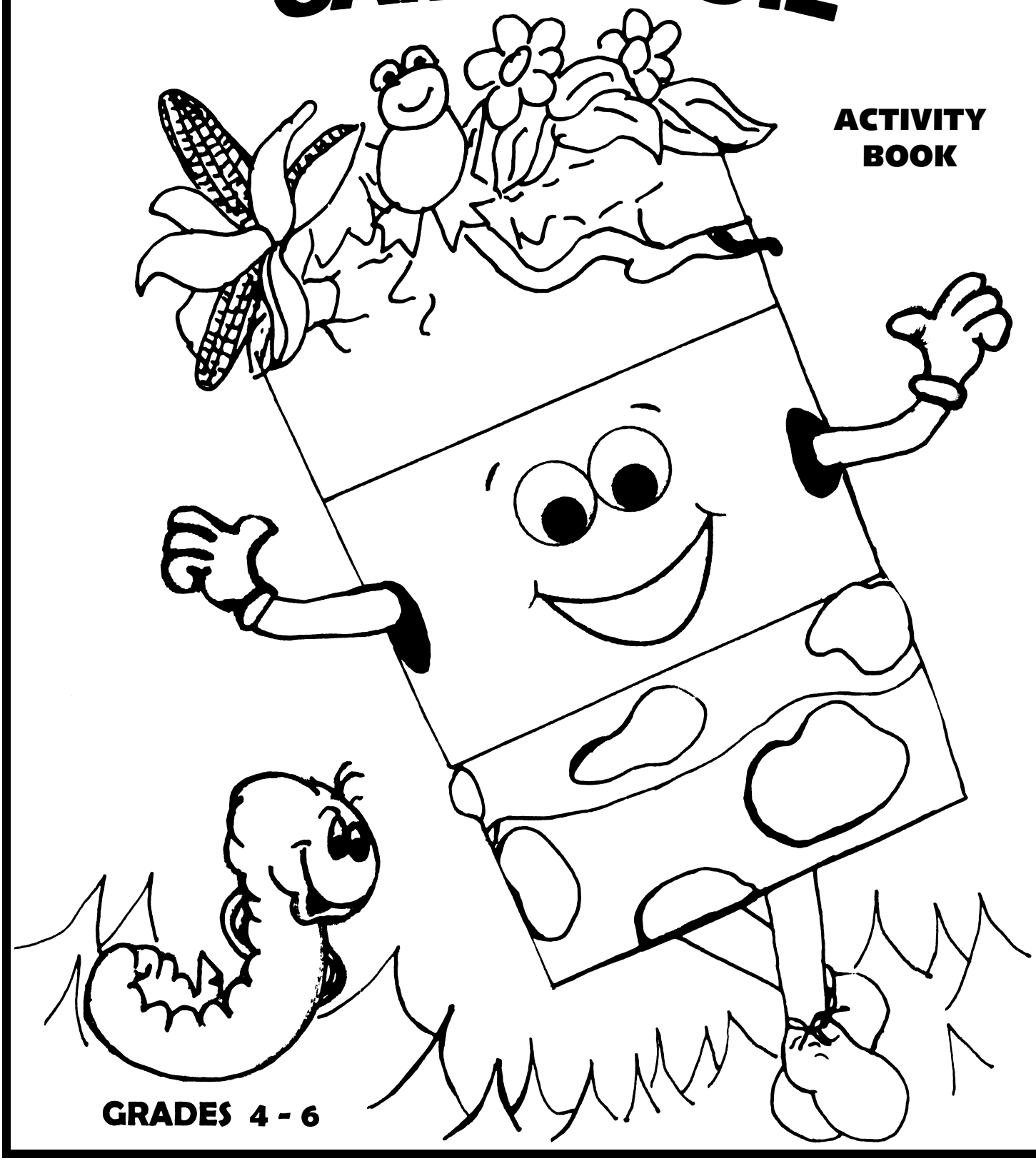
LEARN WITH SAM E. SOIL

ACTIVITY BOOK



GRADES 4 - 6

This book belongs to:

_____.

This activity book was written to teach the importance of conserving our natural resources – our soil and water.

By teaching children the value of our natural resources at an early age, it will give them the ability to protect and use these resources wisely. We know what they learn will be passed onto future generations.

Working together we can learn ways we can protect and preserve our God-given natural resources.

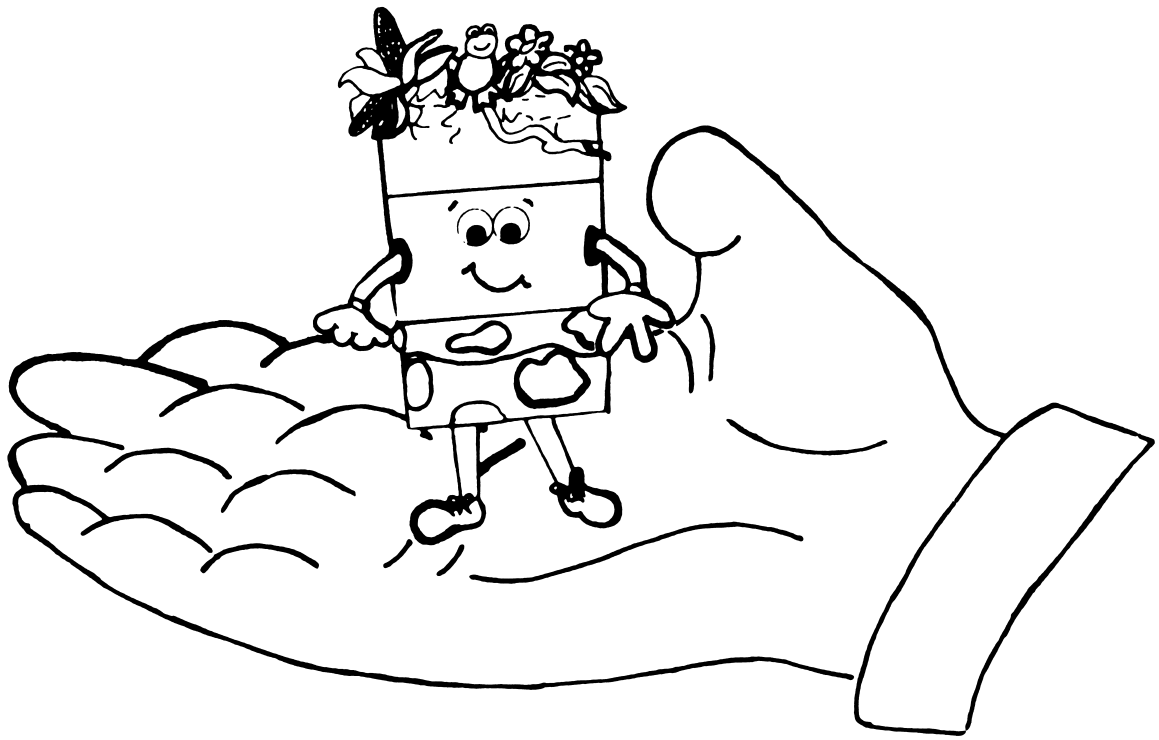
We sincerely hope you will enjoy this book!

TABLE OF CONTENTS

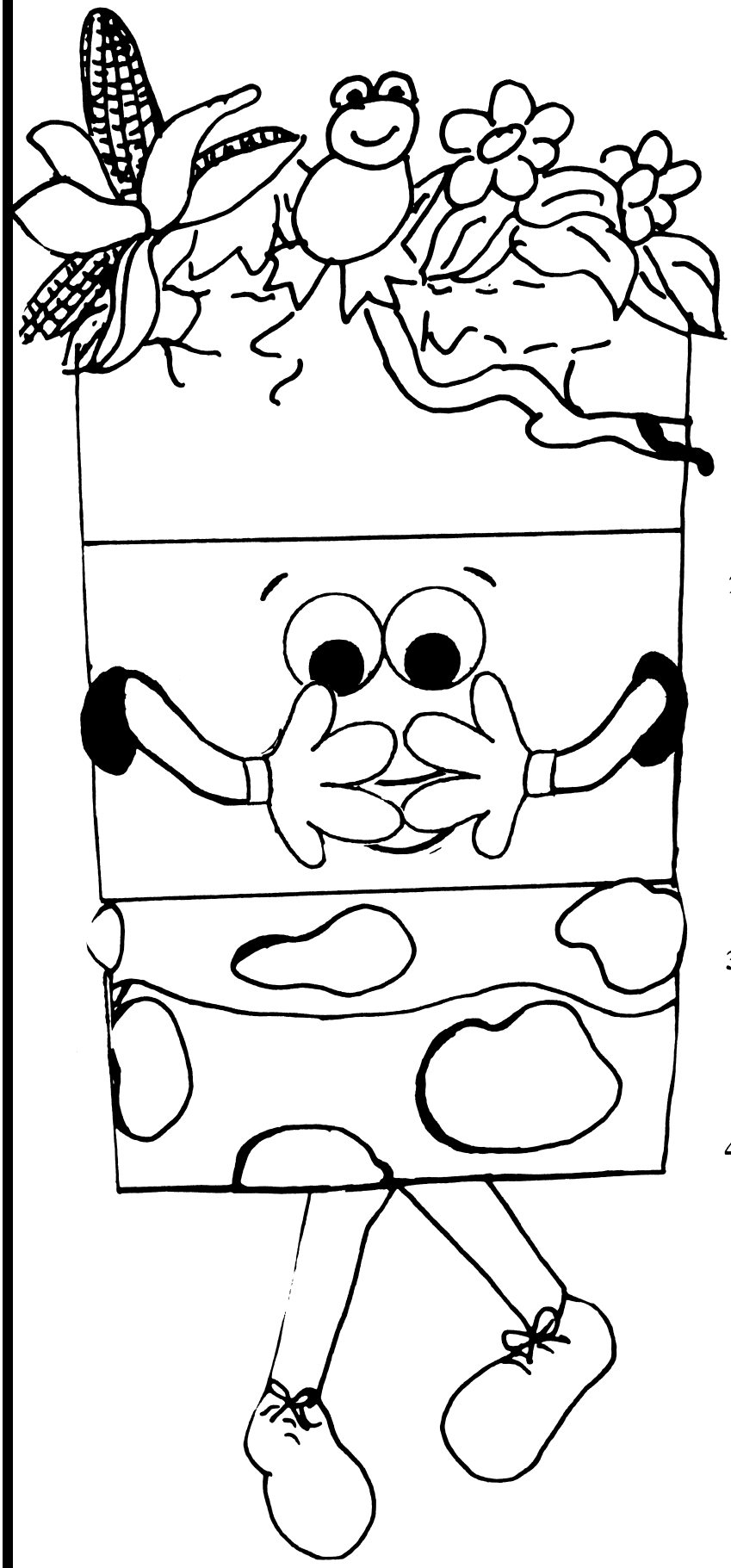
WHAT IS SOIL?

