Stormy's Guide To Storm Water

Hi, I'm Stormy!

Ever wonder where the rain

goes when it storms?

In Charlotte, water that comes from our sinks,

bathtubs,

and washing machines

is carried through pipes to the

wastewater treatment plant. The dirty water at

the plant is cleaned through a complex system. But water that

washes over streets,

lawns,

and parking lots

when it rains flows directly to creeks, ponds, lakes

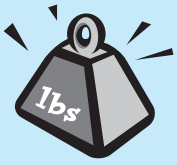
and rivers. Storm water can pollute our streams

because it is never cleaned

and picks up everything

in its path. Storm water can carry things like soil, yard waste,

litter, animal waste, used oil and fertilizers.

Tons and tons 

of litter pollutes Charlotte's creeks.

Trash that's tossed out car windows, has fallen out of

trucks, or dropped on the ground all ends up in our

creeks. Remember to recycle or throw it in the

trashcan. Keep our creeks clean!

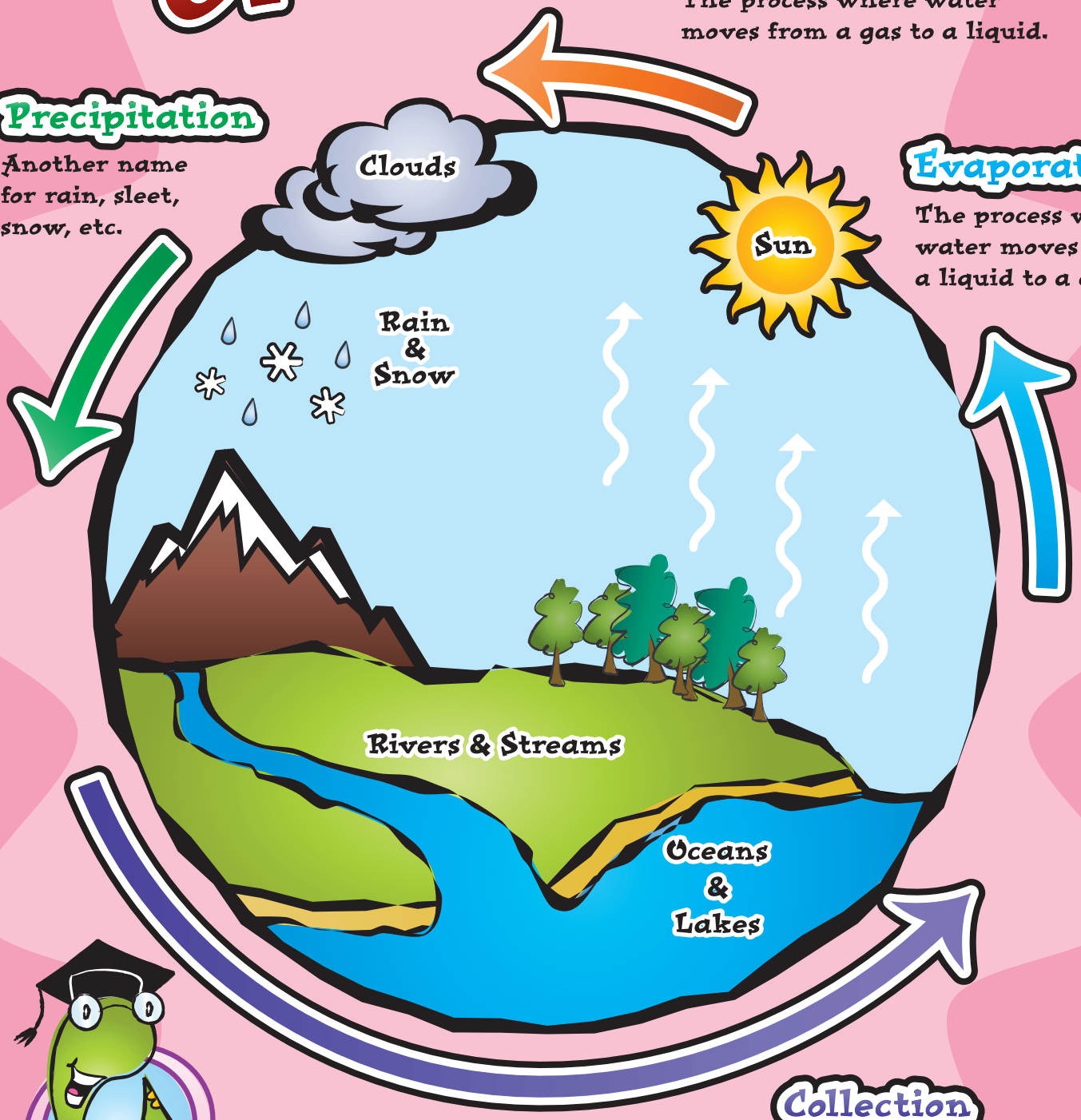
The Water Cycle

Condensation

The process where water moves from a gas to a liquid.

