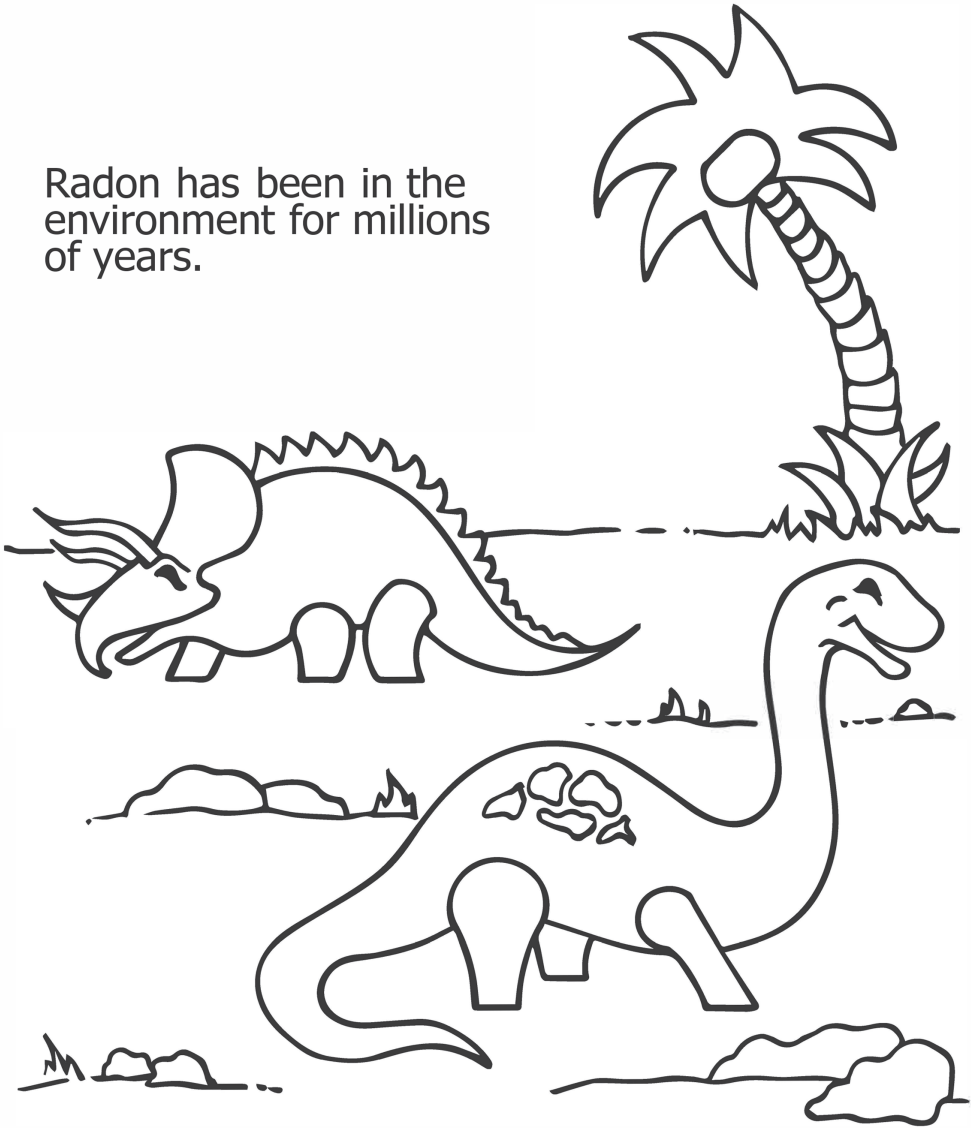
**Problem:**

**What else happened?**

**Solution:**



Radon has been in the environment for millions of years.

