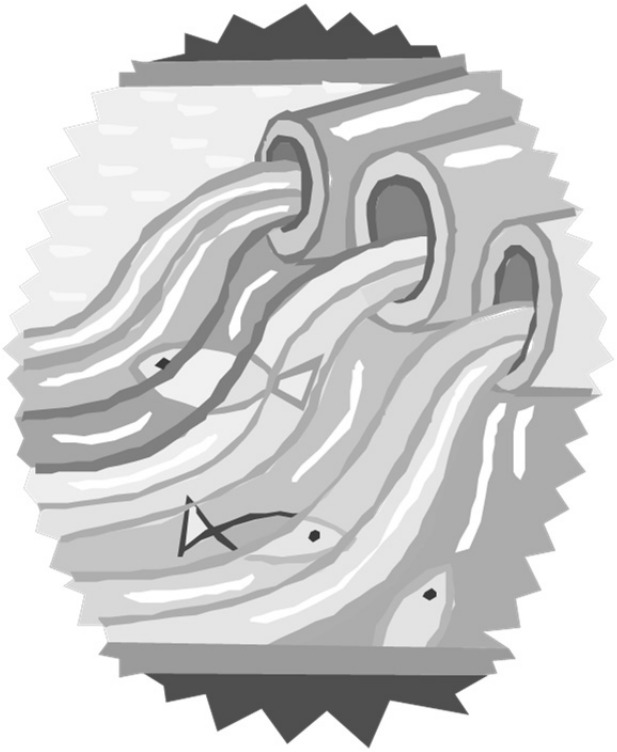
This booklet belongs to:_____

The Spring Creek Stormwater Activity Book



An activity booklet designed to teach children about water resources and stormwater pollution

Created by the MS4 Partners
College, Ferguson, Harris, and Patton Townships;
Penn State; and State College Borough

What is Stormwater?

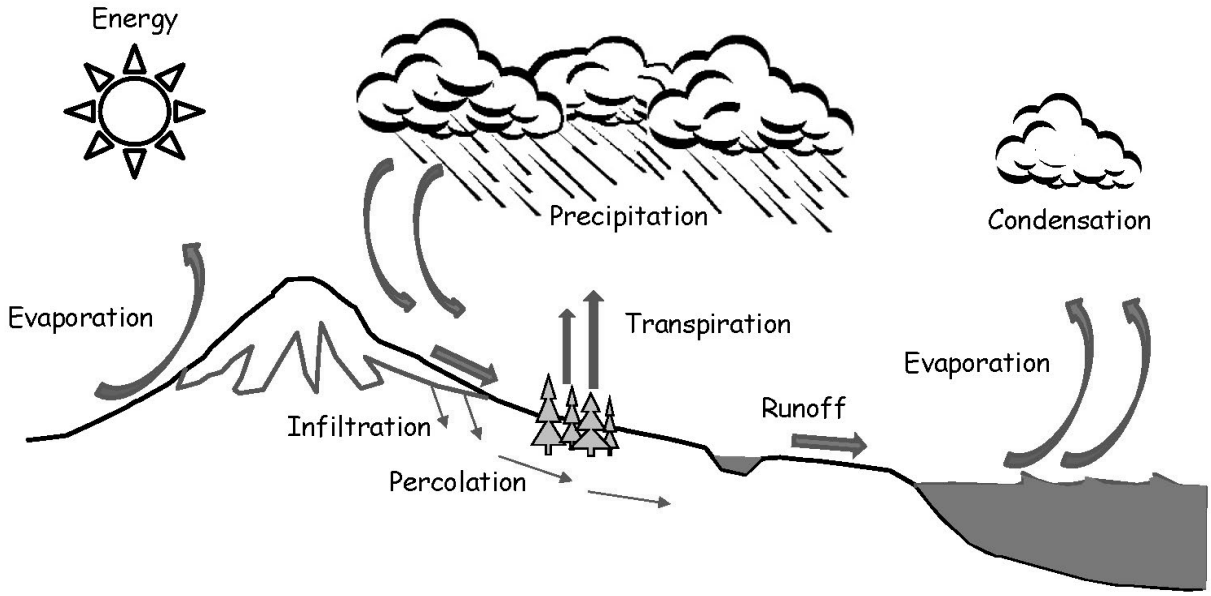
When rain falls or snow melts, where does the water go? Some is soaked into the ground, some sits in puddles, and some disappears. Water that flows over the land surface, downhill to the nearest stream or ditch; we call stormwater runoff.

