The Human Watershed

DESCRIPTION:

Groups will compare the human circulation system to the streams and rivers that criss-cross Wisconsin.

OBJECTIVES

By participating in this activity, your group will:

1. Compare the similarities between a human circulatory system and a typical waterway system.
2. Identify and locate various blood vessels in the human body.
3. Identify and locate major streams and rivers in Wisconsin.

TIME

It will take the instructor about 15 minutes to prepare for the activity, and about 45 minutes to do the activity.

AGE

This activity is appropriate for ages 9 and up.

COST

Minimal. The largest expense is drawing supplies which may be available from a local extension office or nature center.

YOU WILL NEED:

- **Drawing supplies**
  - Two poster sized sheets of paper for the instructor.
  - Two letter sized sheets of paper for each participant, or rolled paper to draw actual body outlines.
  - Enough red, blue, and black colored markers, pencils, pens, crayons, etc., for the group.
  - A Wisconsin road map or topographic map.

BACKGROUND

The blood vessels that return blood to the heart are much like the streams, creeks and rivers that carry surface water through a watershed.

Very tiny capillaries in the tips of our toes return blood through increasingly larger vessels on the way to the heart. In similar fashion, rain water and snow melt flow off the land, first via small rivulets, then intermittent streams and then via larger creeks and rivers.

The blood vessels which carry blood to our hearts are classified by increasing size: capillaries (smallest), venules (mid-sized), and veins (largest).

Streams have a classification system as well. The smallest streams on the edge of a watershed are called first-order streams. When two first-order streams join, they form a second-order stream. When two second-order streams meet, they form a third-order stream.

The largest rivers in the world like the Amazon and the Mississippi are considered 9th- and 10th-order streams.

The largest veins in the body – the inferior and superior vena cava – average 3/4 to 1 1/4 inches in diameter.

GETTING PREPARED

1) Sketch a map of Wisconsin

Before your group arrives, outline the boundaries of Wisconsin on poster sized paper. Accuracy is not that important. Include a few local towns and roads so your group knows where they live on the map.

Don't sketch in the streams yet!

