Where Water Goes

Read water movement to distinguish systems and trace a watershed.

MAQ.2.5 "Distinguish between lentic and lotic water systems, including water flow, seasonal overturn, and watershed mapping."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two clues about water movement, circle two clues about what allows seasonal overturn, and number Fern Creek, Rush Channel, and Cedar Basin in the order water reaches them.

Rain in a Valley

1 After a storm, water moves through a valley in several ways. A lotic system, such as a river, has a current that carries water downstream. A lentic system, such as a pond, holds water with little overall movement, although wind can stir its surface and water can enter and leave. On one side of the valley, pebbles roll along the bottom of Rush Channel. Nearby, Cedar Basin spreads across a deep hollow. Its surface ripples in the wind, but a floating leaf stays near the same shore for hours. Both places receive rain and groundwater.

2 In this temperate valley, Cedar Basin warms during summer. Its warm surface water remains above colder, denser deep water, so the layers mix only a little. In autumn, the surface cools until the density difference shrinks. Winds can then mix water from top to bottom. This mixing is called seasonal overturn and can move oxygen into deep water and nutrients toward the surface. Ice may cover the basin in winter. After the ice melts, spring warming can again bring the water layers close in density, allowing another overturn. A flowing channel seldom forms the same lasting, deep layers.

3 To map where the water comes from, imagine walking along the ridge above the valley. Rain on its west slope runs into Fern Creek, which joins Rush Channel before reaching Cedar Basin. Rain on the east slope runs away from the basin into a different valley. The ridge is a watershed divide: it separates land draining to different destinations. To outline Cedar Basin's watershed, follow the high ground around all land whose runoff eventually reaches the basin, including the slopes above Fern Creek and Rush Channel. Do not draw the line along the shoreline, since distant hills also supply the basin.

2 ANSWER WITH EVIDENCE

Use the passage

1. A student calls Cedar Basin lotic because its surface ripples. Which type of system is it? Use two flow clues to explain.

2. Why could Cedar Basin overturn in autumn, while Rush Channel is less likely to have the same deep-water overturn?

3. Should the east slope of the ridge be inside Cedar Basin's watershed? Explain using the direction of runoff.

4. A raindrop lands above Fern Creek on the west slope. Trace its route to Cedar Basin and explain whether it starts inside the basin's watershed.

3 YOUR TURN

Your own words

Invent a temperate watershed with a lake, a stream, and a ridge. In 5 to 6 sentences, trace runoff on both sides of the ridge, identify the watershed divide, classify the lake and stream by flow, and explain when and why the lake could overturn.

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PART 1 · READ AND MARK

Underline two clues about water movement, circle two clues about what allows seasonal overturn, and number Fern Creek, Rush Channel, and Cedar Basin in the order water reaches them. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	A student calls Cedar Basin lotic because its surface ripples. Which type of system is it? Use two flow clues to explain.	**Cedar Basin is lentic. Its water has little overall movement, and a floating leaf stays near the same shore for hours. Wind can cause ripples without making the basin lotic.**
2	Why could Cedar Basin overturn in autumn, while Rush Channel is less likely to have the same deep-water overturn?	**As Cedar Basin's surface cools, its density becomes closer to that of deeper water, allowing wind to mix the layers. Flowing Rush Channel is less likely to form lasting, deep layers.**
3	Should the east slope of the ridge be inside Cedar Basin's watershed? Explain using the direction of runoff.	**No. Runoff from the east slope flows into a different valley, away from Cedar Basin.**
4	A raindrop lands above Fern Creek on the west slope. Trace its route to Cedar Basin and explain whether it starts inside the basin's watershed.	**It flows into Fern Creek, then Rush Channel, then Cedar Basin. It starts inside the basin's watershed because its runoff eventually reaches the basin.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

At Twin Peaks, rain on the north slope feeds Swift Brook, which runs into Mirror Lake. Rain on the south slope drains into another valley, so the ridge between the slopes marks Mirror Lake's watershed divide. Swift Brook is lotic because its water flows downstream. Mirror Lake is lentic because its water has little overall movement. In summer, warm surface water may remain above colder deep water in the lake. In autumn, surface cooling reduces the density difference, allowing wind to mix the lake's layers in an overturn.

Accept other flow evidence for the classifications. For the original watershed, accept boundaries that include land draining through Fern Creek and Rush Channel to Cedar Basin but exclude the ridge's east slope.