Soil is all around us. Most everything that we have comes directly or indirectly from the soil. Our food, clothes, homes and many products we use everyday have their beginning in the soil. Soil is made from broken rocks, organic matter (which is decayed animal and plant life) water and air. When soil is misplaced it is called "dirt". Dirt is soil when it gets on your shoes, clothes or in the house. Soil can be sticky, gooey, gritty or smooth. Soil can even smell "sweet' or "sour". Soil usually contains layers. There are many things that soil scientists are still learning about soil. What we do know is that we would not live without soil!

- **Soil is the loose covering or outermost layer of broken rock particles and decaying plants and animals on the surface of the Earth, capable of supporting life.**
- **Soil has varying amounts of organic matter (living and dead organisms), minerals and nutrients.**
- **Different-sized mineral particles, such as sand, silt and clay, give soil its texture.**
- **An average soil sample is 45% minerals, 25% water, 25% air and 5% organic matter.**
- **Plant roots break up rocks which become part of new soil.**
- **Roots loosen the soil, allowing oxygen to penetrate. This benefits animals living in the soil.**
- **Roots hold soil together and help prevent erosion.**
- **Topsoil is the most productive soil layer.**
- **Soil scientists have identified over 70,000 kinds of soils in the United States.**
- **Natural processes can take more than 500 years to form one inch of topsoil.**
- **Five tons of topsoil spread over an acre is only as thick as a dime.**
- **Five to 10 tons of animal life live in an acre of soil.**
- **Earthworms digest organic matter, recycle nutrients and make the surface soil richer.**



LABEL THE LAYERS



1. _____

2. _____

3. _____

4. _____

Subsoil

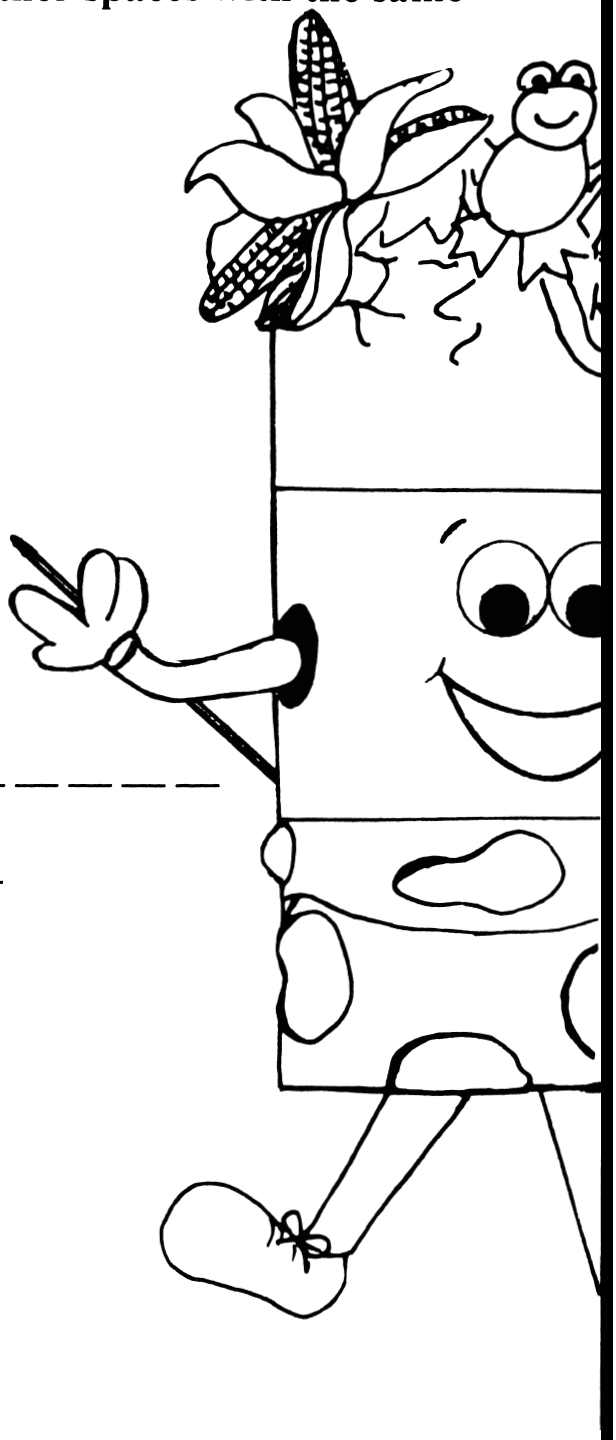
Parent Material

Topsoil

Water

OUR ENVIRONMENT

Unscramble each of the clue words.
Copy the letter in the numbered spaces to other spaces with the same number.



RIOGANC _ _ _ _ _ _ _ _
5

GABGERA _ _ _ _ _ _ _ _

XONGEY _ _ _ _ _ _ _
4

NIWD _ _ _ _

LOIS _ _ _ _

SOORIEN _ _ _ _ _ _ _ _
2

AVENNORSITOC _ _ _ _ _ _ _ _ _ _ _ _ _
7

LINSERMA _ _ _ _ _ _ _ _
1

TERWA _ _ _ _ _

SOCKR _ _ _ _ _
3

TOOPILS _ _ _ _ _ _ _
6

_ _ _ _ _ _ _
1 2 3 4 5 6 7

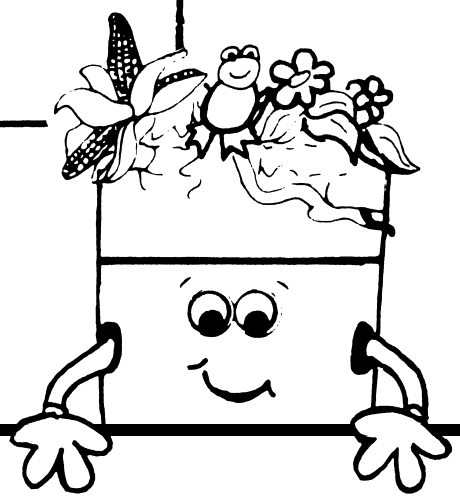
MAGIC SQUARE

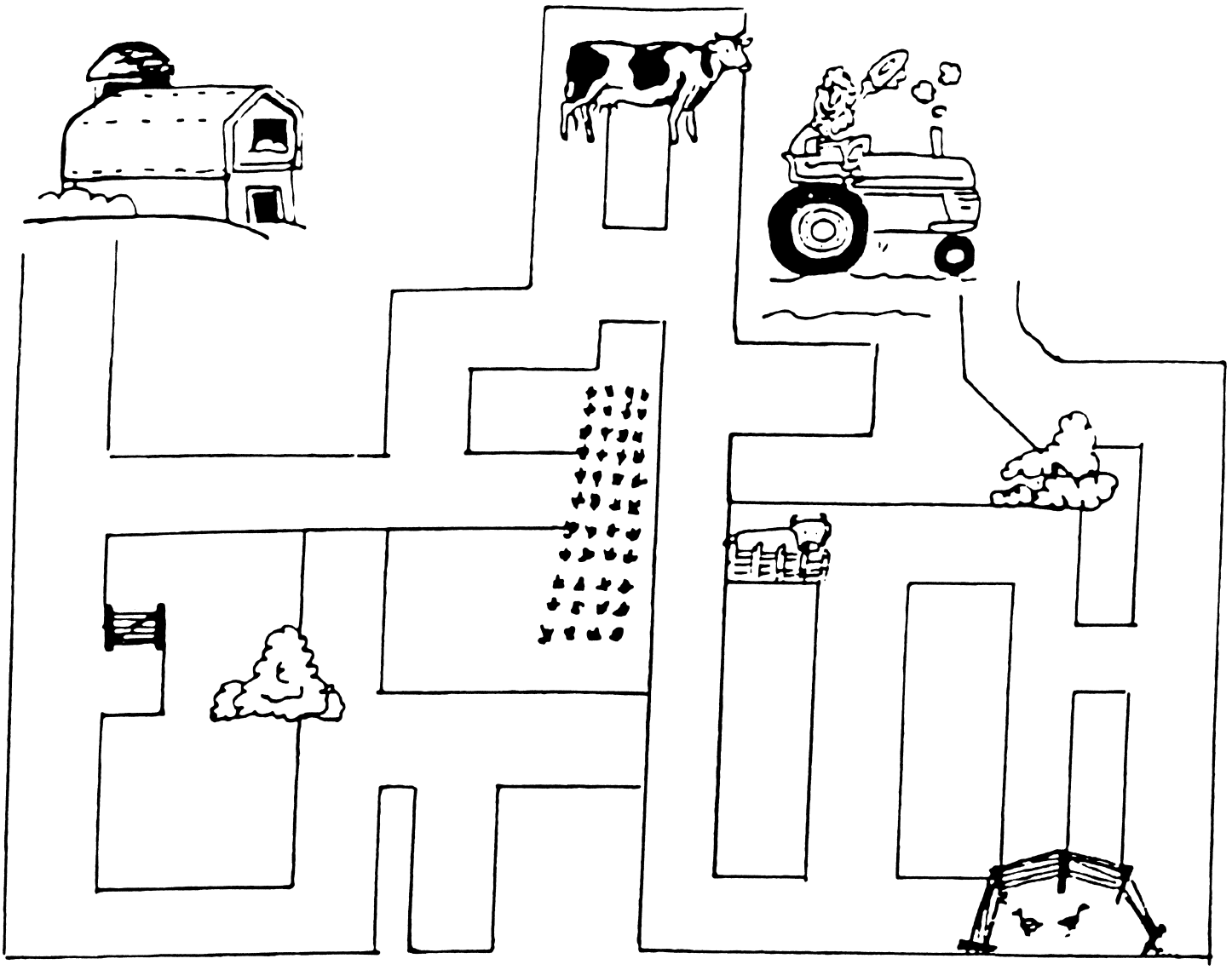
All plants need SOIL, WATER and SUNSHINE. When you line the numbers 1 -9 up correctly, you will have a magic square – each line horizontally, vertically and diagonally will equal - 15

Horizontally, you will have a line of water, soil and sunshine. Vertically, you will have one of each – soil, water and sunshine.

