Name:_____ Date: _____

Student's Guide to MIT Edgerton Center's Grungy Groundwater

What is groundwater?

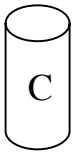
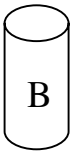
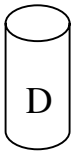
Groundwater is water below the earth's surface. This is different than lakes, oceans or rivers, which can be reached at the surface of the earth. Groundwater is stored underground in the spaces between the soil grains and the cracks of rocks. Groundwater usually flows horizontally (sideways), trying to level itself, so it will move into the spaces between particles, searching for the lowest, most level space.

Why do we care about groundwater?

About **one fourth** of the freshwater used in the US is supplied by groundwater. It is usually refilled by precipitation (rain, snow, etc.). *Normally*, water gets cleaned as it seeps through the ground, because the pollutant gets trapped in the soil, and broken down by microscopic organisms living underground.

Flow through Columns:

Look at the columns of soils on the tables. Draw a line to match the descriptions below to the correct column.

COLUMN #	DESCRIPTION	COLUMN #
	This soil has medium-sized grains.	
	This soil has a clay layer and medium- sized grains.	
	This soil has the largest grains.	
	This soil has the smallest size grains.	

Each student will need to take on a job: *(one job per person, no switching please – we want experts!)*

- the **timer,** who won't begin timing until the water first starts to come out of the column, but will call out 10 second marks
- the **water filler,** who will keep filling the column with water (up to the black line, keep the level as consistent as possible)
- the **water catcher**, who will be holding a test tube under the column to catch the water as it drips
- the **test tube rack "guru"/ recorder** takes the test tubes from the catcher, and reads how much water is in each of the tubes (in milliliters).

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A. Which soil lets water through the fastest? (Use Clear Water):

	Test Tube 1 10 seconds	Test Tube 2 20 seconds	Test Tube 3 30 seconds	Test Tube 4 40 seconds
Column A: Coarse				
Column B: Medium/Clay				
Column C: Fine				
Column D: Medium				

The student jobs are now slightly different:

- the **timer** still won't begin timing until the "contaminated" water first starts to come out of the column, and now calls out 20 second marks for 8 total samples collected
- the **water filler** continues as before
- the **water catcher** will be holding a test tube under the column to catch the water as it drips without worrying about catching every drop
- the **test tube rack "guru"/recorder** will take the test tubes and record the intensity, or color, of the water based on the colorimetric scale model (where "0" = clear, and "8" is intensity of the dye added). **Recorder will add the dye to the column.**

B. Which soil will pollution pass through the fastest? Which will clean the pollution best?

Test Tube #/ Time	#1: 20 seconds	# 2: 40 seconds	# 3: 1 minute	# 4: 1 minute, 20 seconds	# 5: 1 minute, 40 seconds	# 6: 2 minutes	# 7: 2 minute, 20 seconds	# 8: 2 minute, 40 seconds
Column A: Coarse								
Column B: Medium/Clay								
Column C: Fine								
Column D: Medium								

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