When storm drains are free of debris, water can easily drain from roadways. When storm drains are clogged, this causes the potential of flooding on roadway surfaces, which can also cause contamination. Never put anything down a storm drain.

Solve the hidden message. Use the clues below.

Activity Challenge: What secret messages can you make using the above code letters or your own symbols?

The Water Cycle



Evaporation: When water is heated by the sun, it causes the water to turn into vapor and rise into the air.

Transpiration: Water that plants give off as vapor.

Condensation: When water vapor cools, it turns into tiny drops of water. These combine to make clouds.

Precipitation: The water in the clouds falls to the earth as rain or snow.

Runoff: The water falling to the ground through precipitation runs back into the lakes, rivers and oceans over the surface of the ground.

Infiltration: When water enters the soil surface.

Percolation: What water's called after it's infiltrated into the ground and then moves through the soils.

Hydrology: The study of how water moves through the environment.

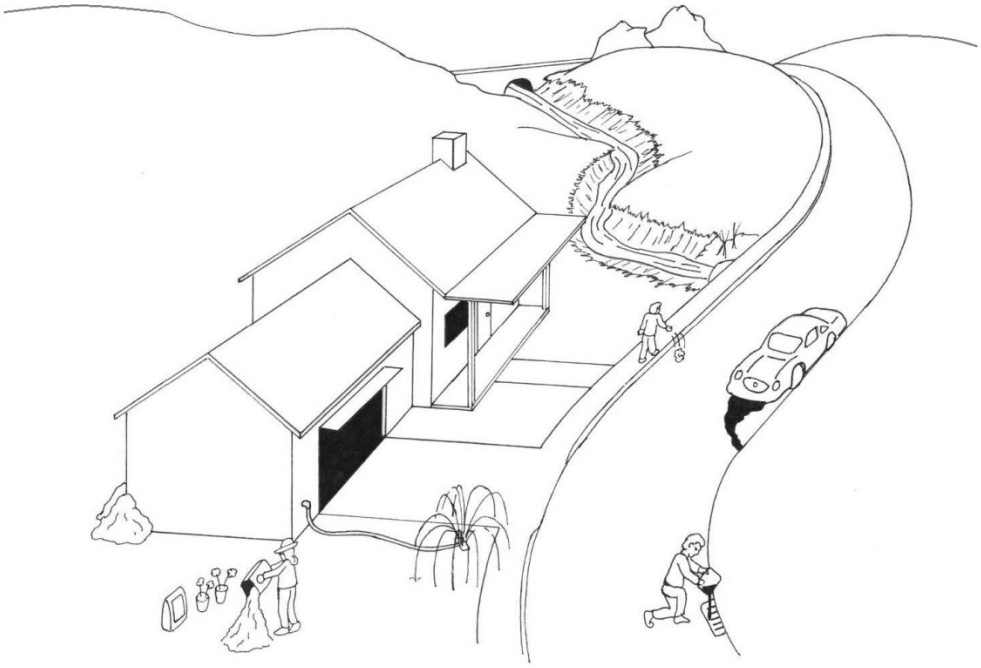
Karst: A landscape term in a carbonate watershed like Spring Creek where sinkholes, closed depressions and blind valleys (valley with an abrupt ending) have developed over geologic time. Water that enters sinkoles can move rapidly and potentially contaminate groundwater.

