Where Gold Gathers

Trace how rock history and stream flow shape gold deposits.

ES.ESS3.5 "Construct a scientific explanation from evidence for how geological processes cause uneven distribution of natural resources."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three geological processes that release, move, or concentrate gold, circle two observations that compare locations, and number the underlined processes in the order they could affect a gold grain.

Two Creeks, Uneven Gold

1. Two creeks cut through a mountain district where people search for gold. On the ridge above Alder Creek, hot water once moved through cracks in rock. As the water cooled, dissolved gold and quartz formed thin veins inside some cracks. Surveys have found these veins near Alder Creek but not in the rock exposed beside nearby Birch Creek. A vein is not proof of a profitable mine, but it shows where gold entered the rock. This difference in bedrock gives erosion more gold to release into one drainage than the other.

2. Over thousands of years, freezing, rain, and moving water break pieces from the ridge and carry them downhill. Gold is much denser than most sand grains, so flowing water can sort the mixture. In a fast, steep stretch of Alder Creek, smaller grains may stay in motion. Where the creek slows around an inside bend, heavy gold grains are more likely to settle among gravel. Across the channel, faster flow near the outside bank can carry many grains farther. A placer deposit forms when transported gold accumulates in sediment, rather than remaining in the original rock vein.

3. To test where gold gathers, a field team washed equal volumes of gravel from four sites. They counted 2 gold grains in a steep stretch of Alder Creek, 18 at its inside bend, and 3 near its outside bank. A sample from a similar bend on Birch Creek held no gold grains. The team repeated the sampling and found the same ranking each time, although the exact counts changed. These small samples do not establish whether any site contains enough gold to mine. They do provide evidence of how rock history and stream flow can produce different concentrations over short distances.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why might Alder Creek receive more gold than Birch Creek before stream sorting begins? Use an observation from the passage.

2. Explain the difference between the gold counts at Alder Creek's inside bend and outside bank. Use both the counts and a geological process.

3. Why does the zero-grain sample from Birch Creek challenge the claim that every slow bend contains gold? Use evidence about the rock near that creek.

4. A student says the 18-grain sample proves Alder Creek's inside bend could support a gold mine. What narrower explanation does the evidence support, and why is the mining claim not proven?

3 YOUR TURN

Your own words

Imagine a fifth site: gravel caught behind a large boulder in Alder Creek just below the gold-bearing ridge. In 4 to 5 sentences, predict how its gold concentration might compare with the steep stretch, explain two geological processes, and name one observation that could test your explanation.

Where Gold Gathers

PART 1 · READ AND MARK

Underline three geological processes that release, move, or concentrate gold, circle two observations that compare locations, and number the underlined processes in the order they could affect a gold grain. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why might Alder Creek receive more gold than Birch Creek before stream sorting begins? Use an observation from the passage.	**Gold-bearing veins were found near Alder Creek but not in the exposed rock beside Birch Creek, so erosion has more gold to release into Alder Creek.**
2	Explain the difference between the gold counts at Alder Creek's inside bend and outside bank. Use both the counts and a geological process.	**The inside bend had 18 grains, while the outside bank had 3. Slower water at the inside bend lets dense gold settle, while faster water near the outside bank can carry grains farther.**
3	Why does the zero-grain sample from Birch Creek challenge the claim that every slow bend contains gold? Use evidence about the rock near that creek.	**A slow bend can concentrate gold only if gold reaches the creek. Surveys found no gold-bearing veins in the exposed rock beside Birch Creek, and its sampled bend held no gold grains.**
4	A student says the 18-grain sample proves Alder Creek's inside bend could support a gold mine. What narrower explanation does the evidence support, and why is the mining claim not proven?	**The samples support an explanation that gold is more concentrated at the inside bend than at the other sampled sites because of stream flow. Small gravel samples cannot show whether enough gold exists there to mine.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I predict gravel behind the boulder will contain more gold grains than the steep stretch of Alder Creek. Weathering can free gold from veins on the ridge, and the creek can carry those grains downstream. Water may slow behind the boulder, allowing dense gold grains to settle there instead of moving on. Washing equal volumes of gravel from both sites and counting the gold grains would test this explanation.

Accept predictions that connect a plausible change in water speed to gold settling or transport, even if students predict fewer grains. Responses should also explain a source or transport process and propose a comparison that could test the prediction.