1 = sunshine	**4 = water**	**7 = soil**
2 = soil	**5 = sunshine**	**8 = water**
3 = water	**6 = soil**	**9 = sunshine**

	5 – SUNSHINE	

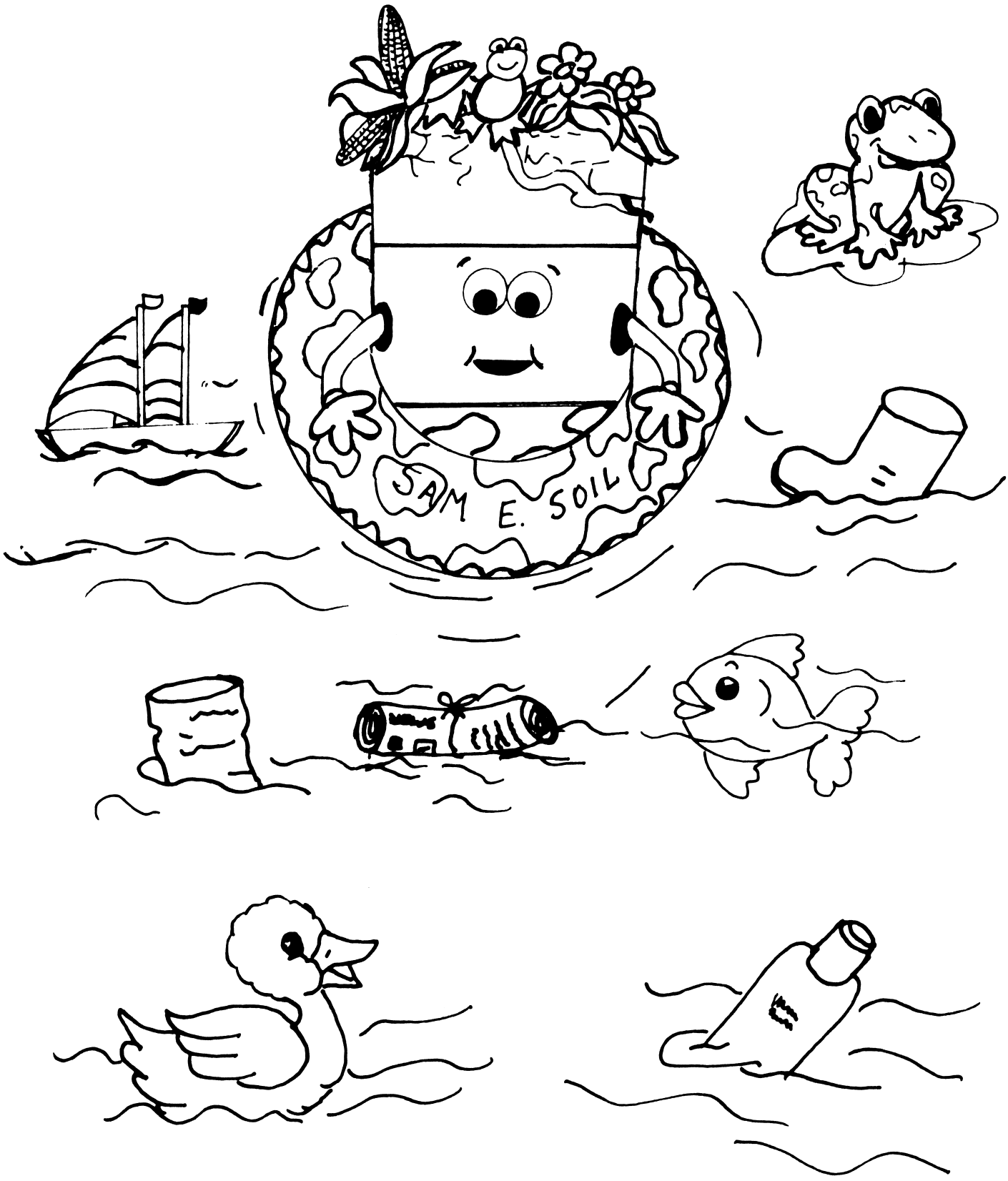




MAZE

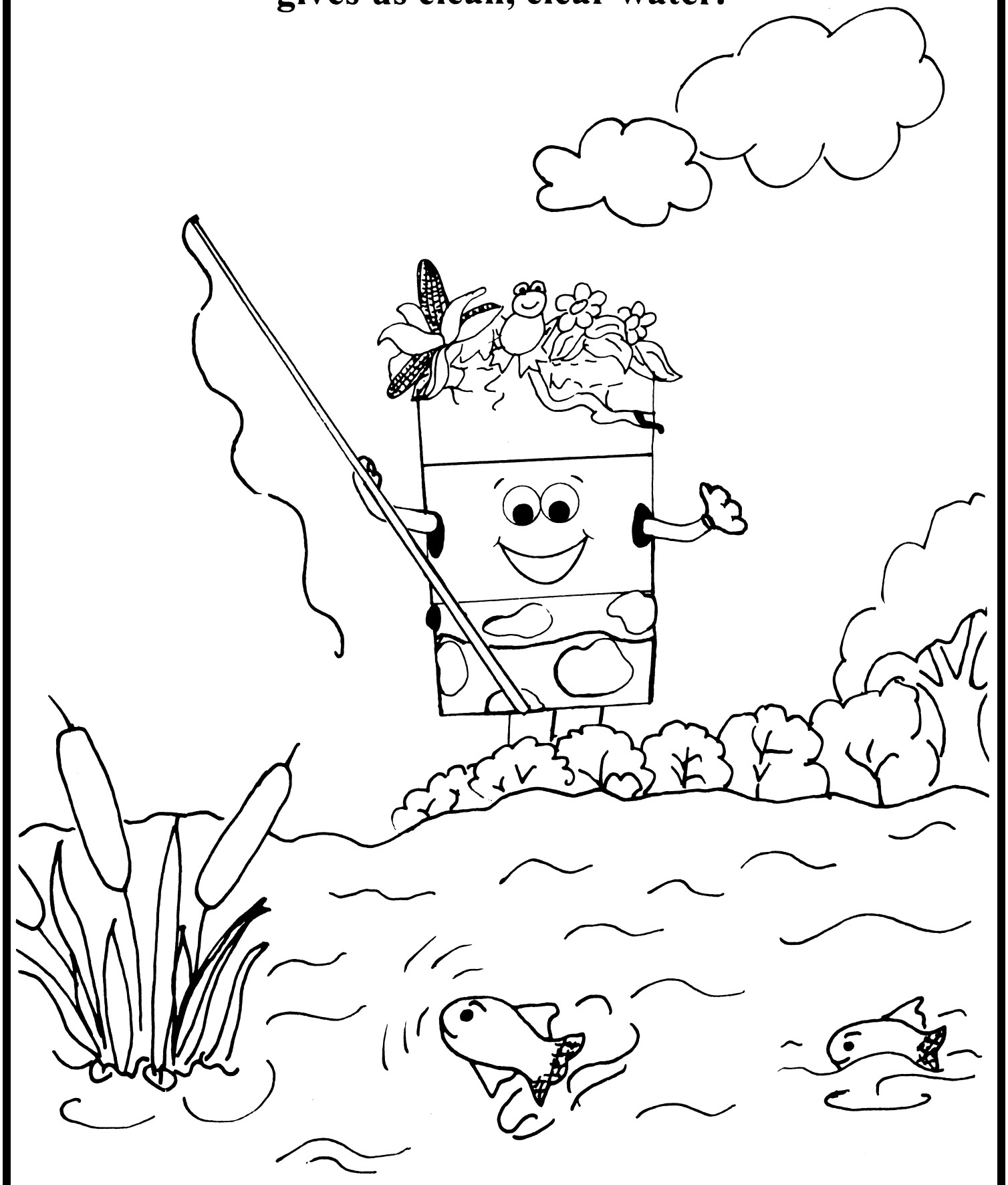
Help the farmer ride his tractor
back to the barn
without crossing any lines.

Some things don't belong in a lake.
Draw an X through them.



People pollute water.

A healthy watershed
gives us clean, clear water.



Connect the dots.

Rain is part of the water cycle.

Importance of Wetlands

(A wetland is a lowland area, such as a marsh or swamp, that is saturated with moisture, especially when regarded as the natural habitat of wildlife.)

True or False or Fill in Blanks

_____ is the most common substance found on earth.

The amount of water on earth has not changed since the earth was formed. T or F

All lakes and rivers are safe for swimming. T or F

Wetlands help with flood control. T or F

Very few animals live in wetlands. T or F

Wetlands help clean sediment and chemicals from soil. T or F

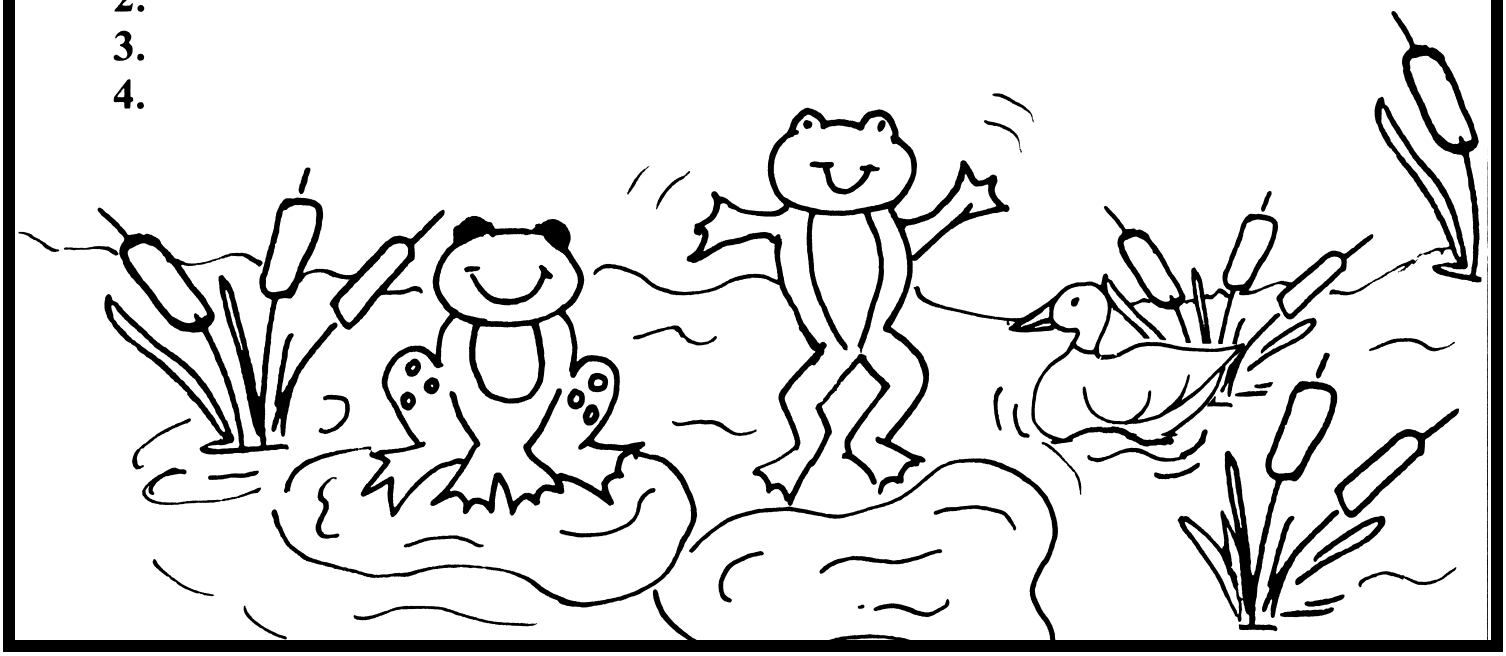
Wetlands are very, very important to our planet's ecosystem. T or F