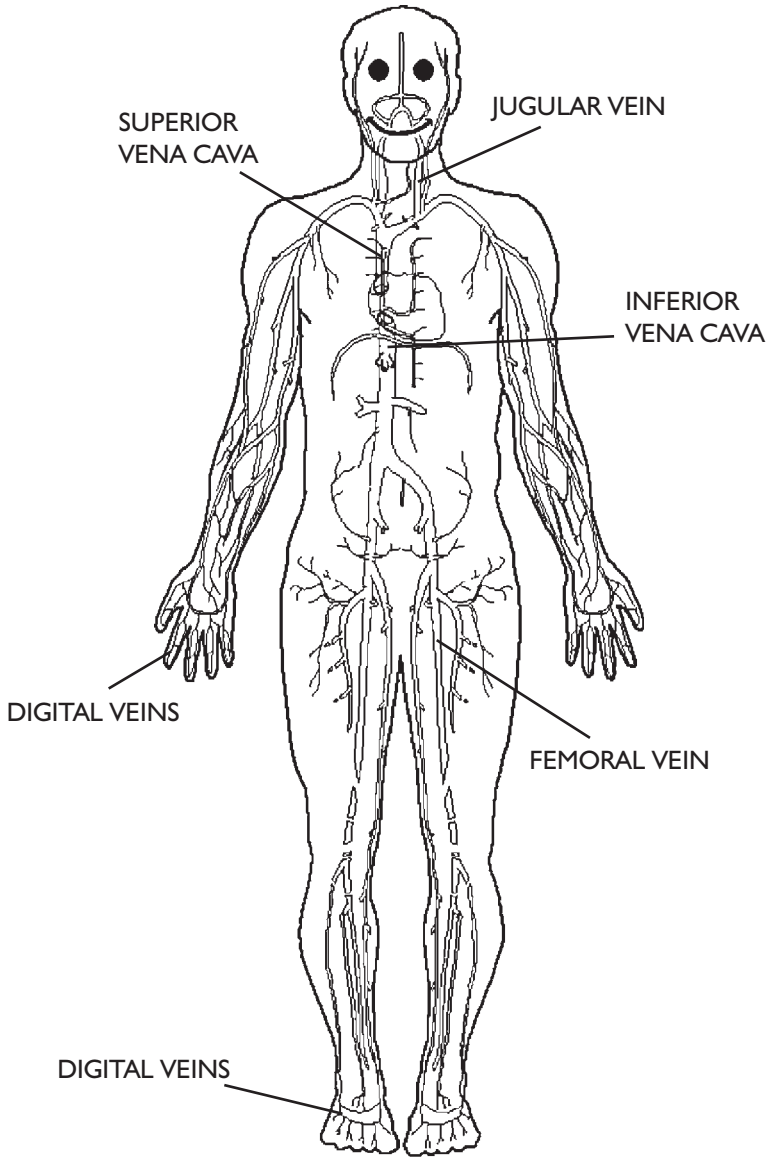
2) Sketch a human outline

Outline a human being on poster-sized paper the best you can.

Don't sketch in any blood vessels yet!

3) Tape human outline on wall.

Keep the Wisconsin map out-of-sight for now.



DO THE ACTIVITY

1) Pass out paper/markers

Give everyone in the group paper, and a blue, red and black markers.

2) Sketch human outline

Have the group sketch a human outline. Let them use the outline taped to the wall for inspiration, but encourage creativity.

3) Discuss blood flow

Ask the group how the blood in the tips of their toes and fingers gets to their heart.

Ask them to name the different blood vessel types (i.e. veins, venules, capillaries) and explain why they are different.

Continue this discussion as far as your knowledge of the cardiovascular system will carry you.

4) Draw blood vessels

Starting at the tips of the toes, use a red marker to sketch (use the example on the previous page for guidance) a pathway of capillaries, venules, and veins leading to the heart. When completed, set this drawing aside.

5) Discuss watersheds

Ask the group where the water in a well known creek or river comes from and goes to. Discuss how rain and melted snow start the journey to small rivulets and intermittent waterways, before forming creeks and rivers. If they mention groundwater springs, ask them where groundwater comes from. (Answer: surface water that soaks into the ground.)

6) Tape Wisconsin map on wall

Ask the group to identify their current location on the map.

7) Sketch Wisconsin outline

Have the group copy the outline of Wisconsin on their paper.