Precipitation

Another name for rain, sleet, snow, etc.



Evaporation

The process where water moves from a liquid to a gas.

Collection

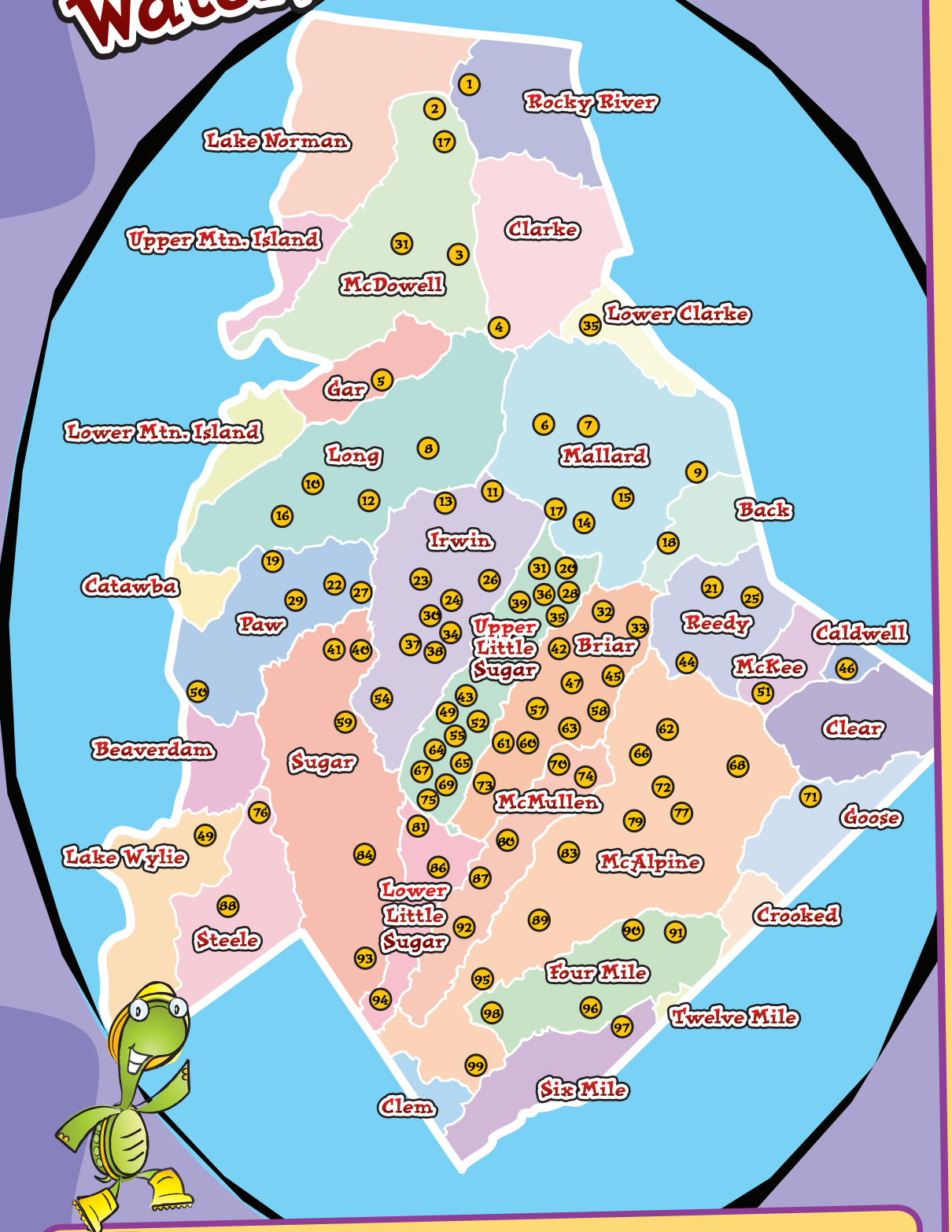
Where water drops accumulate together.

Did You Know?