Name a common wetland tree. _____

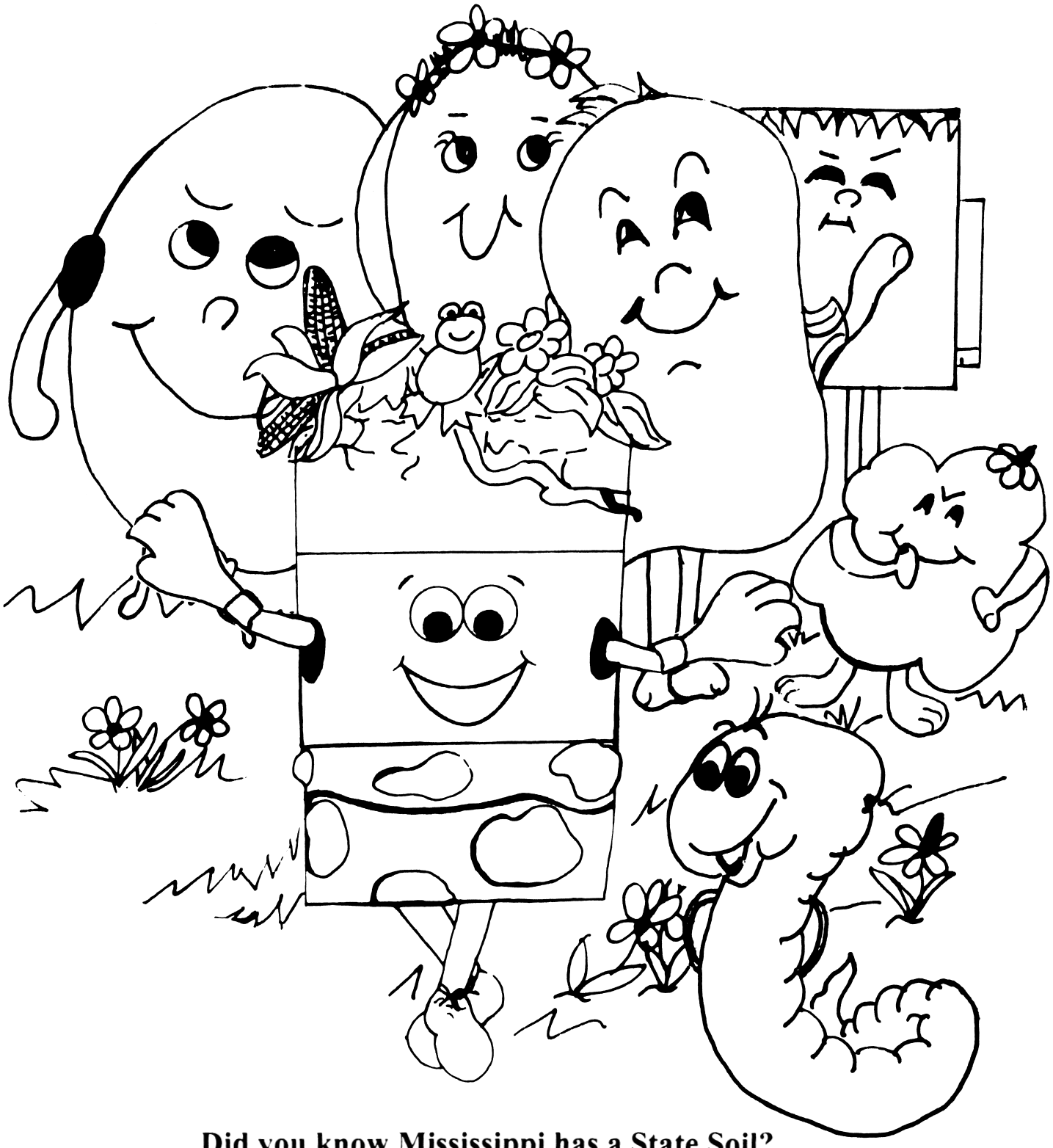
Wetlands help recharge aquifers. T or F

List plants and animals found in wetlands.

1.
2.
3.
4.

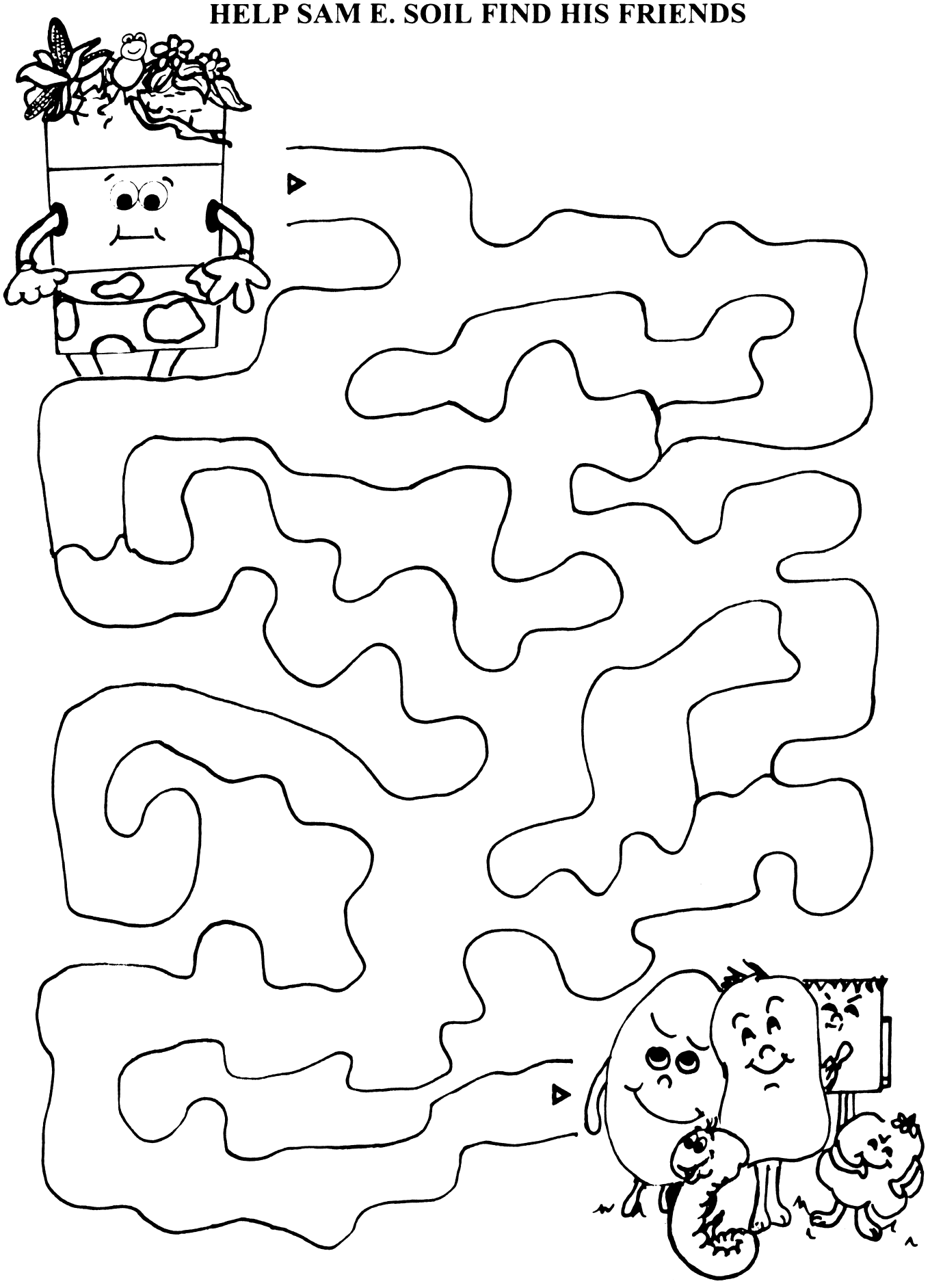


Soil comes in all shapes and sizes !!!
Meet Sam E. Soil's Friends



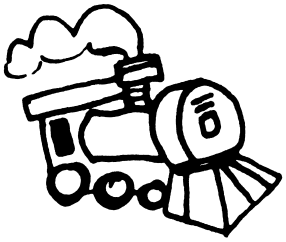
Did you know Mississippi has a State Soil?
Natchez Silt Loam

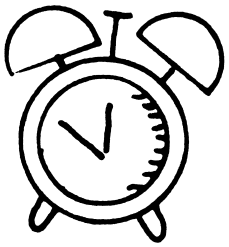
HELP SAM E. SOIL FIND HIS FRIENDS



SAM E. SOIL SAYS

DRAW A LINE FROM THE WORD TO THE PICTURE THAT RHYMES.



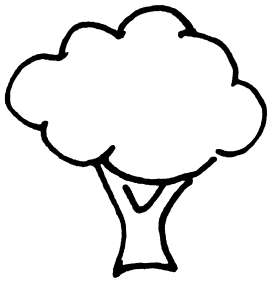


dirt

bee

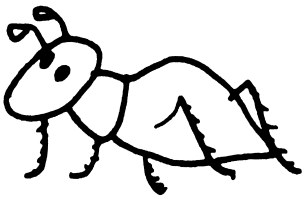
plant

grass



rose

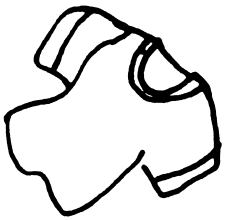
lake



rain

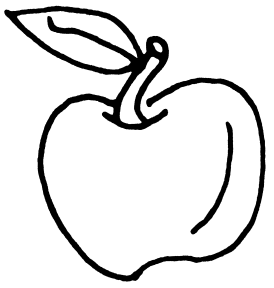
land

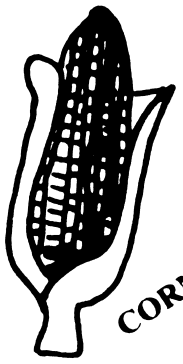
shower



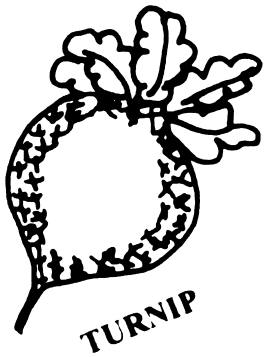
rock

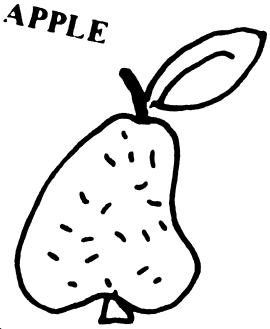
WHERE DO I BELONG???
SAM E. SOIL KNOWS – DO YOU????

