Name _____ Date _____

School Water Budget

Before you begin, read the "Streams and Pervious Surfaces" reading and answer the questions to help you understand the relationship between land use and water quality.

Part 1: Schoolyard Water Budget

1. Look at the aerial photo of your schoolyard. Using the grid your teacher gives you, count the number of squares you think are impermeable. Calculate the percent of the land surface that is covered by permeable surface. This is the 'green-ness' of your school yard; the higher the green-ness rating, the more permeable surfaces your school has.

   # squares that are permeable _____ / total number of squares _____ =

   % permeable cover _____

2. Using the aerial photo provided by your teacher, identify the types of land cover (surfaces) which you think will hold or transmit water differently:

   _____ _____

   _____ _____

3. On the photo, mark the boundaries of each type of land cover. Within each type, try to create geometric shapes. Use the example below to help you. For this school, blue represents playing fields, green is forest, grey is the building, and pink are the parking lots. You can add more detail if you want, and feel free to create your own categories of land use.

4. With your group, choose a person to be the 'pacer'. Ask this person to walk 10 paces, and measure the distance he/she covers. Do this two or three times and get an average. Divide this number by 10, and record it in meters/pace.
   Pace length: _____ meters/pace

5. Pace the length and width of each land cover type to *estimate* its size. Use the geometric shapes, since you can then use formulas to find the area of a rectangle, square, or triangle. Calculate the area and record it in meters ^{2}. Then, multiply by 10,000 to get cm^2.

Land Use Type	Area in meters	Area in cm

6. Look at each patch of land and determine where the water will go when it rains. Look for pathways of water flow: pipes, drains, holes, cracks, areas where water might collect, etc. Now, think about the fates of that water once it has entered your schoolyard ecosystem. The average absorption rate of soil is 50%. You could experiment to determine the absorption amounts, or you can use these numbers as a guide:
   -Asphalt/buildings: 0 % absorption
   -Vegetation: 50% absorption
   -Soil: 50% absorption
   The first one is done for you as an example.

Land Use Type	Where will the water go?	How much of the water will go on this path?
Parking lot	*Storm drain*	*100% (all of the water)*

7. Calculate the amount of water represented by an average annual rainfall hitting each of your areas. In New York, the average precipitation is 40 inches/year (or 102 cm/year).

Your land cover area	Multiply by 102 cm/year	Volume of water that hits this area in one year, in cm^3
Ex: Asphalt = 4000 cm^2	X 102 cm/year	= 408,000 cm^3
	X 102 cm/year	
	X 102 cm/year	
	X 102 cm/year	
	X 102 cm/year	
Total		

8. Which land cover type in your schoolyard receives the largest amount of rain?
   _____

9. Where does the water that hits the surface you identified in #8 go?
   _____

10. How do you think this affects the water quality of the watershed?
    _____
    _____
    _____

11. How could your school improve its 'green-ness' rating?
    _____
    _____
    _____
    _____

Part 2: School Water Use

Let's find out what happens to the water *inside* your school.

1. Circle where your water comes from: a reservoir, a river, or groundwater storage.

2. How much water does your school use each day? On average, a person uses 10 gallons of water a day for drinking, washing hands, and flushing a toilet (this does not include taking a shower, cooking, cleaning, etc).

   School population: _____ x 10 gallons = _____ gallons/day
   (don't forget to include teachers and other staff in your school population estimate!)
   _____ gallons/day x 200 days (days school is in session) = _____ gallons/year

3. Determine how the amount of rainfall you receive as a school compares with the amount of water your school uses.

   One gallon is equal to 3,785 cm^3.

   Example: Our school has a population of 100 people, and therefore uses 1,000 gallons of water a day, which equals 3,785,000 cm^3.

   Your school's daily use in gallons: _____ gallons/day x 3785 cm^3 = _____ cm^3
   Your school's yearly use in gallons: _____ gallons/year x 3785 cm^3 = _____ cm^3

   From #6 in Part 1, what is the total amount of water that hits the surfaces in your schoolyard every year? _____

   How does this compare with the amount of water that your school uses on a daily basis? On a yearly basis?

   _____
   _____
   _____
   _____

4. Would your school have enough water if we placed you and your schoolyard in an imaginary 'dome' that sealed off the school from any additional water inputs? Why or why not?

   _____
   _____
   _____
   _____

5. What happens to your wastewater? Describe the process or draw it below.

   _____
   _____
   _____
   _____

6. If you were able to purify the wastewater created in your school, would your school have enough water to survive?

   _____
   _____