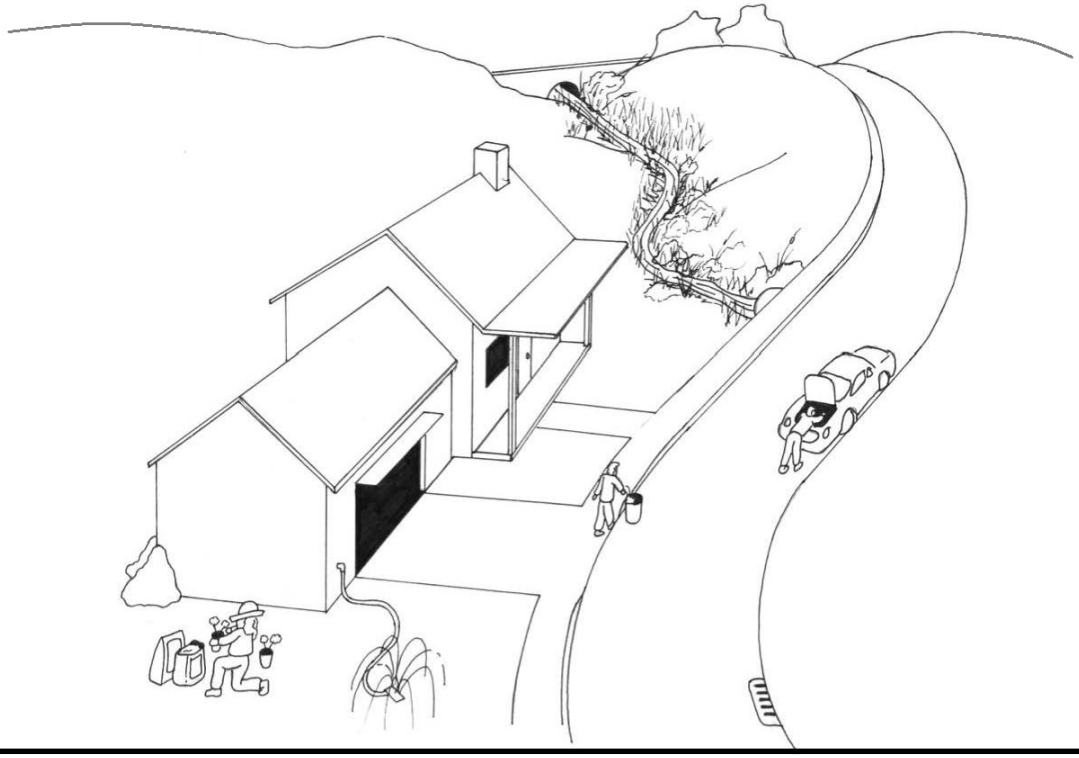
Impervious Surfaces: Are mainly artificial surfaces like roofs, roads, sidewalks, and parking lots that are impenetrable to water, which makes water runoff.

Did you know that the water you drink is as old as the earth itself? Dinosaurs may have swum in the water from your kitchen sink. The earth's water supply is about the same as it was millions of years ago. That's because every molecule of water is recycled over and over through the water cycle. More than 99% of the earth's water is salt water in the ocean or trapped in the ice caps or deep underground. That leaves only 1% of the earth's water available for us to use. Let's make sure we protect that water and keep it clean.

Stormwater Pollution Picture Search

Cities and towns have more stormwater runoff than areas in the country because they have more concrete so the water can't soak into the ground. Impervious surfaces like roads and parking lots can contribute lots of pollutants to our streams. Compare the two pictures below. Circle all the differences between them that you can find that could result in polluted runoff. You should find 6 things.