More than 2,000 miles of streams flow through Charlotte neighborhoods, parks, and business areas. That's about the same distance between Charlotte and Los Angeles, CA!

Follow That Raindrop!

What's My Watershed Address?

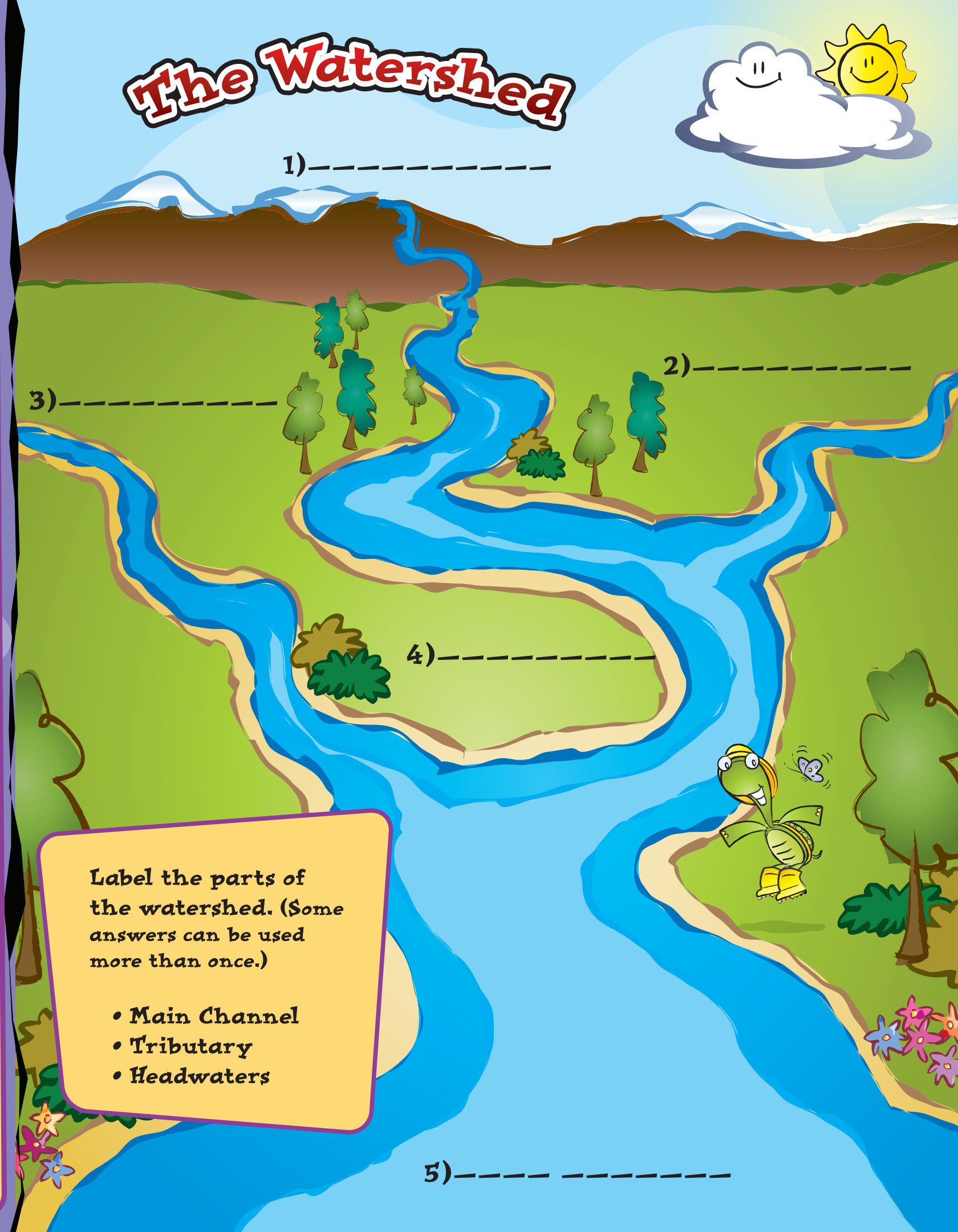


1. Davisdon Elem.
2. Cornelius Elem.
3. Huntersville Elem.
4. Blythe Elem.
5. Long Creek Elem.
6. David Cox Rd Elem.
7. Mallard Creek Elem.
8. Hornets Nest Elem.
9. University Meadows Elem.
10. Mountain Island Elem.
11. Winding Springs Elem.
12. Oakdale Elem.
13. Statesville Rd Elem.
14. Nathaniel Alexander Elem.
15. Morehead Elem.
16. Paw Creek Elem.
17. J.V. Washam Elem.
18. Newell Elem.
19. Pawtuckett Elem.
20. Hidden Valley Elem.
21. Joseph W. Grier Academy
22. Allenbrook Elem.
23. University Park Elem.
24. Lincoln Heights Elem.
25. Reedy Creek Elem.
26. Druid Hills Elem.
27. Thomasboro Elem.
28. Highland Renaissance Acad.
29. Tuckaseegee Elem.
30. Oaklawn Elem.
31. Torrence Creek Elem.
32. Briarwood Elem.
33. Devonshire Elem.
34. Walter G Byers Elem.
35. Highland Creek Elem.
36. Highland Mill Montessori
37. Bruns Av Elem.
38. Irwin Av Elem.
39. Villa Heights Elem.
40. Ashley Park Elem.
41. Westerly Hills Elem.
42. Shamrock Gardens Elem.
43. First Ward Elem.
44. Hickory Grove Elem.
45. Windsor Park Elem.
46. Clear Creek Elem.
47. Merry Oaks Elem.
49. Winget Park Elem.
50. Berryhill Elem.
51. JH Gunn Elem.
52. Elizabeth Traditional Elem.
54. Barringer Elem.
55. Dilworth Elem.
57. Chantilly Elem.
58. Winterfield Elem.
59. Reid Park Elem.
60. Billingsville Elem.
61. Eastover Elem.
62. Albemarle Rd Elem.
63. Oakhurst Elem.
64. Sedgefield Elem.
65. Myers Park Traditional Elem.
66. Idlewild Elem.
67. Collinswood Elem.
68. Lebanon Rd Elem.
69. Park Rd Elem.
70. Cotswold Elem.
71. Bain Elem.
72. Piney Grove Elem.
73. Selwyn Elem.
74. Rama Rd Elem.
75. Pinewood Elem.
76. Steele Creek Elem.
77. Crown Point Elem.
79. Greenway Park Elem.