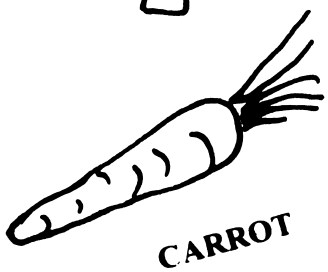

APPLE


CORN

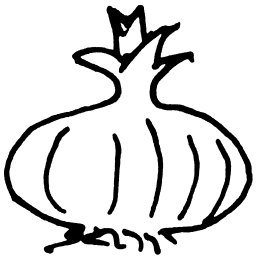

PEANUT

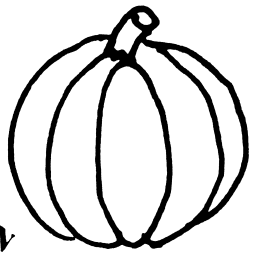

TURNIP

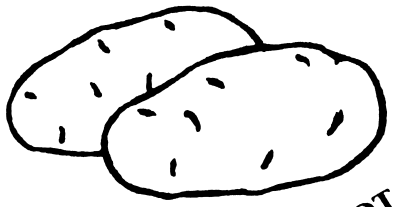

PEAR


CARROT


COTTON


ONION

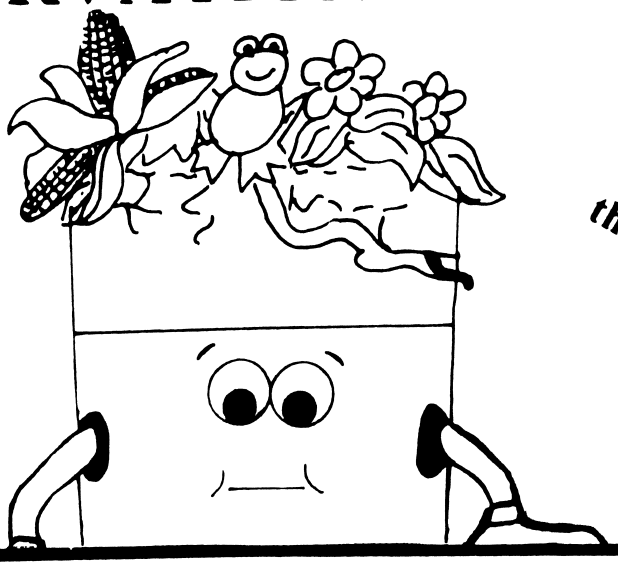

PUMPKIN


POTATO

ABOVE GROUND

BELOW GROUND

CONSERVATION



Please help SAM E. SOIL find the Conservation Words

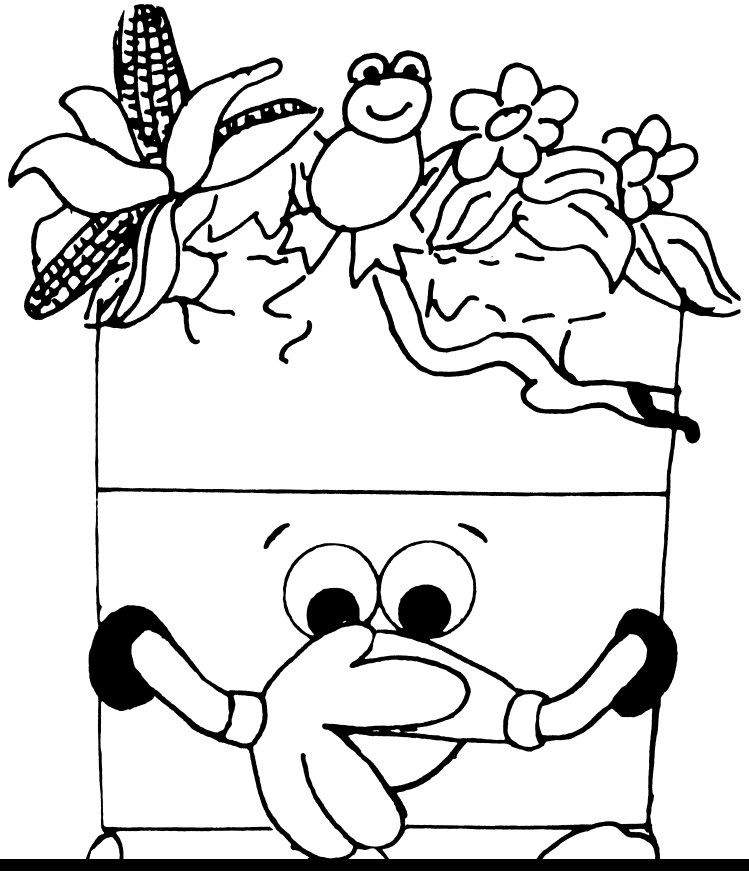
R	G	R	M	J	S	N	P	N	F	L	Y	N	M	T
S	D	R	E	J	V	O	O	D	R	I	L	O	I	D
A	T	L	A	H	E	I	M	A	O	O	S	I	N	D
C	E	N	B	Q	T	T	I	A	O	S	K	S	E	T
N	G	L	A	U	S	A	S	M	T	K	C	O	R	T
Y	J	V	L	L	P	V	E	A	S	E	O	R	A	K
K	E	L	S	V	P	R	V	W	W	V	R	E	L	Y
R	O	A	W	A	T	E	R	S	H	E	D	I	S	P
P	R	F	L	I	O	S	B	U	S	T	S	L	A	G
R	G	M	H	S	D	N	I	W	O	D	A	R	B	L
S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

ANIMALS
CONSERVATION
EROSION
GARBAGE
GRASS
MATERIAL
MINERALS
ORGANIC
OXYGEN
PARENT
PLANTS
POLLUTION
ROCKS
ROOTS
SOIL
SUBSOIL
TOPSOIL
TREES
WASTE
WATER
WEATHER
WATERSHED
WINDS

FIND OUR
SEVEN NATURAL RESOURCES

SOIL WATER AIR
MINERALS PLANTS PEOPLE WILDLIFE

W	A	T	E	R	C	D	H	N	E	O	H
O	A	M	T	E	O	I	B	R	E	N	C
L	M	O	E	V	F	G	H	A	I	L	T
P	E	E	L	O	N	I	F	B	H	E	I
R	I	A	F	M	S	M	L	P	O	N	D
Z	O	B	V	L	N	I	S	D	P	O	T
W	V	O	I	M	E	N	E	T	L	E	R
L	E	O	Z	L	O	E	B	T	A	I	A
D	S	L	P	E	V	R	E	Z	N	O	W
R	O	O	L	Z	I	A	I	R	T	M	T
H	E	V	S	R	T	L	O	V	S	B	O
P	E	V	O	H	S	S	E	S	T	E	R



DECODE AND CHOOSE THE DECODED WORD TO FILL IN THE BLANKS BELOW!

3 15 13 16 15 19 20

5 14 22 9 18 15 14 13 5 14 20

13 9 14 5 18 1 12 19

14 1 20 21 18 1 12 18 5 19 15 21 18 3 5 19

19 15 9 12 5 18 15 19 9 15 14

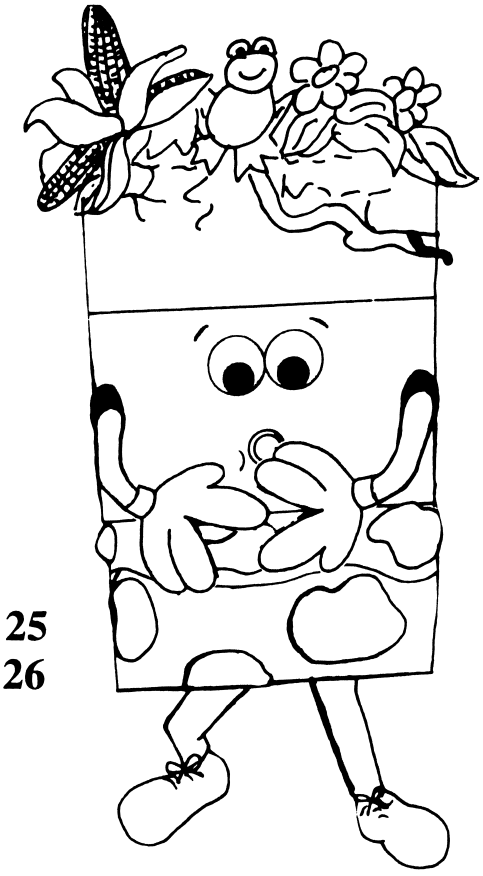
20 18 5 5 19

23 1 20 5 18 19 8 5 4

16 15 12 12 21 20 9 15 14

12 1 14 4 19 3 1 16 9 14 7

16 18 5 3 9 16 9 20 1 20 9 15 14



A = 1	G = 7	M = 13	S = 19	Y = 25
B = 2	H = 8	N = 14	T = 20	Z = 26
C = 3	I = 9	O = 15	U = 21	
D = 4	J = 10	P = 16	V = 22	
E = 5	K= 11	Q = 17	W= 23	
F = 6	L = 12	R = 18	X = 24	