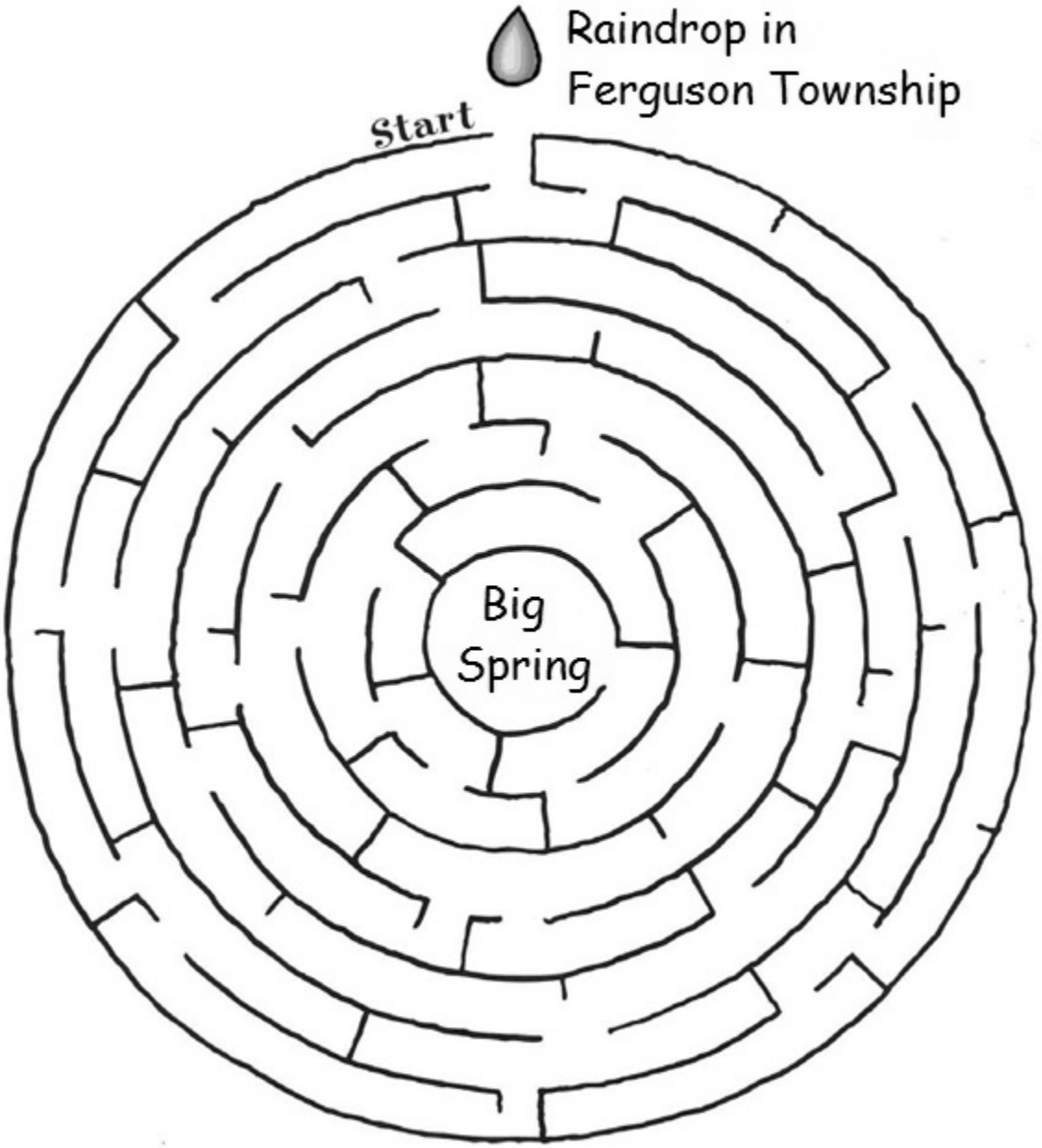




Activity Challenge: What do these differences have to do with protecting our water from stormwater runoff?