80. Sharon Elem.
81. Montclaire Elem.
83. Lansdowne Elem.
84. Nations Ford Elem.
86. Huntingtowne Farms Elem.
87. Beverly Woods Elem.
88. Lake Wylie Elem.
89. Olde Providence Elem.
90. Elizabeth Ln Elem.
91. Matthews Elem.
92. Smithfield Elem.
93. Sterling Elem.
94. Pineville Elem.
95. McAlpine Elem.
96. Providence Spring Elem.
97. McKee Rd Elem.
98. Endhaven Ln Elem.
99. Hawk Ridge Elem.

Using the list to the right, find the school closest to where you live to find your watershed.

My watershed address is _____.

The Watershed



Label the parts of the watershed. (Some answers can be used more than once.)

- Main Channel
- Tributary
- Headwaters

The BIOTIC INDEX

Benthic macroinvertebrates are aquatic organisms that are used to determine the health of a stream.

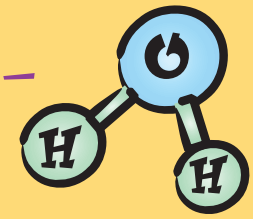
Benthic = Bottom Dwelling
Macro = Large enough to be seen with the eye
Invertebrate = Not having a backbone

We can tell how healthy a stream environment is by knowing how many and what kinds of benthic macroinvertebrates call the stream home. If a stream is clean and healthy, many different kinds of macroinvertebrates and lots of them will be in the stream.

Some kinds of macroinvertebrates are more sensitive to pollution than others and will die first. A few macroinvertebrates can tolerate some pollution and will last longer in a polluted stream.

Did You Know?

Water is composed of two elements — 2 Hydrogen molecules + 1 Oxygen molecule = H_2O



YE OL' BIOTIC INDEX

CLASS 3

Salamander

Stonefly nymph

Mayfly nymph

Water Penny

Riffle Beetle

Caddisfly larva

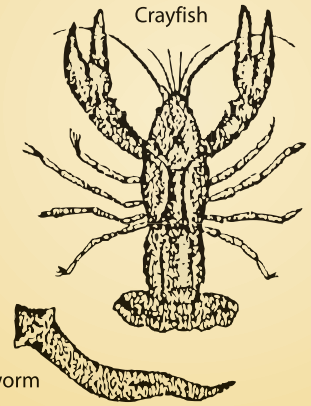
Fairy Shrimp

Fish & other vertebrates

CLASS 2

Aquatic Sowbug

Gill Snail


Crayfish

Flatworm

Dragonfly nymph

Damselfly nymph

Cranefly larva

CLASS 1

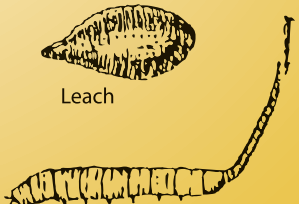
Tubifex worms

Lung Snail

Mosquito larva

Midgefly larva

Leach


Drone-fly larva

What's for Lunch?

