



MODULE 01 | TEACHER GUIDE

Riverside Water Mystery

Water our most valuable resource | English C1 | Ages 15–18 | 45 minutes

An inland school uses water throughout a weekend when it appears to be closed. Students investigate the evidence, reconstruct the school's connection to the ocean and turn their findings into an exhibition panel. The challenge is to communicate a convincing explanation without claiming more than the evidence supports.

Learning outcomes

Students can explain water pathways and distinguish physical abundance from usable freshwater. They can interrogate a dataset, qualify a causal claim and translate technical findings into accurate public-facing communication.

Lesson sequence

Time	Activity	Product
0–4 min	Display the school plan on p. 3. Ask: where could the water have gone? Collect competing hypotheses.	Initial hypotheses
4–13 min	Read p. 2 in pairs. Annotate the route diagram and challenge the inland-school claim.	Annotated route map
13–23 min	Teams of three use the clues on p. 4 and audit on p. 5. Calculate quantities and rank explanations.	Evidence-based verdict
23–37 min	Use p. 6 to draft an exhibition panel and a testable school action.	Three-panel storyboard
37–43 min	Exchange work. Review one causal claim and one number; revise the panel.	Peer-reviewed product
43–45 min	Discuss which explanation is best supported and which evidence would change it.	Shared conclusion

Preparation

Print pp. 2–6 for each team; retain p. 7 as the answer key. Print p. 4 single-sided and cut out the six clue cards. Shuffle the deck before handing it to the team. Provide pens, calculators and optional coloured pencils. Supply extra paper for the implementation note. Display the fictional case instead of using live school data.

Teaching notes

Assign a hydrologist, an evidence analyst and an editor. All three negotiate the final claim. Prioritise reasoning and revisions over decorative artwork. Students may use concise notes during the investigation; the final captions should be coherent prose for a general audience.

Keep drinking-water access and hygiene intact. Any real inspection, meter access or plumbing work belongs with authorised school staff. A campaign is a proposal, not evidence of achieved savings.

Ocean Literacy principles 1 and 6: connected water systems and human–ocean relationships. Topic 1: water cycle, freshwater, drinking water, conservation and sustainable management.



STUDENT SHEET 1 | SOURCE TO SEA

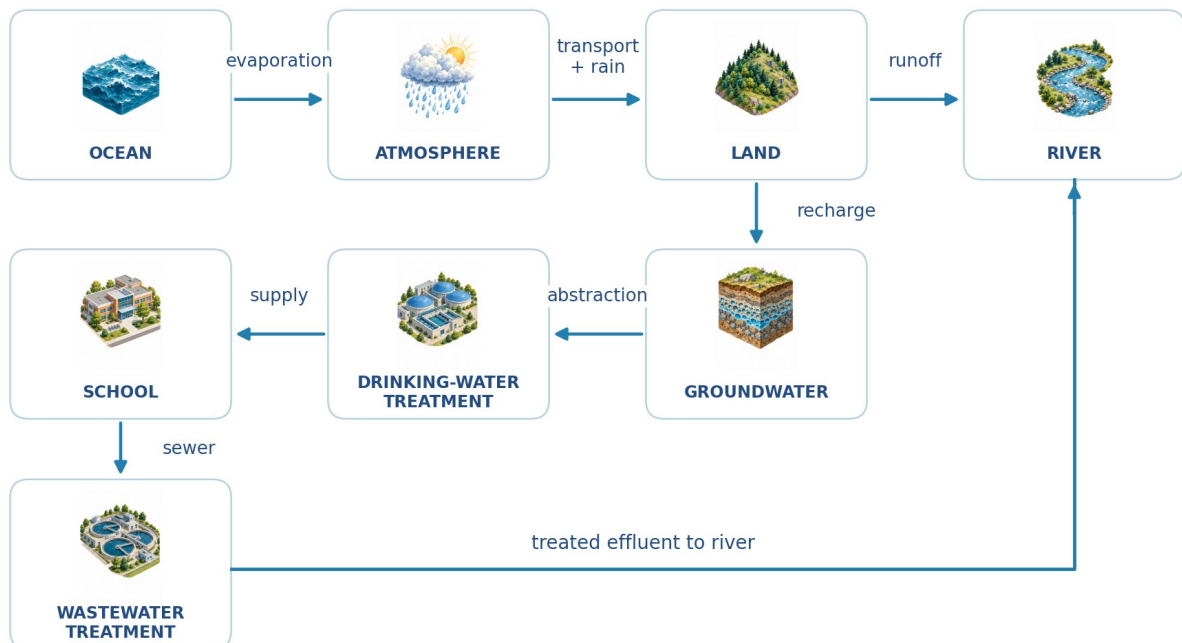
A resource that keeps moving

A planet with abundant water can still face water insecurity. Much of its water is saline, frozen or difficult to access; even liquid freshwater is not necessarily suitable for drinking. What matters is whether water of appropriate quality is available where and when it is needed. A global cycle does not guarantee an adequate local supply. [1]