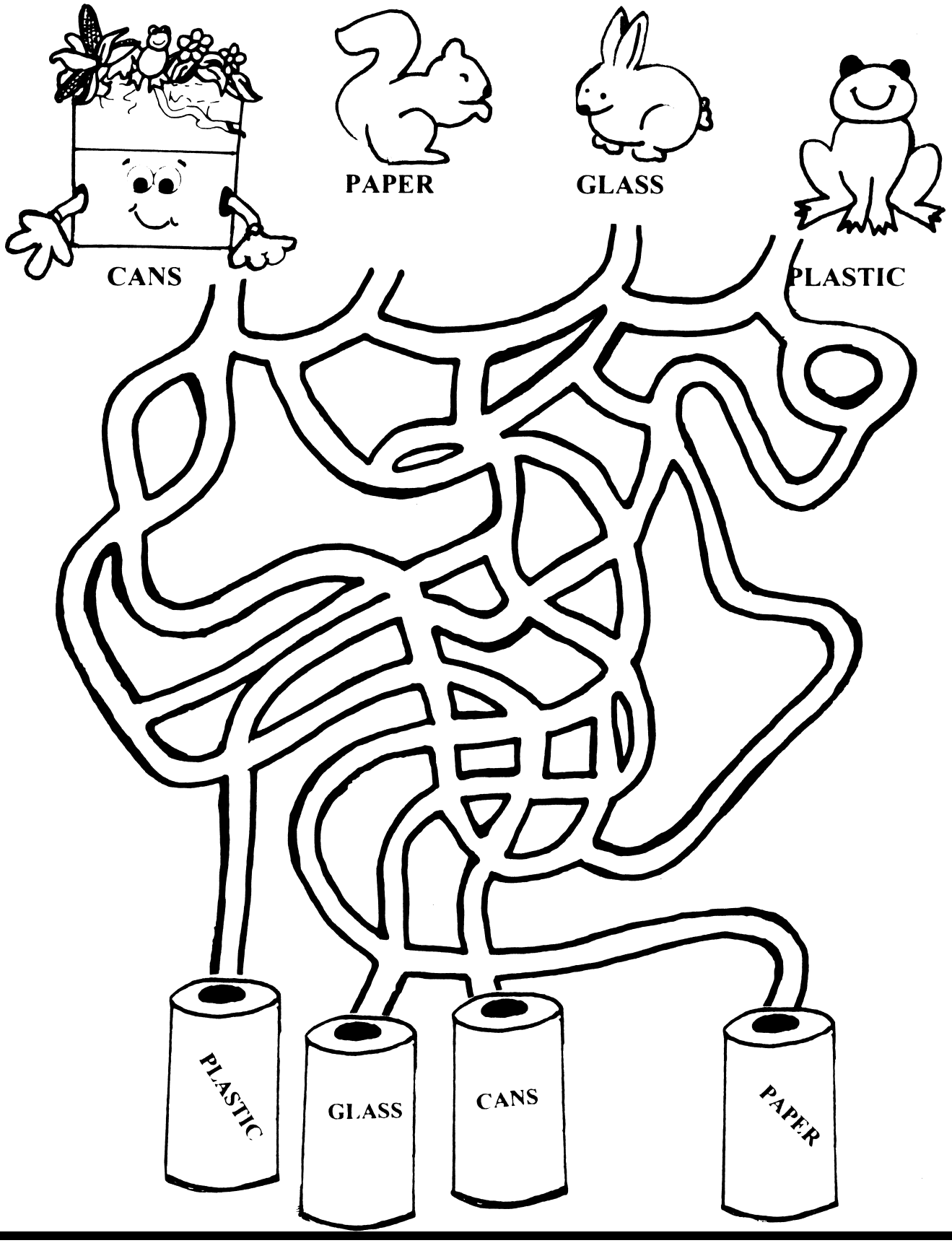
Taking care of our air, soil and water is saving our _____.

Natural or manmade contamination of resources is _____.

The area of land that drains into a common body of water is a _____.

Decayed kitchen scraps and yard debris is_____.

SAM E. SOIL , JACKIE RABBIT, ROBBYE SQUIRREL AND FREDDIE FROG ALL SAY, "DON'T LITTER – RECYCLE" HELP THEM GET TO THE CORRECT RECYLE BINS!!



Sam E. Soil says: Circle the words in the puzzle and write them in correct order to make a sentence!

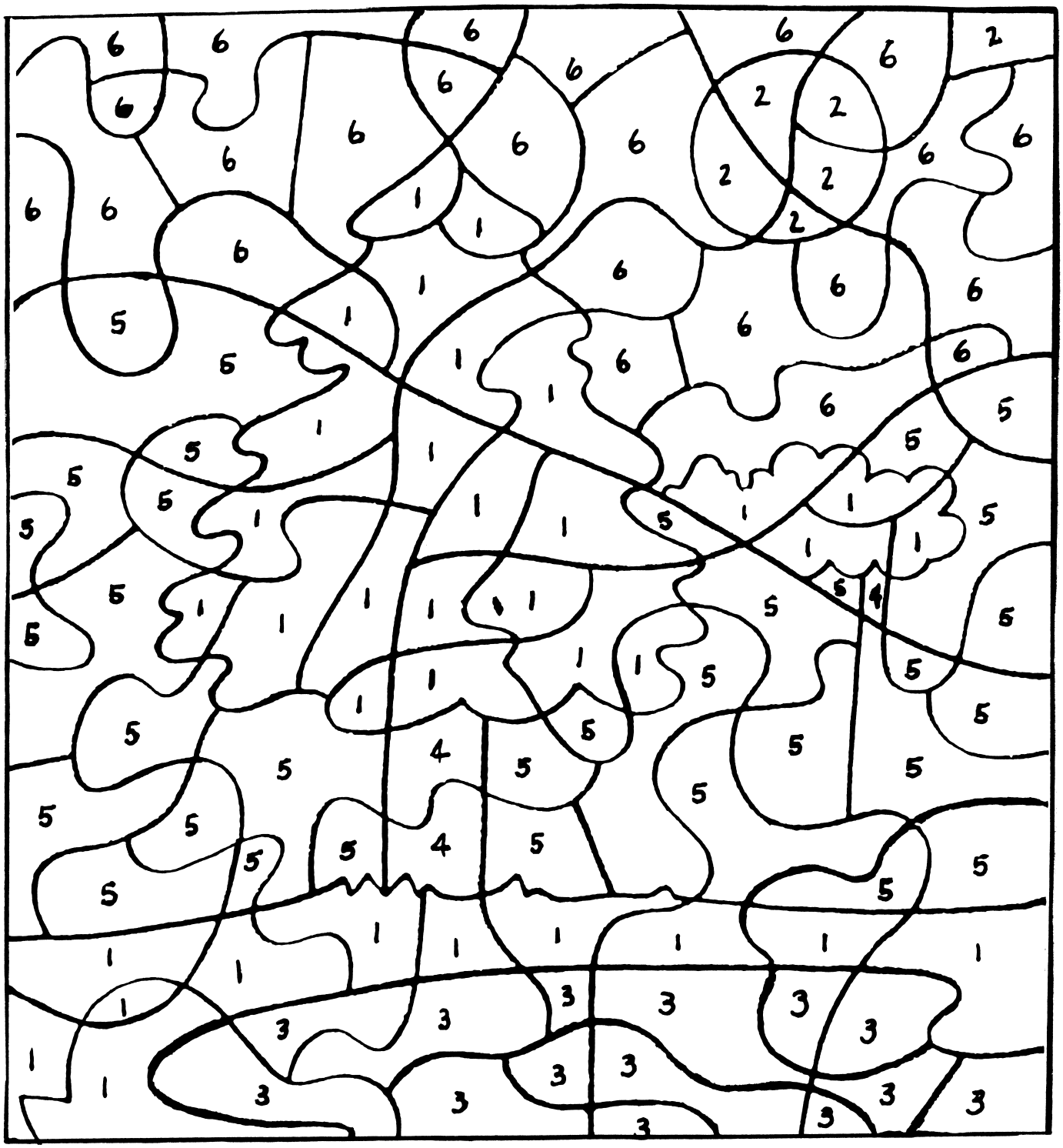
P	S	O	I	L	P	R	O
S	R	V	I	D	E	S	O
E	U	O	R	F	O	O	D
H	D	A	V	S	N	D	O
T	C	L	O	I	O	T	O
O	R	U	O	H	D	I	F
L	B	F	R	N	I	E	M
C	D	N	A	S	R	O	S

AND
CLOTHES
FOOD
OUR
PROVIDES
SOIL

_ _ _ _   _ _ _ V _ _ _ _   _ _ _

_ _ _ _   _ _ _   _ _ _ T _ _ _.

COLOR BY NUMBERS



1 – Dark Green
2 - Yellow
3 – Dark Blue
4 – Brown
5 – Light Green
6 – Light Blue

WHAT DO YOU KNOW ABOUT YOUR STATE?

Line # 1 Write the name of our state.
Line # 2 Write two animals native to your state.
Line # 3 Write three cities in your state.
Line # 4 Write four of your state's agricultural products.
Line # 5 Write three birds native to your state.
Line # 6 Write your state's insect and flower.
Line # 7 Write the name of our state soil.
Line # 8 Write the word to complete the sentence.
My State is known as the_____ state.

_____

_____ _____

_____ _____ _____

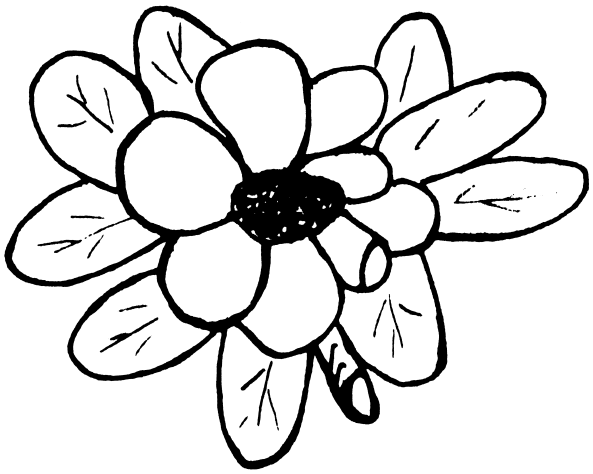
_____ _____ _____ _____

_____ _____ _____

_____ _____

_____

_____



Building Better Soil - Taste the Difference!

It has been said that the average person consumes over a bushel of dirt in their lifetime. Doesn't sound too appetizing, does it? Although it takes a long time to build real soil, you can make a fun visual representation of soil in a few minutes. The recipe below is for "edible soil" that not only tastes good, but also helps children (and adults) learn how soil is formed.

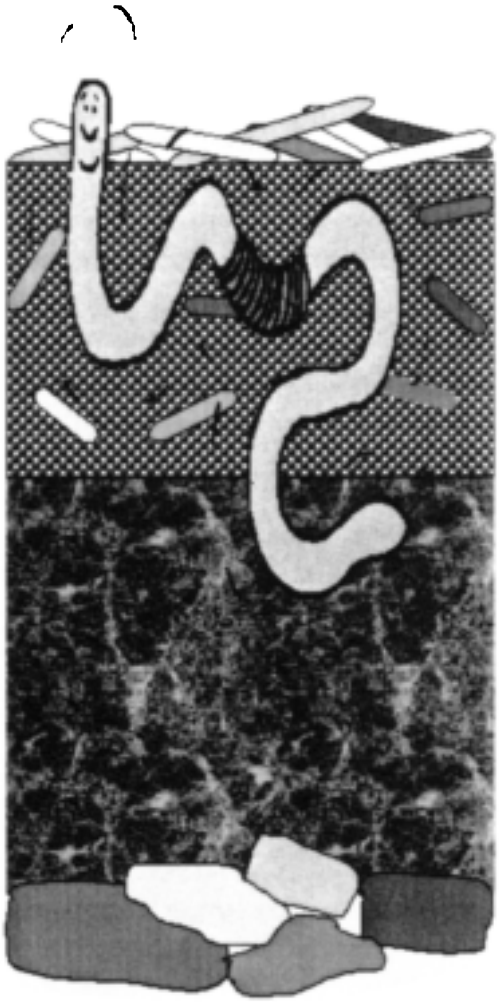
Residue

Topsoil

Organisms
Earthworms
Bacteria
Fungi

Subsoil

Parent Material



SOIL PROFILE

Colored Coconut

Crushed Chocolate Cookies

Sprinkles
Gummy Worms

Chocolate Pudding

Candy-coated Chocolate

Explanation of Soil Profile

All soil starts with a parent material such as weathered bedrock (e.g. limestone, sandstone, gneiss, schist, etc.) or boulders transported by glaciers. The type of parent material determines the type of texture (amount of sand, silt and clay) a soil will have, and thus whether the soil is a silt loam, silty clay, sand, etc.

