

Earth in Motion

Use evidence to explain changing landforms across time and space.

MS-ESS2-2 "Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales..."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each observation that serves as evidence, then number the geoscience process or processes it supports. This will help you connect evidence to an explanation of surface change at different scales.

Pine Creek Changes

- ① At Pine Creek, water usually changes the valley a little at a time. During ordinary flows, the stream carries sand and pebbles downstream. Where the water slows on an inside bend, it drops sediment and builds a sandbar. On the outside bend, faster water wears away the bank. Aerial photos taken ten years apart show the creek curve moving toward a nearby field. These observations are evidence that erosion and deposition gradually reshape the valley at a local scale.
- ② Not all change at Pine Creek is slow. After a day of intense rain, a hillside beside the creek became saturated, and a landslide rushed downhill. It covered part of the channel with soil, rocks, and broken trees within minutes. The new pile forced water toward the opposite bank. Fresh scars on the slope, buried plants, and a blocked channel showed that a rapid event had changed the surface. Later flows began moving the landslide material downstream, linking a sudden event to continuing gradual change.
- ③ Earth's surface also changes across much larger areas and longer times. Beneath a mountain range, tectonic plates can push together for millions of years. The crust thickens and rises, while weathering, ice, and streams remove rock from the high slopes. Layers of marine rock found high above sea level are evidence that land was uplifted after those rocks formed underwater. Although uplift is usually slow, earthquakes can suddenly crack and shift the ground along faults, changing parts of the landscape in seconds.

2 ANSWER WITH EVIDENCE Use the passage

- 1 What evidence shows that Pine Creek changed gradually over ten years, and which processes caused that change?

- 2 Explain how the landslide changed Pine Creek's surface in a short time.

- 3 Which observations provide evidence that a rapid landslide occurred?

- 4 Use the marine rock evidence to explain how a mountain range can change Earth's surface over a long time.

3 YOUR TURN Your own words

Use this evidence: A playground slope has small rills after rain, and photos from four years show bare soil spreading downhill. Write exactly three sentences that explain how water changed the slope. Name a process, use both pieces of evidence, and state whether the change was gradual, sudden, or both.

PART 1 • READ AND MARK

Underline each observation that serves as evidence, then number the geoscience process or processes it supports. This will help you connect evidence to an explanation of surface change at different scales. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What evidence shows that Pine Creek changed gradually over ten years, and which processes caused that change?	Aerial photos show the creek curve moving toward a field. Erosion wore away the outside bank, and deposition built sediment on the inside bend.
2	Explain how the landslide changed Pine Creek's surface in a short time.	Intense rain saturated the hillside, causing a landslide that covered part of the channel. The pile of material forced water toward the opposite bank.
3	Which observations provide evidence that a rapid landslide occurred?	Fresh scars on the slope, buried plants, and a blocked channel provide evidence of the rapid landslide.
4	Use the marine rock evidence to explain how a mountain range can change Earth's surface over a long time.	Marine rock high above sea level shows that land containing rocks formed underwater was uplifted. Tectonic plates pushing together can slowly thicken and raise the crust over millions of years.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Rainwater eroded the playground slope by carrying loose soil downhill. The rills that appear after rain show that water cuts the surface during storms, and the four-year photos show bare soil spreading over time. This evidence supports the explanation that repeated small erosion events caused gradual change, even though each rainstorm may act quickly.

Accept explanations that accurately connect named evidence to a geoscience process and to a time or spatial scale. For the open task, accept different valid explanations if they use both observations and clearly describe erosion by water.