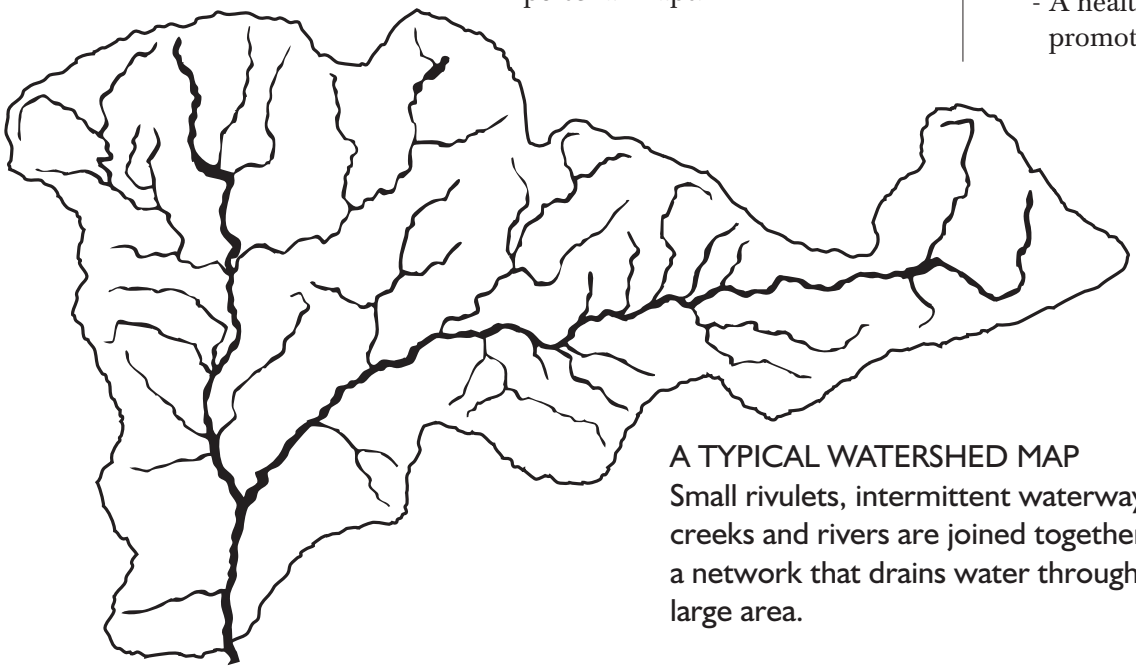
8) Add waterways

Ask for volunteers to name major streams in Wisconsin. Find these waterways on the wall map. Ask the group to copy them to their personal maps.

9) Compare sketches:

Ask the group to compare their drawings. Keep these things in mind: Blood vessels and streams share many similarities. They both:

- **Carry life giving water and nutrients**
  - Streams enrich the landscape
  - Blood nourishes the body
- **Remove waste**
  - Streams remove sediment and nutrients
  - Blood removes metabolic waste
- **Work in cycles**
  - The hydrolic cycle for streams
  - The circulation system for blood
- **Are effected by human decisions**
  - Wise land management promotes clean streams
  - A healthy lifestyle promotes a healthy body



A TYPICAL WATERSHED MAP
Small rivulets, intermittent waterways, creeks and rivers are joined together in a network that drains water through a large area.

OPTIONS

1) Short on time or drawing supplies?

Have group members work in teams to do the sketches, or limit the activity to a comparison and discussion of the wall posters.

2) Lots of time and supplies?

Instead of sketches, have the group make a watershed model. Follow the instructions for the *Watershed in a Box* WAV activity.

3) Interested in a more advanced lesson?

The analogy between blood flow and river systems can be carried much farther, all it takes is imagination.

Introduce participants to the Gaia Theory*: the idea that the earth (the largest watershed we know) is a living organism. The theory suggests that the living things on the earth coexist with each other, and with the nonliving things to make the planet habitable for life (much like the organelles of a cell – mitochondrion, ribosomes, nucleus, etc. – work together for cell function).

*For information about the earth as a living organism read *Gaia: a New Look at Life on Earth,* and *The Ages of Gaia,* by J.E. Lovelock.

4) Localize the activity

Instead of using the map of Wisconsin for the analogy, have the group create a map of their local watershed. Include as many tributaries as the group can remember. Keep in mind that many small, intermittent streams (the capillaries if you will), may not have names. Why not make up your own?

5) Take a watershed tour

Start at the headwaters of a stream you mapped and follow it downstream as far as you can, stopping at sites along the way to examine different land uses.

HELPFUL TIP

Maps:

Your county Land Conservation Department can help you find a map of your watershed. They may even have a copy available for loan.

Your local community or college library may also have a map section.

Your community may have a map store.

You can also order topographic maps from the United States Geological Survey:

Map Distribution
USGS Map Sales
Box 25286, Federal Center,
Bldg. 810
Denver, Colorado 80225
or call: 1-800-USA-MAPS
http://store.usgs.gov

WAV materials revised Summer,

Water Action Volunteers is a cooperative program between the University of Wisconsin–Extension and the Wisconsin Department of Natural Resources. For more information, contact the Water Action Volunteers Coordinator at 608-264-8948.