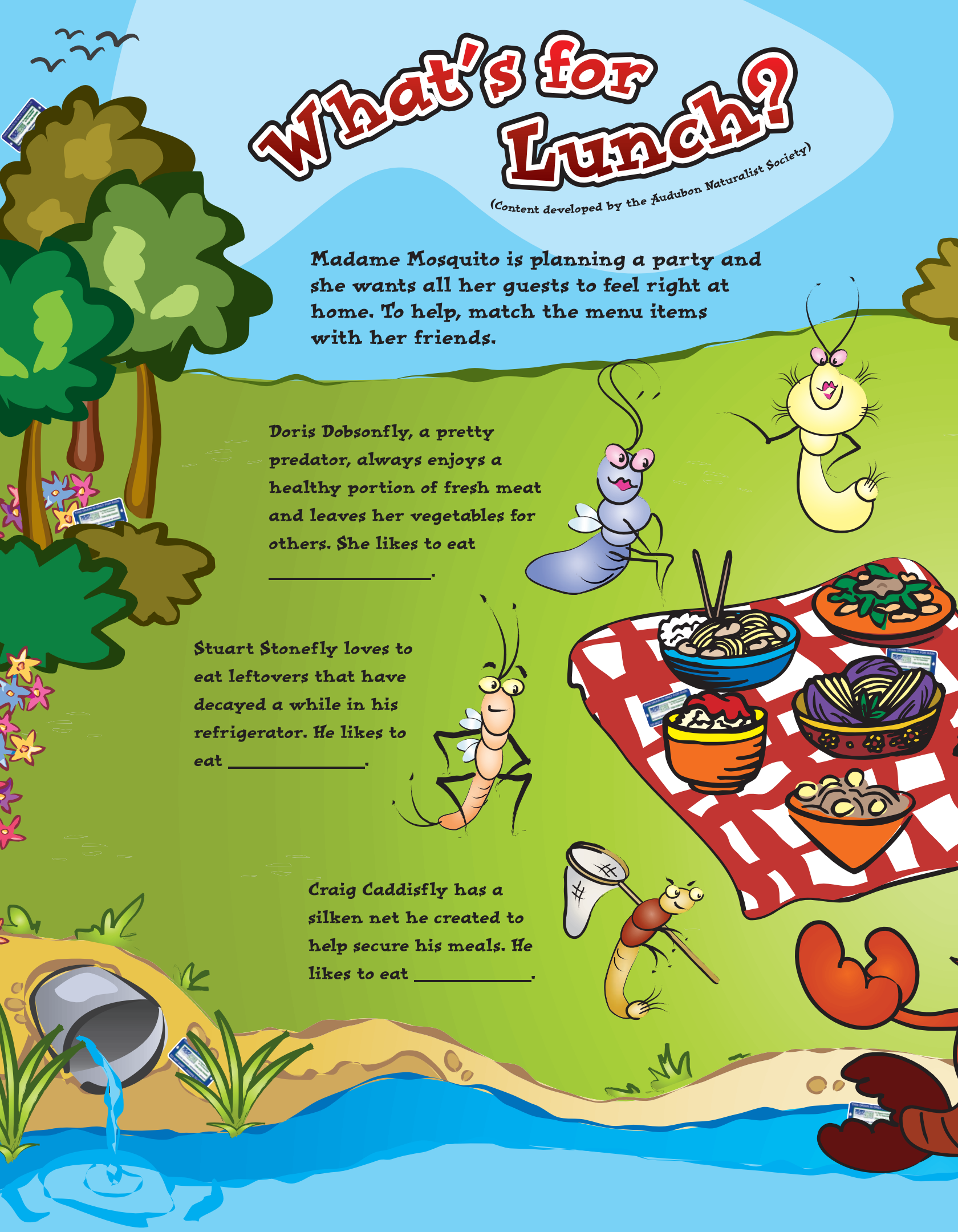
(Content developed by the Audubon Naturalist Society)

Madame Mosquito is planning a party and she wants all her guests to feel right at home. To help, match the menu items with her friends.