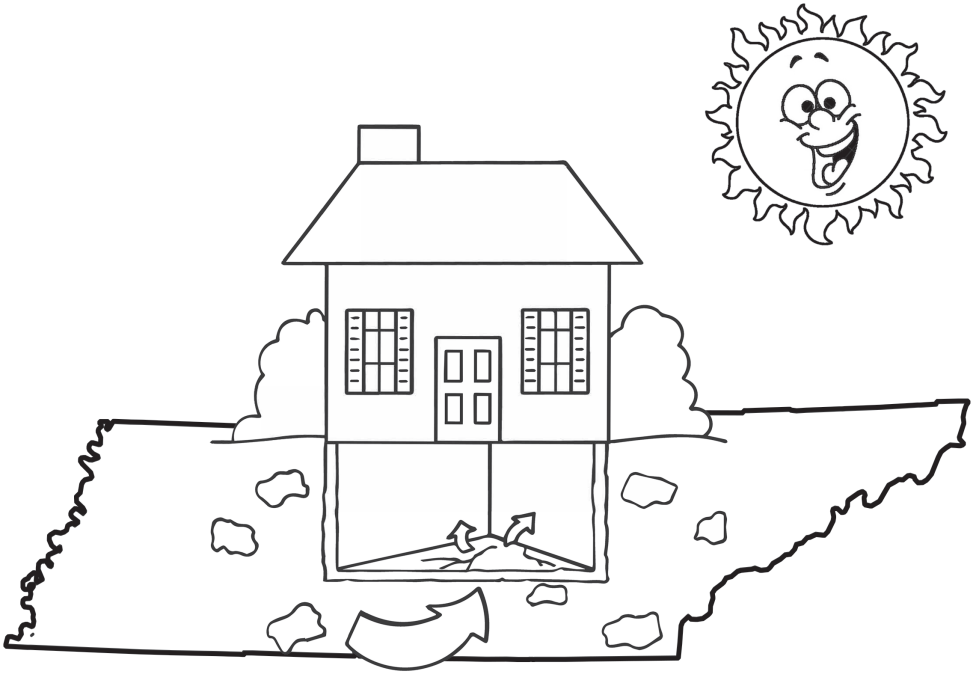




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Radon comes from the breakdown of uranium in the soil. It is naturally occurring and can be harmful to your lungs. Radon is colorless, odorless, and tasteless.

The most common entries for radon include cracks in foundations and openings around pipes and drains.

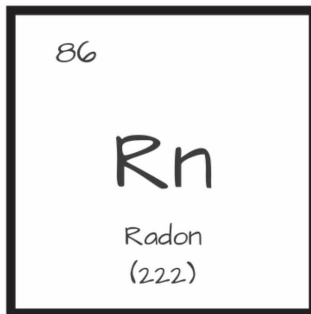
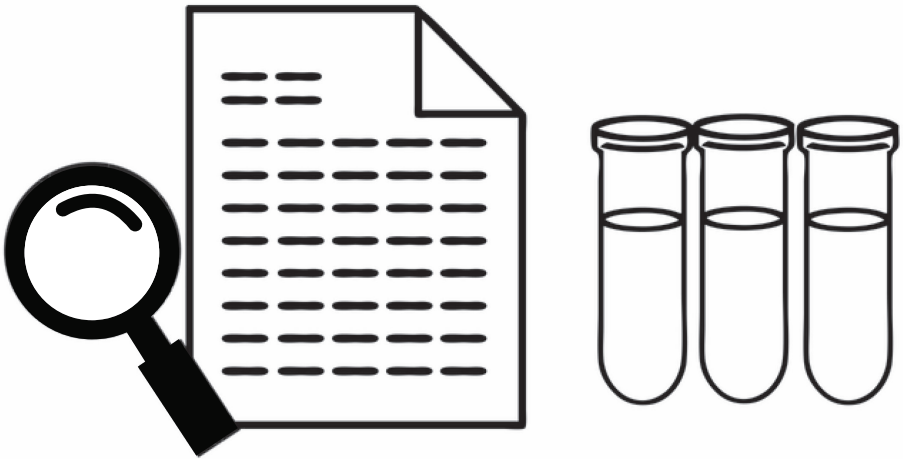


High levels of Radon gas have been found in many parts of the world, including right here in Tennessee.

The only way to be sure if your home is free of Radon gas is to test for Radon using a test kit.

You can get a free test at:  
[tn.gov/environment/radon](http://tn.gov/environment/radon)

Follow the test kit instructions carefully and send your kit to the lab for analysis.



# Notes:

**Intentionally Left Blank**

Answer Key:

Page 2 - What's All the Buzz About

Answer:  $2500 \times 7 = 17,500$  eggs

Page 6 - Pollinator Health

Question 1 Answer: Hive A produces 16 pounds of honey

$3+3+3+3+3+1=16$  OR  $(3 \times 5)+1=16$

Question 2 Answer: Hive B produces 15 pounds of honey

$2+2+2+3+3+3=15$  OR  $(2 \times 3)+(3 \times 3)=15$

TOTAL Answer: 31 pounds of honey

$15+16=31$

Page 11 - Food Recovery Hierarchy

1. Reduction
2. Donated
3. Animals
4. Composting
5. Food waste

Page 15- What is the Problem?

Question 1 Answer:  $\frac{1}{4}$  a pound of food

$\frac{5}{4} \times \frac{1}{5} = \frac{5}{20} = \frac{1}{4}$

4 5 20 4

Question 2 Answer: 12 buckets of green materials

$3B \times 4G = 12$

1G

Page 16 - True/False

1.T 2.T 3.F 4.T 5.F

Page 18 - Sustainable Vocabulary

1. Nonrenewable, Oil/Coal/Natural
2. Renewable
3. Carbon Dioxide, Oxygen
4. Composted
5. Conservation, Resources
6. Donated
7. Pollutant
8. Extinct, Habitat
9. Food Chain
10. Ecosystem

Page 20 - Reduce, Reuse, Recycle

1. a 2. b 3. b 4. b 5. a 6. b 7. b 8. a

Page 28 - Crossword Puzzle

Across

1. Water
2. Air
3. Aluminum
4. Food
5. Plastic

Down

3. Agriculture
6. Paper
7. Sustainability
8. Compost
9. Electricity

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Tennessee Department of Environment and  
Conservation**

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