Subsoil takes hundreds or thousands of years to build. Agents such as rain and growing plants slowly break the parent material down into smaller and smaller pieces until it eventually becomes subsoil.

Topsoil is at the surface of the soil and is necessary for plant growth. As subsoil continues to be exposed to the elements of weather such as freeze-thaw cycles and rain, it begins to develop horizons or visible layers. As plants and animals in the uppermost layer die, their remains become organic matter and make a healthy dark brown or black topsoil.

Organisms such as fungi, bacteria, earthworms and plant roots live in topsoil. They decompose manure, plant residue and crop pests. Other organisms in the soil "fix" nitrogen from the air and make it available to help plants grow.

Residue is the stalks, stems, leaves of last year's crop that is left on top of the soil. Conservation tillage is a system of farming where the soil is disturbed as little as possible (minimally tilled), allowing lots of residue to cover and protect the soil surface.

Earthworms love residue because it provides food for them and moderates the temperature of the soil. The practice of conservation tillage not only protects the precious topsoil from erosion (where soil is washed into rivers making them dirty), but it encourages more earthworms - and the more earthworms, the better the topsoil!

Bacteria are microscopic, single-celled organisms. A teaspoon of soil generally contains over 100 million bacteria!

Fungi are usually multi-celled organisms that are neither plants nor animals. Fungal cells form long chains called hyphae and may form fruiting bodies such as mold or mushrooms to disperse spores.

Better Soil Recipe

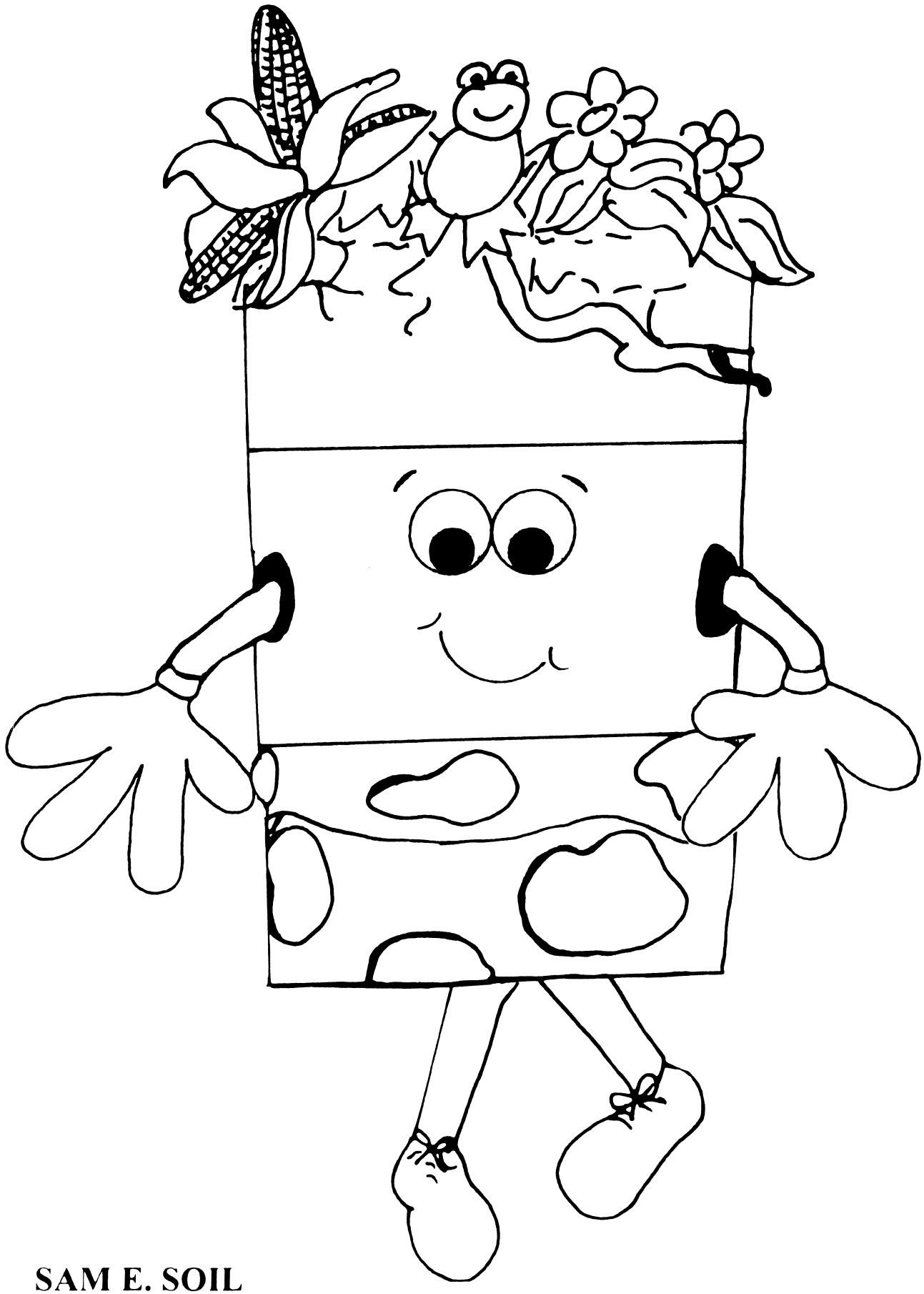
Ingredients/Items needed for a class of 30:

- **Copy of SOIL PROFILE from Better Soil website**
- **6 small (approx. 1-cup) clear containers**
- **30 (2 oz.) plastic portion cups (available at restaurant food store)**
- **36 plastic spoons**
- **30 napkins**
- **16 oz. candy coated chocolate (with or without nuts)**
- **2 (15 oz) cans of pudding (light chocolate or butterscotch)***
- **30 gummy worms**
- **½ cup+ colored sprinkles**
- **15 chocolate sandwich cookies, crushed**
- **½ cup coconut**
- **yellow, brown or green food coloring**

Instructions:

1. **Print a copy of the SOIL PROFILE. Laminate for durability.**
2. **Pour candy coated chocolate into a clear container and place by the word Parent Material on the SOIL PROFILE.**
3. **Open a can of pudding (or make a box of pudding*) and pour it into a clear container and place by the word Subsoil.**
4. **Place chocolate sandwich cookies into a sealed plastic bag and crush using a rolling pin. (Or, cookies can be crumbled with a food processor.) Pour into a clear container and place beside the word Topsoil.**
5. **Pour sprinkles into a clear container and place by the word Organisms.**
6. **Place coconut in a plastic container with a tight-fitting lid. Add a couple of drops of food color. Snap lid on and shake container for 30 to 45 seconds. Dump coconut onto paper towels to dry. When coconut appears dry (about ½ hour), place into clear container and put beside the word Residue.**
7. **Place gummy worms in clear container and put beside the word Earthworms.**
8. **Place a plastic spoon in each container of the 6 clear containers.**
9. **Demonstrate building better soil to the audience before turning them loose to make their own! Scoop a spoonful of candy-coated chocolates into the bottom of a 2 oz. portion cup; discuss what Parent Material is Repeat this procedure with the pudding (Subsoil), followed by cookie crumbs (Topsoil), sprinkles (Organisms), coconut (Residue) and finally a gummy worm (Earthworms).**
10. **Let the audience make their own better soil....and enjoy!**

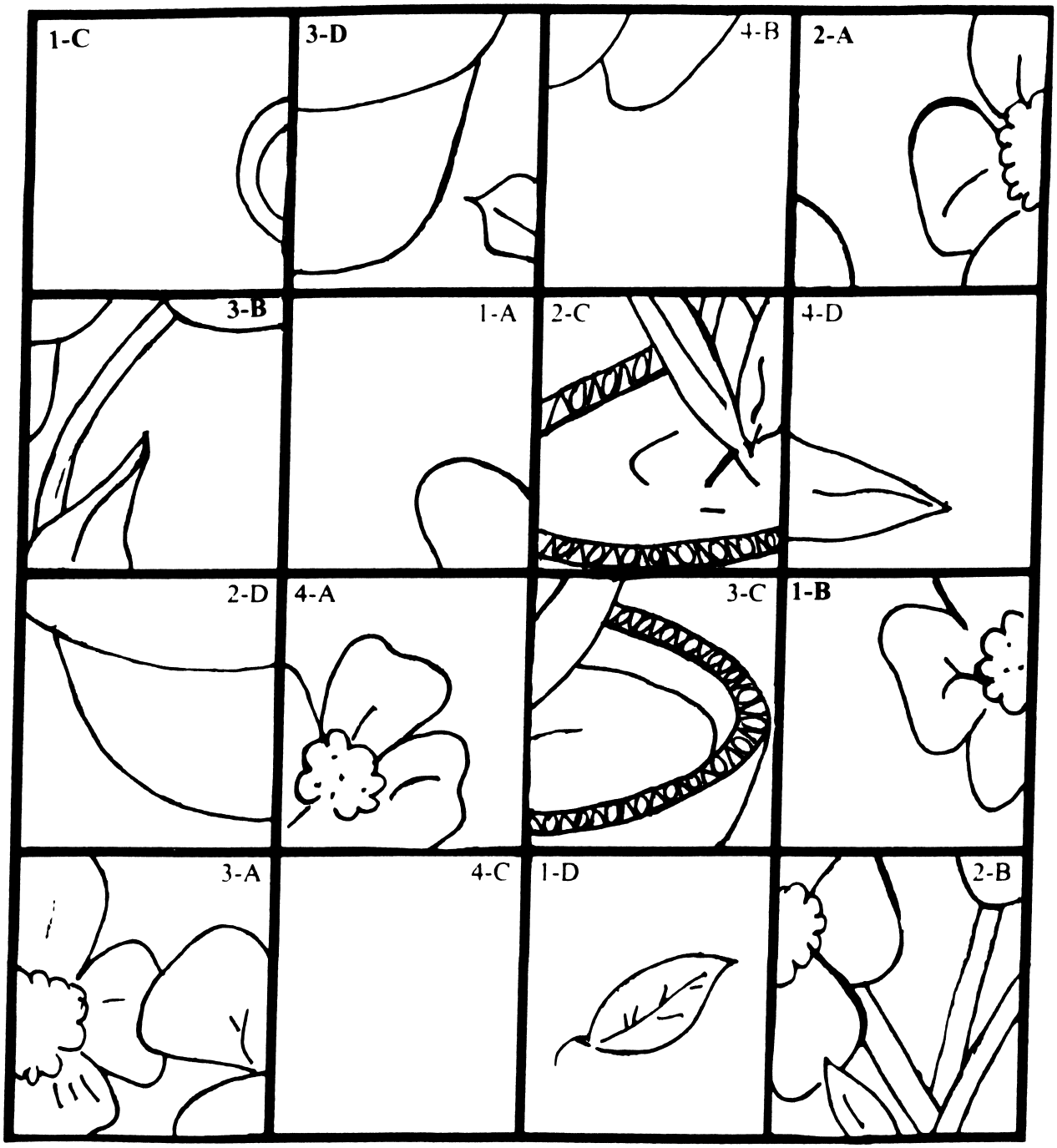
** One (3.8 oz) box of instant pudding may be used in place of the canned pudding. Mix according to directions on package. If light chocolate pudding is not available, mix vanilla pudding with chocolate to obtain a color similar to subsoil.*



SAM E. SOIL

COPY to a sheet of paper - then

Cut out the following pictures to place in the correct boxes. Use letters and numbers to tell you where each piece belongs.



