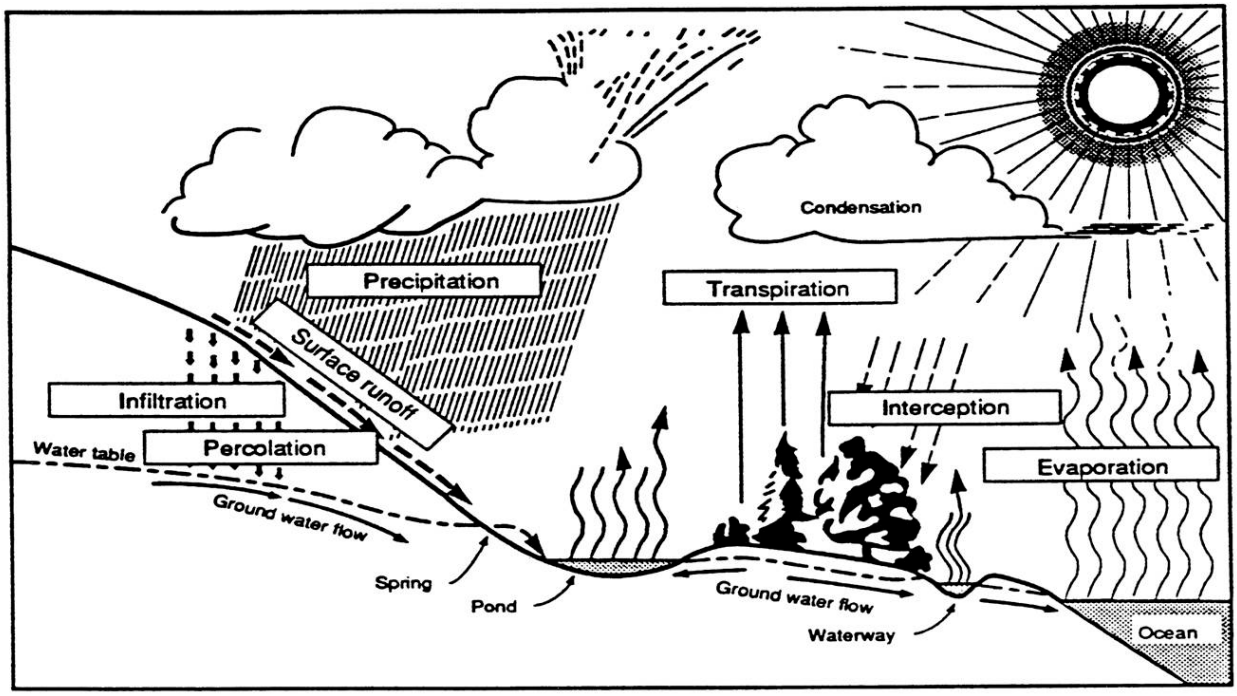
Activity 1 - Solution

1. In your own words, define hydrology and hydraulics.

Hydrology is the science that deals with the occurrence and behavior of water in the atmosphere, on the earth's surface, and below its surface. Hydrology is the science that relates to water.

Hydraulics is the branch of engineering science dealing primarily with the flow of water or other liquids.

2. In the blank spaces below (marked with small black boxes), enter the processes in the hydrologic cycle.



3. Runoff is that part of precipitation which appears as streamflow. There are three types of runoff. In most streams, base flow comes largely from groundwater. Water that reaches the stream by traveling over the soil surface is referred to as surface runoff . Water that moves through upper soil layers and retums to the surface or appears in streams promptly, but does not enter the water table is interflow or quick return flow

4. What is direct runoff?

Direct runoff is runoff that enters a stream promptly (contributes to a flood) and consists chiefly of surface runoff and interflow.

Activity 2

1. What are the four typical volume units used in field office activities?

a) gal
b) ft^3
c) in^2
d) liters
e) ac-ft
f) milliliters
g) watershed inches

2. What are four rate units (volume per time) used in field office activities?

a) cfs
b) gpm or gpd
c) cfs-day
d) miner's inch
e) ft/s
f) in/hr

3. Define the following common hydrologic terms.

a) Time of concentration (Tc) - The time it takes water to move from the hydraulically most distant point in a watershed to a watershed outlet usually expressed in hours. It is used to estimate peak discharge or to develop a hydrograph.
b) Hydrograph - A graph showing the discharge stage velocity or other property of water with respect to time. Usually we work with discharge hydrographs where the points on the hydrograph are expressed in cfs.

c) Peak discharge (q_p) - The maximum discharge rate for a given hydrograph or flood event, usually expressed in cfs.

d) Velocity (V) - The distance traveled divided by the time required to travel that distance. usually expressed in *ft/s.*

e) Flood routing - De1ermining the changes in a hydrograph as ~ moves downstream through a valley or through a reservoir (then sometimes called reservoir routing).

f) Initial abstraction (I_a) - The portion of precipitation occurring before surface runoff begins, usually expressed in inches. It consists mainly of interception, infiltration, and depression storage.

g) Runoff curve number (CN) - A measure of the runoff potential from a specific combination of cover, land use, and son type.

h) Watershed (w/s) - The area contained within a divide above a specified point on a stream. It can also be called drainage area, subarea, basin, or catchment area.

i) Frequency - An expression or measure of how often a hydrologic event of given size or magnitude should, on the average, be equaled or exceeded, usually expressed in years. For example a SO-year frequency flood will be equaled or exceeded in size, on the average only once in 50 years.

4.Convert 4 cfs-day to acre-feet

1 cfs-day =1.9835 ac-ft
4cffs-day = 4(1.9835 ac-ft)= 7.9 ac-ft

5.How many acre-feet are there in 37.5 cfs-hours?

12.1 cfs-hour=1 ac-ft
1cfs-hr= 1/12.1 ac-ft
37.5 cfs-hr= 37.5(1 ac-ft)/12.1=3.1 ac-ft

6.Convert 3.4 acre-inch per hour to cubic feet per second.
1 ac-in/hr=1.0083 cfs
3.4 ac-in/hr = (3.4)(1.0083 cfs)= 3.4cfs

7.Convert 100 gal to cubic feet.
100 gal * ($1ft^3$/7.48 gal)= 13.4 ft^3