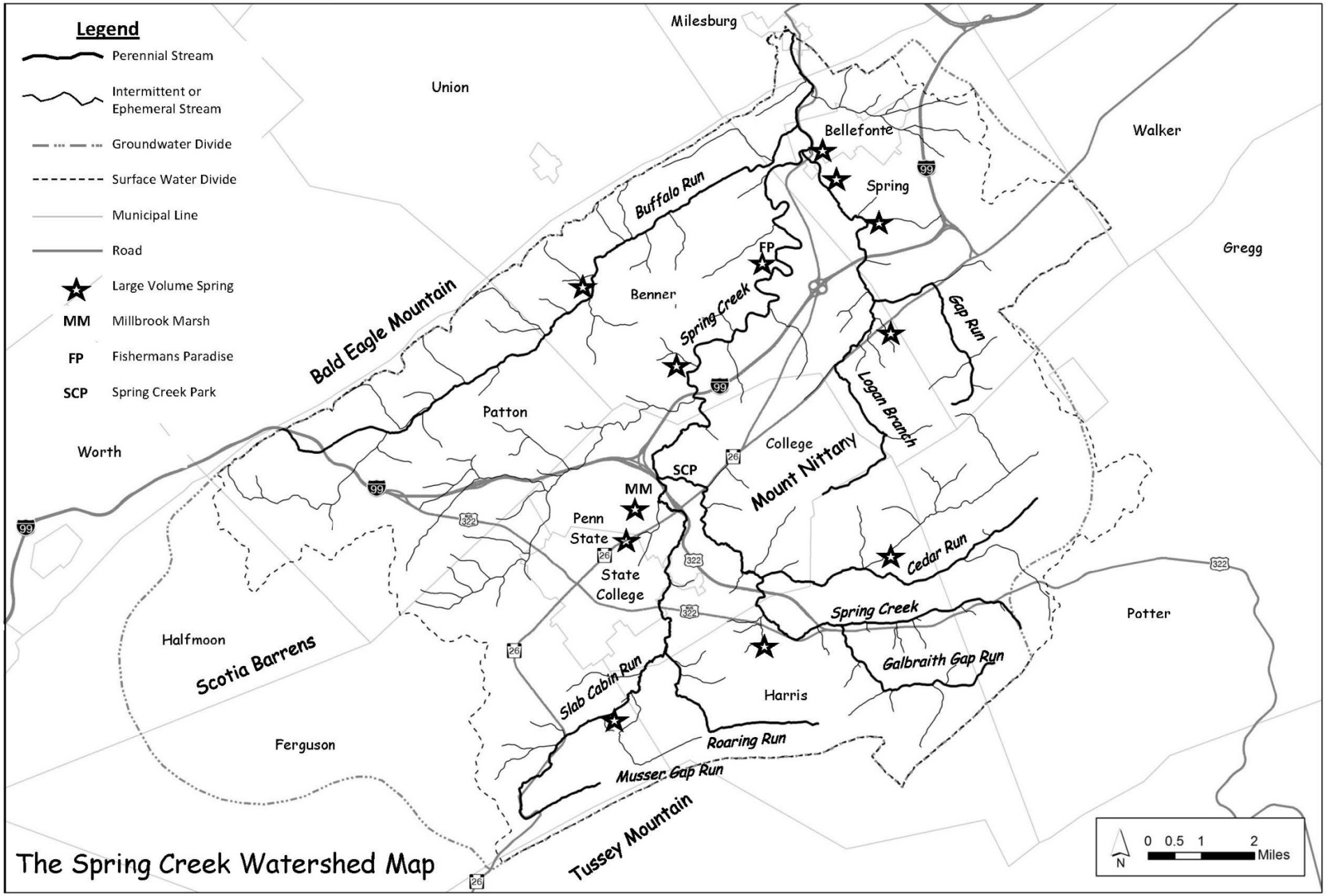
Water Maze

How water moves in and around the Spring Creek Watershed can be very complex due to the carbonate geology. Lead the water droplet through the maze from where it landed in the upper reaches of Ferguson Township to the Big Spring in Bellefonte.



Did you know that a cistern is a tank for storing rainwater and rain barrels are a type of cistern? Many older homes and farms in the region had cisterns.