GLOSSARY

Air – The mixture of invisible gases (78% nitrogen and 21% oxygen) that surround the earth.

Agricultural – Is anything concerning farming or gardening; the science, art, and business of cultivating soil, producing crops, and raising livestock; farming.

Aquifer – A water-bearing stratum (layer) of permeable rock, sand, or gravel. A well can be drilled into an aquifer where large quantities of water are stored in the spaces between the rock, sand, or gravel. Then the water may be used as follows: by homeowners or communities for drinking and domestic water supply; by farmers to irrigate (water) their crops; or by an industry in a manufacturing process.

Compost – A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.

Contamination – Is the intrusion (entry) of impurities, nutrients, or dirt into the water, soil, food and other materials that leads to various kinds of pollution and may lead to impairment or failure of the system or product.

Ecosystem – A community of living things (animals, plants, and micro-organisms) existing together with the environment in which they live. All exist in a delicate, complex, interdependent balance. Altering or moving something within the environment can disrupt the balance and function of an ecosystem.

Environment - The sum of all external conditions (surroundings) affecting the life, development and survival of an organism (plants, animals, micro-organisms, etc.).

Erosion – It is the wearing away, eating away, washing away and leaching away of soil.

Garbage – It is waste which is purged or cleansed away.

Landscaping – It refers to any activity that modifies the visible features of an area of land. It can include the planting of trees, shrubs, plants, and flowering plants.

Mineral – Is a naturally occurring, inorganic, crystalline solid, with a fixed range of chemical composition and physical properties such as calcium, sulfur, zinc, etc.

Natural Resources – Natural assets (raw materials, water, soil, etc.) occurring in nature that can be used for consumption (food), fiber (cotton for clothes or trees for paper) or economic production (coal, oil).

Organic – (1) of, relating to, or derived from living organisms. In topsoil, organic substances such as decomposing plant material and manure give vital nutrients to the soil and help plants to grow. (2) The growing of plants without the use of pesticides, synthetic fertilizers, sewage sludge, genetically modified organisms, or ionizing radiation. Animals that produce meat, poultry, eggs, and dairy products do not take antibiotics or growth hormones.

Oxygen – It is a non-metallic bivalent element that is normally a colorless tasteless nonflammable diatomic gas; constitutes 21 percent of the atmosphere by volume; the most abundant element in the earth's crust. People and most animals must breathe oxygen for survival.

Parent Material – It is the earthy materials, both mineral and organic, from which soil is formed.

Pollute – Is to make unfit for or harmful to living things.

Pollution – It is the act of contaminating with substances that are either harmful or out of place, such as too much soil or fertilizer washing into a river.

Precipitation – Rain, sleet, hail, snow, and other forms of water falling from the sky.

Rain – Is water falling in drops from the clouds; the descent of water from the clouds in drops.

Recycle – To use again, especially to reprocess.

Residue - It is the matter remaining at the end of a process, as after evaporation, combustion, or filtration.

Rock – A mineral matter of variable composition, or unconsolidated which is assembled in masses or considerable quantities in nature, as by the action of heat or water.

Sediment – Is any particulate matter that can be transported by fluid flow and which eventually is deposited as a layer of solid particles on the bed or bottom of a body of water or other liquid.

Subsoil – It is the layer of soil beneath the topsoil.

Topsoil – Surface soil usually including the rich, organic layer in which plants have most of their roots. The topsoil layer is usually no deeper than approximately 20 centimeters.

Waste – It is the destroying, stripping, wearing away or throwing away of a substance. Waste can be material derived by mechanical and chemical weathering of the land (soil) and moved down sloping surfaces and carried by streams to the sea. Waste such as garbage, rubbish, human/animal waste (sewage and manure), and used motor oil can sometimes be reused or recycled.

Water – The liquid that descends from the clouds as rain and forms streams, lakes, seas, and underground aquifers. Water is a clear, colorless, odorless, and tasteless liquid, essential for most plant and animal life and the most widely used of all solvents (to dissolve things in). It is a molecule made up of two hydrogen atoms and one oxygen atom (H20).

Water cycle – It is the cycle that involves the continuous circulation of water in the earth and atmosphere system. The most important processes are evaporation, transpiration, condensation, precipitation, runoff, and groundwater (aquifer) recharge. Although the total amount of water within the cycle remains essentially constant, its distribution among the various processes is continually changing.

Watershed – The region (area of land) draining into a river, river system, or other body of water.

Weather – The state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind velocity and barometric pressure.

Wetland – A lowland area, such as a marsh or swamp, which is saturated with moisture, especially when regarded as the natural habitat of wildlife.

Wildlife – Living things and especially mammals, birds, and fish that are neither human nor domesticated.

Wind – Air in natural motion, such as a gale, storm or hurricane.

ANSWER SHEET

PAGE 3 – OUR ENVIRONMENT

RIOGANC	O R G A N I C (5)
GABGERA	G A R B A G E
XONGEY	O X Y G E N (4)
NIWD	W I N D
LOIS	S O I L
SOORIEN	E R O S I O N (2)
AVENNORSITOC	C O N S E R V A T I O N (7)
LINSERMA	M I N E R A L S (1)
TERWA	W A T E R
SOCKR	R O C K S (3)
TOOPILS	T O P S O I L (6)

R E C Y C L E
1 2 3 4 5 6 7

PAGE 4 – MAGIC SQUARE

4 – WATER	3 - WATER	8 - WATER
9 - SUNSHINE	5 - SUNSHINE	1 - SUNSHINE
2 - SOIL	7 - SOIL	6 - SOIL

PAGE 9 – IMPORTANCE OF WETLANDS

SOIL is the most common substance found on earth.

The amount of water on earth has not changed since the earth was formed. T or F

All lakes and rivers are safe for swimming. T or F

Wetlands help with flood control. T or F

Very few animals live in wetlands. T or F

Wetlands help clean sediment and chemicals from soil. T or F

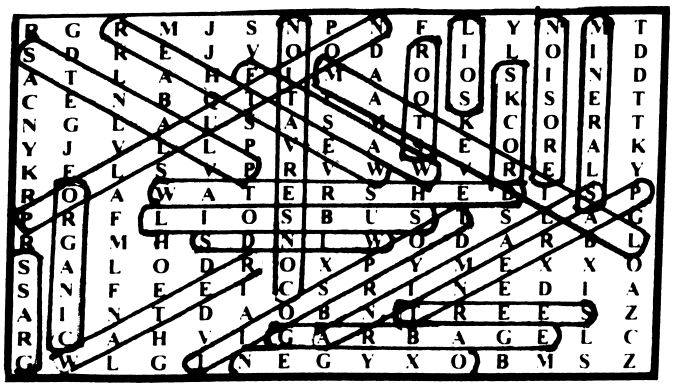
Wetlands are very, very important to our planet's ecosystem. T or F

Name a common wetland tree. BALD CYPRESS

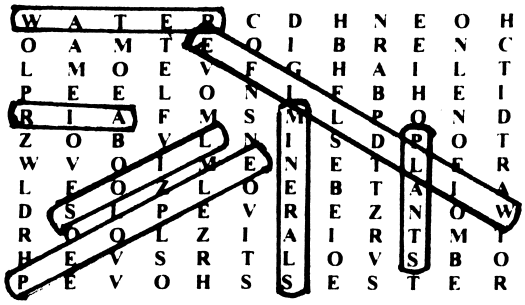
Wetlands help recharge aquifers. T or F

List plants and animals found in wetlands.
1. BEAVER
2. FROG
3. CAT TAILS
4. BALD CYPRESS

PAGE 14 – CONSERVATION WORDS



PAGE 15 – SEVEN NATURAL RESOURCES



PAGE 16 – DECODE

C O M P O S T
3 15 13 16 15 19 20

E N V I R O N M E N T
5 14 22 9 18 15 14 13 5 14 20

M I N E R A L S
13 9 14 5 18 1 12 19

N A T U R A L R E S O U R C E S
14 1 20 21 18 1 12 18 5 19 15 21 18 3 5 19

S O I L E R O S I O N
19 15 9 12 5 18 15 19 9 15 14

T R E E S
20 18 5 5 19

W A T E R S H E D
23 1 20 5 18 19 8 5 4

P O L L U T I O N
16 15 12 12 21 20 9 15 14

L A N D S C A P I N G
12 1 14 4 19 3 1 16 9 14 7

P R E C I P I T A T I O N
16 18 5 3 9 16 9 20 1 20 9 15 14

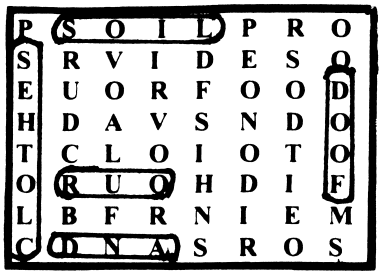
Taking care our air, soil and water is savings our natural resources.

Natural or manmade contamination of resources is pollution.

The area of land that drains into a common body of water is a watershed.

Decayed kitchen scraps and yard debris is compost.

PAGE 18 – WORD PUZZLE



S O I L P R O V I D E S O U R
F O O D A N D C L O T H E S.

PAGE 19 - WHAT DO YOU KNOW

#1 MISSISSIPPI

#2 RABBIT SQUIRREL

#3 JACKSON CANTON OXFORD

#4 COTTON CORN SOYBEANS PEANUTS

#5 HONEY BEE MAGNOLIA

#6 MOCKINGBIRD CARDINAL BLUEJAY

#7 NATCHEZ SILT LOAM

#8 MAGNOLIA

SAM E. SOIL

An Activity Book About
Soils and Other Natural Resources

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