

Take a Ride on the Water Cycle!

All the water in the world cycles between the atmosphere and the earth's surface. The water cycle is moving all around us every day. Generally water enters the atmosphere from the ground and open bodies of water through **evaporation**. **Transpiration** is a special case of evaporation that occurs from the leaves and stems of plants. In the atmosphere, **condensation** forms clouds which then return water to the earth by **precipitation** (rain, sleet, snow, or hail). Some of this water moves as **runoff** across the ground surface to streams, rivers and lakes. The rest of the water moves downward into the soil through **percolation** and becomes soil water or groundwater. This can move towards streams, rivers, and lakes via interflow (through the soil) or groundwater flow, or be drawn back into the atmosphere via evaporation or transpiration again.

ANSWER THE FOLLOWING QUESTIONS:

- 1) How do pollutants get into and get removed from the water cycle? *Into: point sources, e.g., septic systems, sewage outflows, leaching of toxic wastes, etc. nonpoint sources, e.g., fertilizers & manure, soil erosion, atmospheric inputs, e.g., power plant & auto emissions of NO_x and SO_2 , etc. direct contamination of water bodies, e.g., motorboat oil.*
- 2) How does the water cycle change during winter months? *Evaporation, driven by solar radiation, is slower. Transpiration is considerably reduced due to greatly reduced leaf area in deciduous regions, to frozen soil and to reduced solar radiation.*
- 3) How does removal of forests affect the water cycle? *Transpiration is reduced or even eliminated, at least at first. Thus, runoff and percolation increase, leading to higher stream flow and/or pond levels. In the long run, (decades+), absence of plants can reduce a watershed's ability to retain water and maintain pond & stream levels during dry periods.*
- 4) Which of the six steps of the water cycle listed above are affected by the construction of roads, parking lots and streets? *Evaporation from the soil is reduced or eliminated by asphalt. Runoff is greatly increased by paving and percolation virtually eliminated stream flow rises much more quickly after precipitation as a result.*
- 5) How might global warming patterns affect the water cycle? *Evaporation and transpiration would increase, but so might precipitation, at least in some places. It is possible that stream & pond levels would be lower.*

Exploring a Topographic Map
Arlington School District

Answer the following questions using the Pleasant Valley Quadrangle topographic map.

- 1) What is the distance between contour lines on this map? 10 feet
- 2) How many bridges would you expect to find on Arthursburg Road (in the southeast section of the map)? 4 (based on the number of streams)
- 3) What is the distance as-a-crow-flies between the LaGrange Cemetery and the lake in James Baird State Park: in miles? ~ 3.4 in kilometers? ~ 5.5
- 4) What is the highest elevation shown on this map? 810 feet
- 5) In what year was the map made? 1957; photo-revised 1981
- 6) Who made the map? USGS
- 7) How many houses are located on Vail Road? ~ 27
- 8) *Circle one:* The Wappinger Creek is shown in the (northeast, northwest, southeast, southwest) corner of the map.
- 9) What is the "road classification" for route 55? heavy-duty
- 10) What is the highest elevation on Moores Hill and Sunset Hill? 625 feet

Meet the Maps
Arlington School District

Answer the following questions using the SWEAP map(s) which provides the appropriate information. You will need all the maps.

- 1) This is the symbol for a wetland: Which of the three watersheds contains a wetland area? Watershed #2 (Budd Lane)
- 2) What is the distance between contour lines on the topographic map? 10 feet
- 3) What is the "road classification" for the Taconic State Parkway? heavy-duty
- 4) Jackson Creek is a tributary to what larger creek? Sprout Creek
- 5) Which of the three watersheds is closest to Arlington High School? #2 Budd Lane
- 6) What is the highest elevation shown on the Pleasant Valley topographic map? 810 feet
- 7) On what dates were the aerial photographs taken? April 1970 & April 1990
- 8) Which watershed includes the largest amount of agricultural land? #2 (Budd Lane)
- 9) Which aerial photograph includes a segment of the Wappinger Creek? 1990; WS #3
- 10) How many new houses were built within the boundaries of Watershed #1 (Downing Road) between 1970 and 1990? ~ 13
- 11) A large commercial development was built within the boundaries of one of the three watersheds between 1970 and 1990. Which watershed was it? #3 (Noxon Road)
- 12) What four soil types can be found within the boundaries of the watershed that is the farthest north on the map? NXE NWD NWC NWB
- 13) What soil type is found in the wetland area in watershed #2? C c