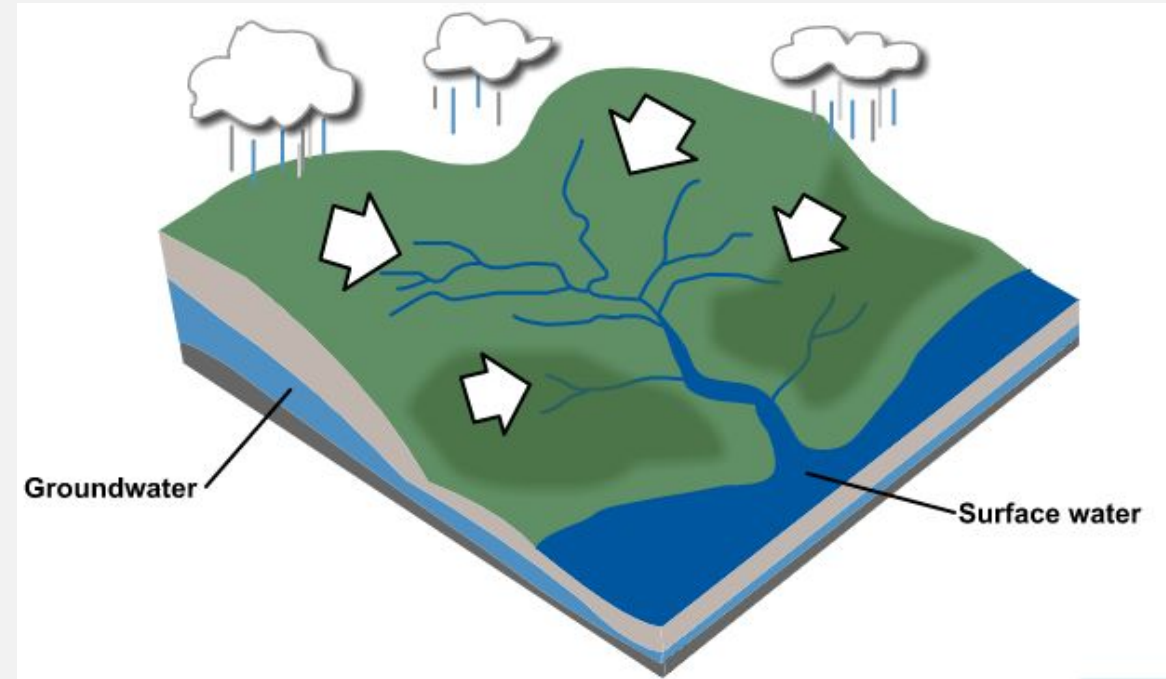# Water Quality- Ask the Bugs!

The most direct measure of the condition of a water body is the status of what's living there.

What is a Watershed?

- An area of land where water drains downhill to the lowest point.

- When it rains or snow and ice melt the liquid water flows downhill through the watershed, called **runoff**.

Groundwater — Surface water

Humans impact on watersheds: During runoff events flowing water picks up loose liquids and other materials such as lawn chemicals, cleaning products, gasoline, etc.
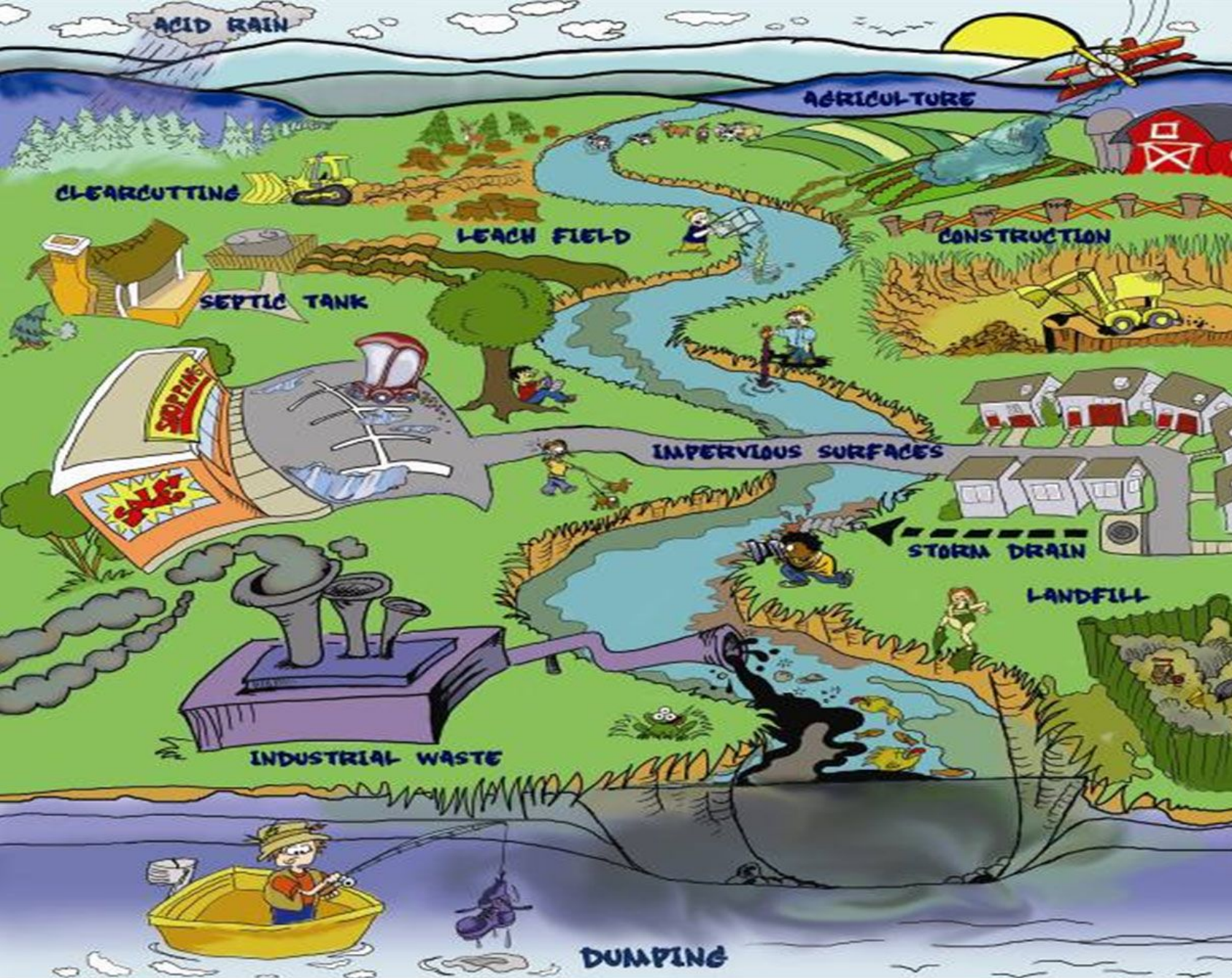
Human activities that alter the watershed have immediate and long-term effects on the animals that live there.