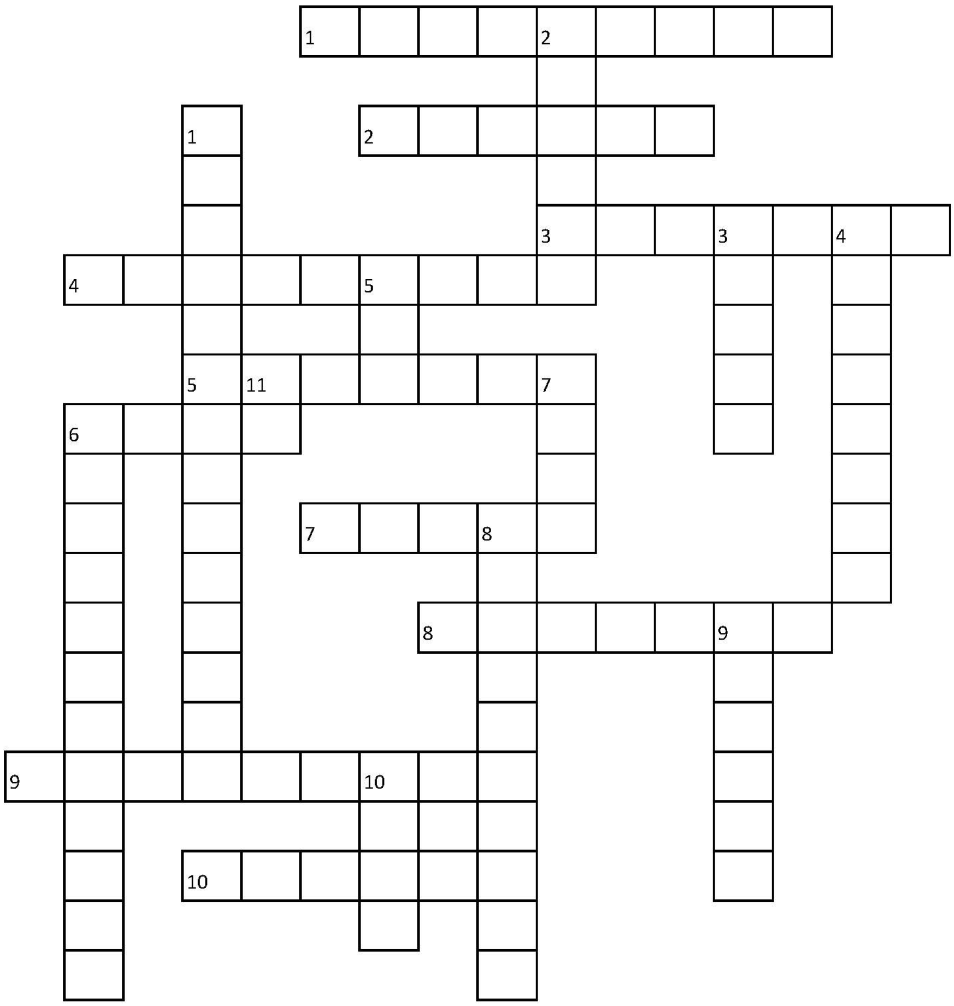
Activity Challenge: Create your own maze with multiple exits. Is there any shape that works best?



A high quality color map can be obtained from ClearWater Conservancy or your MS4 Partner Municipality.

Crossword Puzzle

Everything we do is interconnected and can affect something else. Complete the crossword puzzle below. Hint, many of the words can be found in this activity book.