Doris Dobsonfly, a pretty predator, always enjoys a healthy portion of fresh meat and leaves her vegetables for others. She likes to eat _____.

Stuart Stonefly loves to eat leftovers that have decayed a while in his refrigerator. He likes to eat _____.

Craig Caddisfly has a silken net he created to help secure his meals. He likes to eat _____.



Le Menu

Stream Soup: a savory dish from the bottom reaches, a clear broth with scrumptious suspended flavors

Stream Stir-fry: a blend of vegetable debris and day-old delicacies

Prey Pudding: get your fix with this mix of the freshest insects

Creek Casserole: a mix of anything from plants to insects

Guest Goulash: a quick-prepared meal of raw insect meat, ready in seconds

Algae Appetizer: a sampling of the finest algae scraped from the bottom of our local creek

Walter Water-Penny, a flat-shaped scraper, munches on algae he scrapes from rocks and other materials. He likes to eat _____.

Dave Dragonfly is an impatient guest. He's a carnivore that can't wait for the meal to be served and starts eyeing up the other guests. He likes to eat _____.

Charlie Crayfish is a larger guest. He's not picky as an omnivore; he'll eat anything he can scavenge. He likes to eat _____

Word Games!

Word Search

How many storm water words in the list to the right can you find in the water?

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

BASIN
CHEMICALS
CONCRETE
CREEK
DITCH
DRAIN
DUMPING
ENGINEER
ENVIRONMENT
EROSION
FERTILIZER
FLOODING
GAUGE
GIS
GUTTER
IMPERVIOUS
INSPECTOR
LAWN
NONPOINT
OIL
OUTFALL
PIPE
POLLUTION
QUALITY
QUANTITY
RAIN
ROOF
RUNOFF
SPILL
STORM
WASTE
WATER
WETLAND

Word Scramble

Unscramble these Storm Water words.

alke	_ _ _ _	dtwsrheae	_ _ _ _ _ _ _ _ _
donp	_ _ _ _	nclhnae	_ _ _ _ _ _ _
ekcer	_ _ _ _ _	ndari	_ _ _ _ _
oltnpluoi	_ _ _ _ _ _ _ _ _	tyulqai	_ _ _ _ _ _ _
mrtso	_ _ _ _ _	odfol	_ _ _ _ _
twrae	_ _ _ _ _	sbani	_ _ _ _ _
snioroe	_ _ _ _ _ _ _	mntverienon	_ _ _ _ _ _ _ _ _ _ _

If you arrange the red underlined letters into a three word phrase you can spell: _ _ _ _ _ _ _   _ _ _ _ _   _ _ _ _ _ _ _ _ _

Hidden Message

Use the key to the right to decode the secret hidden message.

_ _ _ _   _ _ _ _   _ _ _ _   _ _ _ _

○ ⊡ ⬡ ⬟   ◎ ⌖ △ ⊡   ✚ ○ + ⊠   ✕ ○ ◊ ⊡

_ _ _   _ _ _ _ _   _ _ _ _ _

▣ ⊙ +   ⊠ ▣ ○ ◎ ▽   ✕ ◎ ⌖ △ ⊡

A	B	C	D		Q	R	S	T	
⌖	⊠	⊕	✕		◉	◎	⊠	▣	
E	F	G	H		U	V	W	X	
+	✜	✚	⊙		◬	▲	◊	◆	
I	J	K	L		Y	Z			
△	⊡	⬠	⬡		⬟	⍟			
M	N	O	P						
▽	⊡	○	●						

??? What can you

Volunteers are marking storm drains in neighborhoods all over Charlotte so that our citizens know that dumping anything down storm drains can harm our environment. **How many storm drain markers can you find in Stormy's Guide to Storm Water?**

Volunteer to mark storm drains!

Volunteer to mark the storm drains at your school or in your neighborhood.

do? Volunteer!!!

Want to keep our creeks clean? Your school can Adopt-A-Stream. Ask your teacher to contact 704-336-5500 to find out more information.