Water circulates through interconnected stores rather than following one fixed itinerary. Evaporation transfers water into the atmosphere; precipitation returns it to land and sea. On land, water may run over the surface, infiltrate soil or recharge groundwater. Some groundwater eventually feeds rivers, while some remains underground for long periods. The connection between an inland school and the ocean therefore involves branching routes and different timescales. [1]

Schools also participate in an engineered network. Drinking-water supply and wastewater treatment serve different purposes: one provides water for use, while the other treats used water before discharge or reuse. In the fictional case below, effluent enters a river which reaches the sea. Returning water downstream does not automatically restore its original quality, location or availability. Conservation should therefore be evaluated within the wider system, not simply at the tap. [2]

Meter readings make some of these otherwise invisible flows observable. They can reveal unexpected consumption and guide an investigation, but they do not identify a cause by themselves. A school needs to compare readings with occupancy and equipment records before attributing a change to behaviour or a leak. A credible action plan connects a measured problem to a responsible person and a way to check the outcome. [2]



Schematic of the fictional school system. Some connections are deliberately omitted. [1]

Trace a natural route and a school-use route. Add the missing river-to-ocean and groundwater-to-river arrows. Explain how one litre can remain in the water cycle while becoming unavailable to the school. Challenge the claim: “We are inland, so conservation makes no difference.”



STUDENT SHEET 2 | EVIDENCE LAB

What happened over the weekend

Riverside School reports unexpected water use. Your team must advise the caretaker before the school publishes a conservation campaign. All readings and records below are invented classroom evidence.



Use the plan to suggest where authorised staff might investigate. It shows possible water-use points, not a proven leak location. Match each clue to a place or to the whole site.

Plan your investigation

Mark two places where authorised staff could gather useful evidence. For each, state what they should check and what the result could show. A room illustration is not evidence of actual water use.



STUDENT SHEET 3 | CUT-OUT CLUE DECK

Six clues one investigation

01  FRIDAY READING Friday 18:00 Main meter: 2,480.000 m³ RIVERSIDE WATER MYSTERY	02  MONDAY READING Monday 06:00 Main meter: 2,493.200 m³ RIVERSIDE WATER MYSTERY
03  SITE LOG No students, visitors or cleaning staff were recorded on site. RIVERSIDE WATER MYSTERY	04  AUTOMATIC USE A flushing system used 2,400 litres over the first weekend. RIVERSIDE WATER MYSTERY
05  A HYPOTHESIS The caretaker estimates a possible continuous leak at 3 L/min. The flow rate has not been measured. RIVERSIDE WATER MYSTERY	06  FOLLOW-UP An equally long weekend after an inspection used 3,000 L, including 2,400 L of automatic use. Occupancy was unchanged; the inspection record is incomplete. RIVERSIDE WATER MYSTERY

Cut along the dashed lines. Sort the cards into observations, estimates and follow-up evidence. All records are fictional.



STUDENT SHEET 4 | EVIDENCE LAB

Test the explanation



Investigate

1 Establish the timeline. How many hours elapsed? Calculate total metered use in litres and the volume remaining after the recorded automatic use. Show units.

2 Test the leak hypothesis. What volume would a constant 3 L/min flow produce? Does numerical agreement prove that a leak caused the entire unexplained volume? Give two alternative explanations or uncertainties.

3 Assess the follow-up. Calculate the fall in total use and its percentage of the first weekend's total. Calculate the remaining unexplained volume. Can you claim that the inspection caused the reduction? Specify one record you would request.

4 Reach a verdict: supported / plausible but unconfirmed / not supported. Apply these labels to: "Water was used"; "The estimated leak explains the residual"; "The school has permanently eliminated avoidable water use".

Conversion: 1 m³ = 1,000 litres. Treat both weekends as exactly 60 hours. Assume the meter readings and recorded automatic-use volumes are accurate for the calculations; question causation separately.