Across

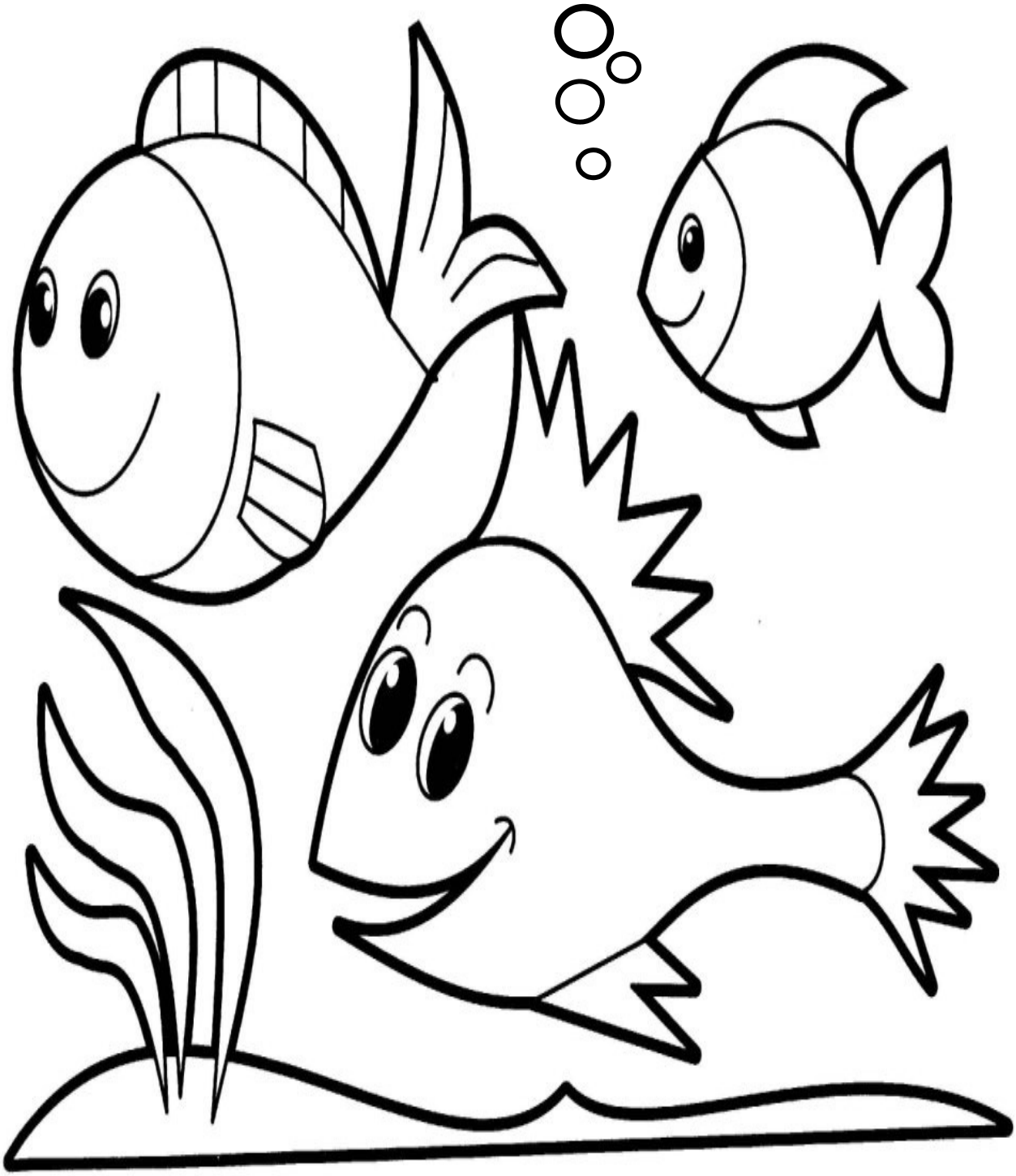
1) A local University
2) A rain _____, for storing water
3) A Spring Creek Mountain
4) A town at the mouth of the watershed
5) A practice that helps the environment
6) A form of precipitation
7) A landscape term describing sinkholes and closed depressions
8) A local municipality (2 will work)
9) An under drained valley of Spring Creek
10) A town at the base of 3 across

Down

1) A large local wetland
2) Where water comes out of the ground
3) A Spring Creek fish
4) Pollution not from a single spot or "point"
5) Something you do at a store
6) A Spring Creek tributary
7) A compass direction
8) What this activity book is about
9) Where the community gets its drinking water
10) A type of bird found around marshes
11) Something you say when you touch something slimy

Color the Fish

Did you know that Spring Creek is a world famous trout stream fishery? People love to fish at "Fishermans Paradise."



Activity Challenge: Draw your own picture of what you think is needed for a healthy watershed.

Word Search

Pollution in our streams and groundwater can come from many sources (including nonpoint) and not just from big spills. See if you can find the pollutants listed below.

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

Agriculture	**Dirt**	**Grass Clippings**	**Nitrate**	**Sewage**
Animals	**Driveway**	**Grease**	**Pesticides**	**Tar**
Cars	**Fertilizer**	**Lead**	**Phosphorous**	**Trash**
Chromium	**Garbage**	**Motor Oil**	**Salt**	**Wastewater**
Copper	**Gasoline**	**Mud**	**Sediment**	**Wildlife**

Polluted water that goes down the drains in your house goes to a wastewater plant or septic system for treatment.