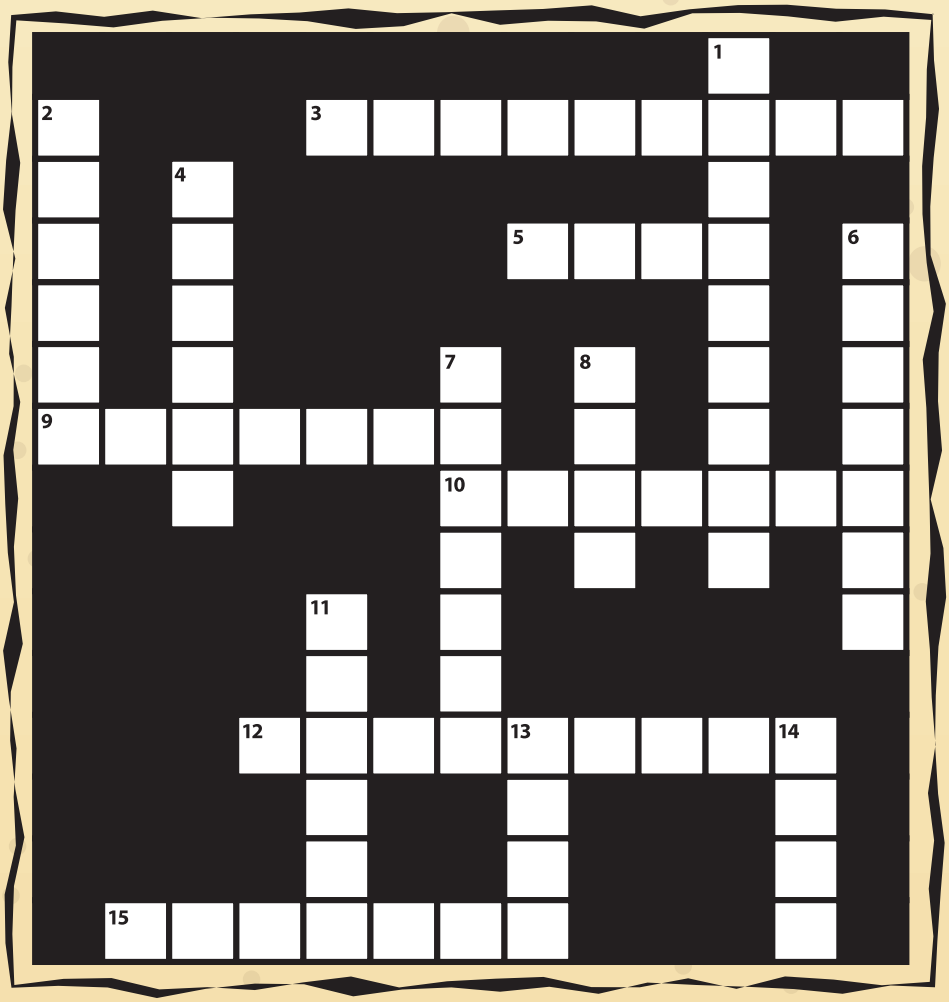
...never dump anything down a storm drain,

...participate in Big Sweep,

...adopt-a-stream,

...and don't litter!

CROSSWORD PUZZLE!



CROSSWORD CLUES

Down

1. Anything that gets in the path of a raindrop becomes storm water _____.
2. _____ and grass clippings are types of yard waste that can become storm water pollution.
4. Storm water flows to creeks, lakes, ponds, _____ and oceans.
6. When streams become polluted with oils, sediment and trash, fish and other _____ organisms will die or leave.
7. Don't dump used oil or paint down storm drains. _____ it!
8. Storm drain markers say, "Do Not _____, Drains to Creek."
11. Storm _____ are only for rain.
13. Another name for storm water is _____.
14. Water flows _____ hill.

Across

3. Used oil is a type of household _____ waste.
5. _____ is another name for sediment.
9. Storm water flows through the drainage system to our _____ waters.
10. Yard waste can be recycled or you can _____ it.
12. A _____ is an area of land that drains to a specific body of water.
15. _____ occurs when bare soil is exposed to rain.

TRUE/FALSE

Storm water flows to a wastewater treatment plant. T / F

Water that goes down the kitchen sink is treated. T / F

Another name for storm water is rain. T / F

There are more than 85,000 storm drains in Charlotte. T / F

Impervious surfaces allow water to soak into the ground. T / F

There is nothing people can do to keep creeks clean of pollution. T / F

Animal waste is a non-point source pollutant. T / F

Watery Maze!

Help Stormy get to the trash in the creek before it flows downstream to the ocean.

