

STREAM RESEARCH

Water connects, fascinates, flows, cools and is the bearer of life. Let's follow a stream as it winds through the landscape.

GOAL: The students explore a stream or river through the eyes of a hydrologist. They will learn to draw and map using map symbols. They will enjoy running water outside. They will learn to measure current speed or even flow rate.

WHO: : Grade 6–9 of elementary school, high school

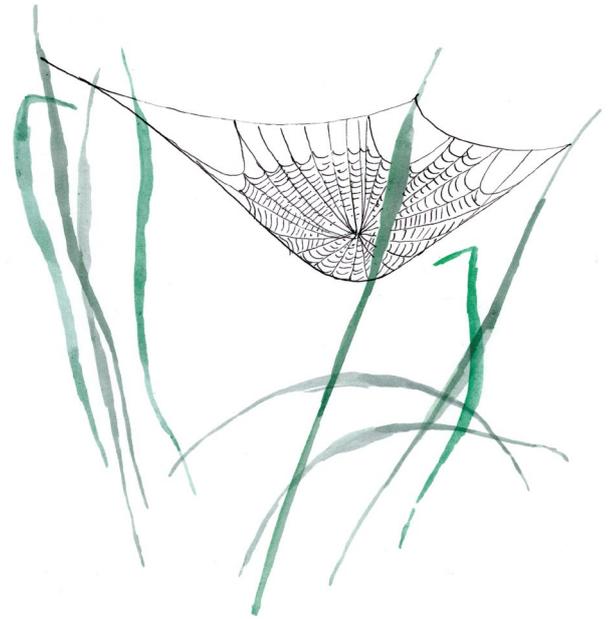
TIME: One school day

WHERE: at least 1 km of river or stream away from residential areas

WHEN: All year round

YOU NEED: Writing pad, pencil, paper and map (preferably 1:25000), this guide, good shoes, preferably wellies, folding measure, ping pong ball (can be substituted with a pine cone), stopwatch and compass.

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STEP 1 – LEGEND

Walk along or through a stream, follow it for about 1 km and draw it on a map using the LEGEND below. You can also walk along the river but look for the natural rather than the artificial sections. Walk along the stream or river that is closest to you and thus combine learning about water with learning about the surroundings of your school or home.

STEP 2 – DRAWING

Draw the course of the flow with the legend in the following way:

Colour code the banks:

- in black: if the flow is straight, with a double line if it is artificial (stone, concrete, poured)
- in red: gradual sloping bank (where water deposits sediments)
- in blue: undercut bank, washed away by water and dead and blind river arms

CROSS LINES:

- transverse lines on the stream indicate artificial steps or cascades (the water drops sharply down here)
- a double line indicates a waterfall (water does not jump over a steep rock, but falls vertically down)
- a special mark for dam or weir

COLOUR:

- use crosshatch to markers where there are rapids (faster currents that make ripples on the surface of the stream)
- colour pools blue (places where there is deep water – under cascades...)
- draw dotted areas for gravel or sand bars and islands

You can use other markers to indicate artificial dams, tributaries, piped sections, artificial beds or perhaps river terraces, vegetation in the floodplain etc.

STEP 3 – CURRENT

Explore the streamlines of the water's flow on an interesting section of the river with meanders. Use the ball to follow the main current, i.e. the place where the flow has the greatest speed. It is usually in the middle of the river on its straight sections and closer to the outside bank in bends and meanders (at the steep side that the river current washes out). Draw the main current with a dashed line.

STEP 4 – CURRENT SPEED

If you would like to measure the speed of the current, we recommend that you measure the time it takes the ball to travel the distance on a section of approx. 10 m of the river and 2 m of the stream. Velocity (v) = distance travelled by the ball (s) / time taken (t).

Discharge is defined as the flow across an area of the river profile, i.e. its width multiplied by the average flow depth, multiplied by the flow velocity. Flow (Q) = flow width (d) x depth (h) x velocity (v).

LAST STEP – LOOKING BACK

In the final discussion we ideally share 4 areas (process, result, evaluation of the landscape and the influence of the river/stream on the climate and the landscape):

1. How did you work in the field as a team?
2. What did you figure out together? What new facts did everyone learn?
3. What kind of landscape did you walk through? Was the stream more natural, or human-influenced? What human interventions could be found?
4. What would the stream look like if it flowed naturally? Why do we need naturally meandering streams in the landscape?

WHAT CAN BE ASSESSED (PROOF OF LEARNING)

- the student explored a stream or river
- the student created a map of a stream and used map symbols
- the student calculated water speed/flow
- the student drew the current's streamline
- the student enjoyed observing and measuring running water outside
- whether or not your shoes are wet

RECOMMENDATION

Take your wellies and ford your stream, map about 1 km. In the summer you can walk the same stretch barefoot.

Try to identify the accompanying greenery or at least the woody plants (you can divide the work: someone hunts animals, someone identifies trees, another examines water quality and another maps the flow).

In the summer, go out on the river in a canoe in which you can easily feel the main current flow. See what a meander or perhaps a blind arm on the river looks like