STUDENT SHEET 5 | CREATIVE COMMISSION

Make the invisible visible

Create an exhibition panel for students and visitors entitled “The missing water”. Your audience should understand why an inland school’s water use matters and which action the evidence justifies. Use the storyboard below as your final paper prototype.

Your brief

Produce three connected panels with arrows, a simple sketch and 25–35 words of caption text per panel. Use one calculated figure with its unit and time period. Distinguish observations from hypotheses, include one meaningful uncertainty and finish with an achievable action. Avoid invented quotations or claims of verified savings.

1 FOLLOW THE RESOURCE

Sketch + arrows

Caption • 25–35 words

2 REVEAL THE EVIDENCE

Sketch + arrows

Caption • 25–35 words

3 PROPOSE A RESPONSE

Sketch + arrows

Caption • 25–35 words

Implementation note

On separate paper, write 40–60 words naming the responsible person, a comparable baseline, one outcome measure and a review date or interval. Explain why a lower reading alone does not identify the cause of the change.

Editorial review

Exchange panels. Check a route, a number and a causal claim. Identify one overstatement or missing qualification and suggest a precise revision. The authors must make one revision and explain why it improves the panel.

Success criteria: accurate pathways; defensible interpretation; a feasible, measurable action; clear language suited to a public audience. Artistic skill is not assessed.



TEACHER SHEET | ANSWERS AND SOURCES

Reasoning and model responses

Source to sea

Possible routes: ocean → evaporation/atmospheric transport → precipitation → runoff → river → ocean; precipitation → infiltration/recharge → groundwater → abstraction/treatment → school → sewer → wastewater treatment → river → ocean. Include groundwater discharge to a river as a branch. These are possible pathways, not the itinerary of every molecule. Recycling does not guarantee local availability or unchanged quality. Actual school routes require local verification.

Card sort: 01–04 are recorded observations; 05 is an estimate; 06 is follow-up evidence. Cards 01–02 relate to the main meter, 03 to site records, 04 to D, 05 has no confirmed location and 06 applies to the whole site.

Investigation plan: staff could check A for unrecorded toilet or tap flows, and D for flushing schedules and measured volumes. Either could support an explanation; the illustrations alone establish neither.

Evidence lab

1 Friday 18:00 to Monday 06:00 = 60 hours = 3,600 minutes. Meter difference: 13.200 m³ = 13,200 L. Subtract 2,400 L of automatic use: 10,800 L unexplained.

2 Estimated leak: $3 \times 3,600 = 10,800$ L. Agreement is consistent with the hypothesis, not proof. The rate is an estimate and may vary; an unlogged automatic process or inaccurate occupancy record could also contribute. Request a measured flow profile and maintenance records.

3 Reduction: $13,200 - 3,000 = 10,200$ L; $10,200 \div 13,200 \times 100 \approx 77.3\%$. Second residual: $3,000 - 2,400 = 600$ L. The cause is unresolved: request the inspection/repair log and comparable system-operation records. Do not subtract the automatic use again when calculating the fall in total use.

4 Water was used: supported by the meter. The estimated leak explains the residual: plausible but unconfirmed. Permanent elimination of avoidable use: not supported by two weekends; the 600 L residual is unexplained, not automatically waste.

Model exhibition captions

Panel 1: Our school belongs to a connected water system. Groundwater reaches our taps through treatment and supply; used water passes through wastewater treatment before entering a river and, eventually, the sea.

Panel 2: Over one 60-hour weekend, the meter recorded 13,200 litres. Logged automatic flushing accounts for 2,400 litres. The remaining 10,800 litres match an estimated leak, but a matching calculation is not proof.

Panel 3: Report dripping taps to the caretaker and request a documented inspection. Compare subsequent weekend readings with the same baseline conditions. Protect drinking water and hygiene while investigating unexplained use.

Implementation note: The caretaker should document inspections and repairs, then compare the next two 60-hour weekends with the baseline. Record occupancy, automatic flushing and total litres each time. Review unexplained use after two weeks. A lower reading supports further investigation, but cannot establish which intervention caused the change without reliable operational records.

Assessment

Award 0–2 each for scientific accuracy, numerical reasoning, handling uncertainty, feasible action and audience-appropriate communication (10 total). 0 = absent/inaccurate; 1 = partly achieved; 2 = accurate and developed. C1 performance includes precise qualification, synthesis and effective reformulation for non-specialists.

Sources

[1] USGS. Water cycle. <https://www.usgs.gov/water-science-school/water-cycle>

[2] US EPA. WaterSense: Getting Started. <https://www.epa.gov/watersense/getting-started>

Last visited: 13 October 2026.