Glossary:

Aquatic - living or growing in or on the water
Benthic macroinvertebrate - a bottom-dwelling aquatic organism that has no backbone and is large enough to be seen with the naked eye
Blockage - an obstruction to the flow of water
Compost - organic matter produced by the breakdown of natural items such as food scraps, grass clippings and leaves
Detention - to temporarily hold water before being slowly released
Environment - the natural world of living organisms
Erosion - the wearing away and transportation of the Earth's surface by running water, wind, ice or other geological agents
Fertilizer - nutrients applied to plants to help them grow
Habitat - place where an organism grows or lives
Household hazardous waste - chemicals that are corrosive, ignitable, toxic or reactive that present a threat or unreasonable risk to people or the environment and can no longer be used
Impervious - areas that do not allow water to soak into the ground like roofs, streets, sidewalks and parking lots (Antonym — Pervious)
Litter- items that have been discarded improperly
Monitor - to observe a system for changes and keep records of the data collected
Non-point source - pollution that cannot be traced to a single point, because it comes from many individual places or a widespread area
Runoff - the portion of rainfall or water from lawn sprinklers that flows across the land's surface, does not soak into the ground and eventually runs into a larger body of water
Sediment - soil
Storm drainage system - the collection of pipes, ditches, culverts and creeks that allow water to drain to larger bodies of water during a storm
Storm water - rain
Surface water - water that flows or is stored above the land (examples include: ponds, lakes, rivers and oceans)
Water cycle - the continuous journey a water drop makes over time; also known as the hydrologic cycle
Water pollution - any human-caused contamination of water that reduces its usefulness to humans and other organisms
Water quality - the condition of our surface waters as it relates to a healthy environment
Watershed - the total land area that drains runoff to a particular body of water
Yard waste - natural debris that is no longer wanted (examples include: leaves, grass clippings and branches)

Visit Stormy on the web!

stormy.charmeck.org

For more information:

call 704-336-2291
or write to:
Charlotte-Mecklenburg Storm Water Services
600 E. Fourth St, 14th Floor
Charlotte, NC 28202.

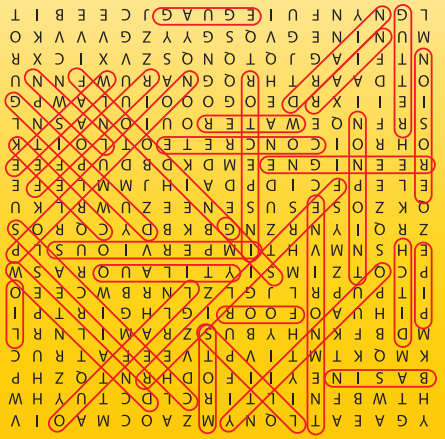
Answers:

SECRET PHRASE: Prevent water pollution.

WORD SCRAMBLE:

alke – lake
donp – pond
ekcer – creek
oltnpluoi – pollution
mrtso – storm
twrae – water
snioroe – erosion
dtwsrheae – watershed
nclhnae _ channel
ndari – drain
tyulqai – quality
odfol – flood
sbani – basin
mntverienon – environment

WORD SEARCH:



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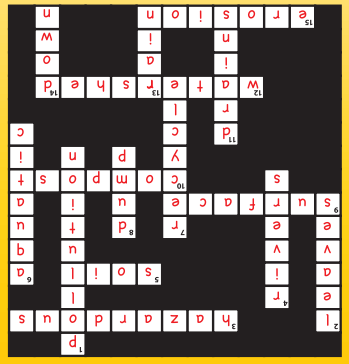
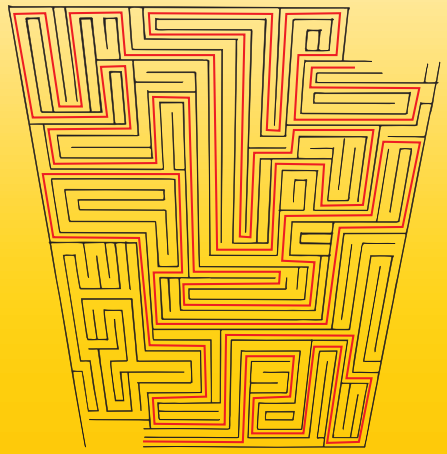


MAZE:



STORM DRAIN MARKER TOTAL: 46

WHATS FOR LUNCH?

Doris Dobsonfly – Prey Pudding
Craig Caddisfly – Stream Soup
Stuart Stonefly – Stream Stir-fry
Walter Water-Penny – Algae Appetizer
Dave Dragonfly – Guest Goulash
Charlie Crayfish – Creek Casserole

HIDDEN MESSAGE:

ONLY RAIN GOES
DOWN THE STORM
DRAIN

PARTS OF THE WATERSHED:

1) Headwaters
2) Tributary
3) Tributary
4) Tributary
5) Main Channel

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