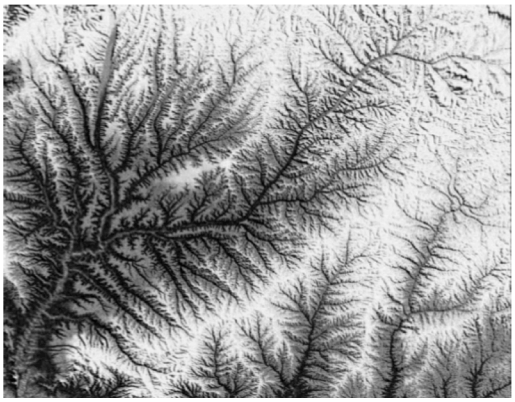
Watersheds and Rivers

Overview

In this exercise, students learn about fractal rivers, create their own watershed and discover what a watershed is. This activity wraps up with students creating their own fractal design using pipe cleaners.



Appropriate for: grades K – 12, college and adults

Objectives

- To analyze fractal patterns in natural landscapes
- To understand what a watershed is and create one
- To create a map of their created watershed
- To apply creativity in designing a fractal pattern

Materials

- Watersheds and Rivers worksheet
- Pencil
- Two options
    - garbage bag with edges cut so it is one large rectangle and a few students' shoes and/or backpacks, or
    - a piece of paper per student and a marker
- Spray bottle(s) with water
- Pipe cleaners – some the original length, some cut in half, some cut quarter length

Method for watershed activity

You can do this as one large group with a plastic bag and spray bottle of water or have each student create their own watershed (more fun for everyone).

If you're doing this as a **large group**, lay out a large plastic bag whose edges have been cut so it is now one wide, long sheet of plastic. Have kids create a landscape under it using their shoes and backpacks. Make it rain on the landscape using a spray water bottle.

For **each student** to create their own watershed, have each student crumples up their sheet of paper (not too much!) and then un-crumple it. Once your sheet of paper is open, mark the ridges of your paper or tops of the mountains of your watershed with a marker. Then see what happens when you spray water on the landscape (again, not too much!).

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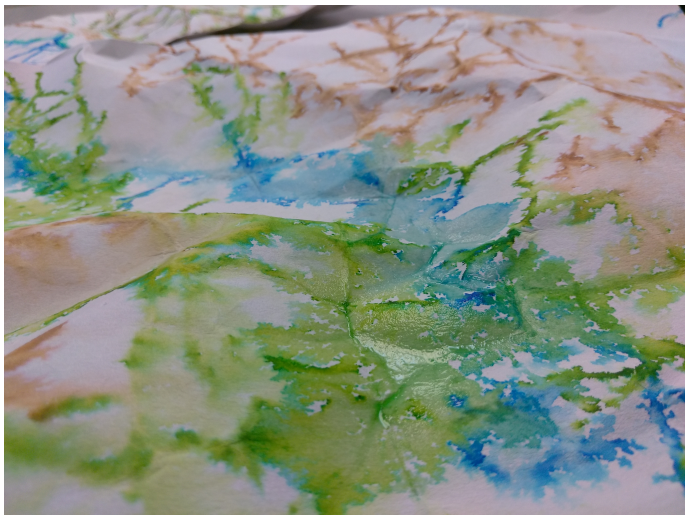
Discussion

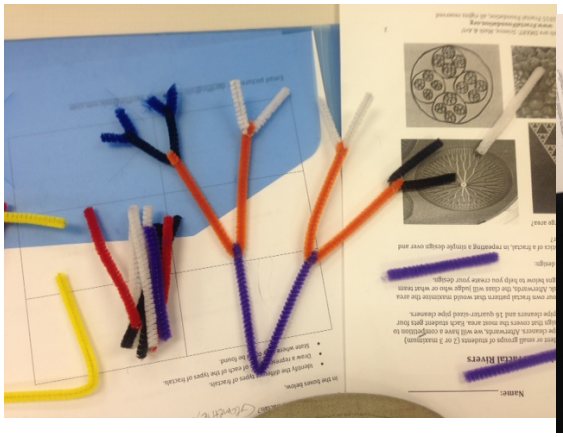
See what happens to the water – where does it go? Where are the high points (mountains and ridges) and where are the low points (valleys, rivers and lakes)? Can you map out the watershed of one of one river or lake?

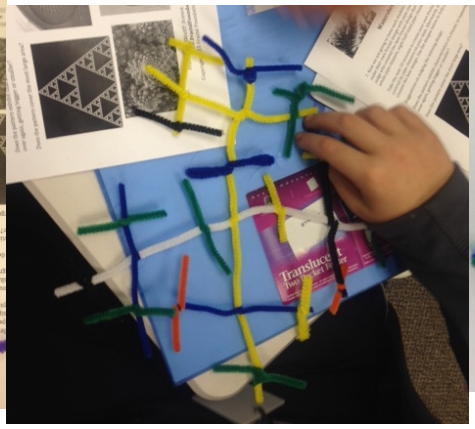


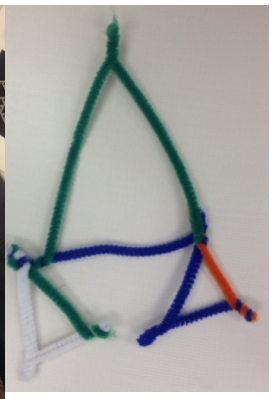
Method for activity with pipe cleaners

Have each student or small groups of students (2 or 3 maximum) make their own fractal design with pipe cleaners that would maximize the area covered by pipe cleaners on your desk. Each student gets four whole pipe cleaners, eight half-sized pipe cleaners and 16 quarter-sized pipe cleaners.

Afterwards, the class will judge who or what team created the best design. Use the designs in the worksheet to help you create your design.







Watersheds and Rivers

Common Core Standards for Mathematics

Code	Standard	Grade	Code	Standard	Grade
OA	Operations and Algebraic Thinking	5	G	Geometry	K – 7
MD	Measurement and Data	3	RP	Ratios and Proportional Relationships	6, 7

Common Core Standards for English Language Arts

Code	Standard	Grades K – 5	Grades 6 – 8	Grades 9 – 12
RL	Reading: Literature	1, 4, 7, 10	1, 4, 7, 10	1, 4, 10
RI	Reading: Informational Text	1, 3, 4, 7, 10	1, 3, 4, 7, 10	1, 3, 4, 10
FS	Foundational Skills	1, 2, 3 for grades K – 1; 3 and 4 for grades 2 – 5	None available	None available
W	Writing	2, 3, 8; 4 for grades 3 – 5	2, 3, 4	2, 3, 4, 9
SL	Speaking and Listening	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6
L	Language	1, 4, 6; 3 for grades 2 – 5	1, 3, 4, 6	1, 3, 4, 6
RST	Science and Technical Subjects	None available	1, 3, 4, 6, 7, 10	2, 3, 4, 6, 7, 10