Aquatic Macroinvertebrates

• Aquatic   Lives in or near water

• Macro   Large enough to see with the naked eye

• Invertebrate   Without a backbone

Bioassessment-

looking at what lives in a water body to determine water quality.

The diversity of animals living in a water body like a stream or pond is one of the best indicators of water quality.

Each type of aquatic macroinvertebrate has specific conditions to survive or thrive and reproduce

Reasons Why Aquatic Macroinvertebrates are often used

- They are affected by the physical, chemical, and biological conditions of the stream.
- They can't escape pollution very easily.
- They may show the cumulative impacts of pollution.
- They may show the impacts from habitat loss not detected by chemical water quality tests.
- They are an essential part of the stream's food web.
- Some are very intolerant of pollution.
- They are relatively easy to sample and identify.

Pollution Tolerance

Intolerant

- Sensitive to water pollution, low oxygen, and warmer water temperature.

- Indicators of good water quality.

Mayflies

Stoneflies

Caddisflies

Pollution Tolerance

Moderate Tolerance

- Somewhat sensitive to pollution or poor water quality conditions like dissolved oxygen and temperature.

Dragonflies

Dobsonflies

Scuds

Pollution Tolerance

Tolerant

- Can withstand pollution or poor water conditions.

Midges

Blackflies

Leeches

Healthy stream ecosystems have many species of macroinvertebrates!

(Including tolerant species)

- High Biodiversity
- High Abundance

Polluted Streams have fewer speces

(Only have tolerant species)

- Low Biodiversity

The Activity

- Read the scenario card with information about your stream.

- Each person in the group should dump the cubes out of the bag.

- Put a check mark next to each type of invertebrate you find.

- Complete the worksheet to find out the condition of your stream.

- Answer the worksheet questions.

SENSITIVE	LESS SENSITIVE	TOLERANT
_____ Caddisflies (except net spinners) _____ Mayflies _____ Stoneflies _____ Watersnipe flies _____ Riffle beetles _____ Water pennies _____ Gilled snails	_____ Dobsonflies _____ Fishflies _____ Common net spinning Caddisflies _____ Crane flies _____ Damselflies _____ Dragonflies _____ Alderflies _____ Crayfish _____ Scuds _____ Sowbugs (aquatic) _____ Clams _____ Mussels	_____ Aquatic worms _____ Black flies _____ Midge flies _____ Leeches _____ Lunged snails and orb snails
_____ # of √s x 3 =_____	_____ # of √s x 2 =_____	_____ # of √s x 1 =_____

TOTAL: _____

What's the water quality in YOUR stream?

_____ Excellent (> 22)   _____ Good (17-22)   _____ Fair (11-16)   _____ Poor (< 11)

Draw the River System

Jefferson Creek

Red-tail Creek

Bowie Creek

Green River

Which factor the number of organisms, or the types of organisms found in a water source determines the quality of the water?

The type of organisms present determines the water quality

BIODIVERSITY!!!

Reasons Why Aquatic Macroinvertebrates are often used

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They are an essential part of the stream's food web.

Some are very intolerant of pollution.

They are relatively easy to sample and identify.

Which water source was considered to have the best water quality?

What human impact factors might have caused this source to be high quality?

- Jefferson Creek had the best water quality.

- Much of the creek is located within a state park where the stream is protected from human development and many human influences.

•Which water source was considered to have the poorest water quality?

- •Green River

What are some of the human impact factors that caused the low quality?

- Refinery and gasification plant.

- Concrete flood walls remove the natural meandering patterns of rivers. This straightening of the river causes path to be shorter and the flow to be much faster, increasing erosion in the river channel.

- Instead of mitigating flood damage it could possibly increase the threat.

- Limited habitat for fish and aquatic.

- Channelization of rivers may have some benefits. However, they are often outweighed by its disadvantages

What things could be done by humans to improve the water quality?

- Levees and flood walls can be constructed without disturbing the natural channel vegetation, cross section, or bottom slope.
- Add rip-rap for bank stabilization
- Vegetative buffer zones to stabilize soil, slow runoff, and filter pollutants.