Activity Challenge: Make your own word search with words you think are important.

Word Scramble

See if you can unscramble the following words. If you get stuck, look at the hints for suggestions. Another hint is that most of these words can be found somewhere in this activity book. Good Luck!

	Hints
R I P N G S K R E C E	Words on the cover
H M F N R S I S E A R E D P S I A A	Great place to fish
N R U G A W T R E D O	Where our fresh water is located
S T A R W E D H E	Watershed
E L G E L C O	Township Millbrook Marsh is located
N P D O	Stored water on the ground surface
T N P S A L	Things that help clean the environment
A T S U E I S L B A N	A good practice that preserves resources
D A N W E L T	What Millbrook Marsh is
T O P N T A	Buffalo Run municipality
E R N T I C S	Used for storing water
T L A I A C T	A type of wetland plant
E G N R E O F O R	An urban stormwater practice
I R N A E R G D N A	Stormwater practice that's good for homes
S W E A T T R W A E N T A P L	Where polluted water should go
T O U T R M E T U I L D I N	A fish conservation group

Activity Challenge: Create scrambled words you've learned about protecting our water for your friends to solve.

Final Stream Facts

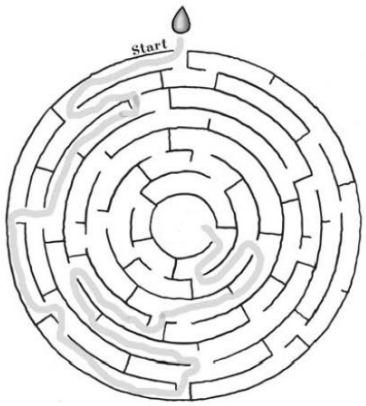
Perennial Stream – Are streams that flow year round like Spring Creek.
Intermittent Streams – Are streams that flow part of the year or seasonally.
Many tributaries to Spring Creek are intermittent.
Ephemeral Stream – Are streams that only flow in direct response to precipitation.
The Big Hollow is an ephemeral stream because it's an under drained valley.
Many of the small drainageways without any bed or banks in the watershed are some of the most important in protecting the watershed and are highly infiltrative. Help protect our streams no matter what size they are!

Answer Key

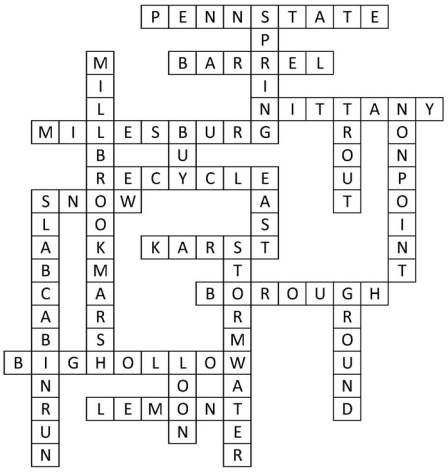
Hidden Message: Millbrook Marsh is a great place to visit and learn about wetlands.

Pollution Picture Search: 1) creek without vegetation, 2) car leaking fluid, 3) man dumping down a drain, 4) woman uses excess nutrients, 5) watering impervious areas like sidewalks, and 6) throwing trash on the street.

Maze:



Crossword Puzzle:



Word Search:

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

Word Scramble:

Spring Creek
Fishermans Paradise
Groundwater
Watershed
College
Pond
Plants
Sustainable
Wetland
Patton
Cistern
Cattail
Green Roof
Rain Garden
Wastewater Plant
Trout Unlimited

Stormwater pollution picture search and maze adapted from Utah State University Stormwater Activity Book

STORMY

The raincloud
doesn't like
getting blamed
for polluted
runoff, do your
part to keep
stormy happy.

www.ms4partners.org

The acronym MS4 is short for "Municipal Separate Storm Sewer System."
All of the MS4 Partners have a MS4 stormwater permit that helps protect the environment.

2015