Forest From Above

Use satellite evidence and local records to investigate land change.

ENV.3.3 "Use satellite imagery and other resources to analyze changes in biomes over time (e.g., glacial retreat, deforestation, desertification) and propose strategies to reduce the impact of human activities leading to these issues."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two details that make the satellite images comparable, circle two clues from other sources, and write a 1 beside one action that could reduce land damage.

A Dry Forest in Transition

1 At the edge of a dry forest, a fictional district called Arroyo Vale has changed. Researchers compare satellite images taken in the same dry-season month in 2005, 2015, and 2025. They classify each pixel as tree cover, exposed soil, or another surface. The table reports percentages for the same study area each year, not the number of trees.

ARROYO VALE LAND COVER FROM SATELLITE IMAGES

Year	Tree cover (%)	Exposed soil (%)
2005	71	10
2015	60	18
2025	44	30

2 Land records show new cattle pastures between 2015 and 2025. Field teams found hoofprints and sparse plants on grazed hillsides. Rain gauges showed no steady decline in rainfall across the full period, though some years were dry. Together, these records help investigate the satellite pattern without proving that every bare patch has the same cause.

3 Less tree cover can leave soil exposed to wind and heavy rain, increasing erosion and the risk of land degradation. Exposed soil alone does not show that the entire dry forest has become a desert. The district could limit grazing on damaged hillsides and protect areas where native trees can regrow. Later images and field surveys could test whether those actions work.

2 ANSWER WITH EVIDENCE

Use the passage

1. Using the table, how did tree cover and exposed soil change from 2005 to 2025? Give both changes in percentage points.

2. How do the satellite results from 2015 to 2025 and one other source together support a possible human cause of the change?

3. Why would the satellite results not prove that the entire district became a desert?

4. How could you use rainfall records and land records to test whether low rainfall, rather than pasture expansion, best explains the satellite changes?

3 YOUR TURN

Your own words

Suppose Arroyo Vale can either restrict cattle on damaged hillsides or plant native trees in active pastures. Choose one option. In three or four sentences, explain how it addresses the measured change and how later satellite images plus one field record could show whether it worked.

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PART 1 · READ AND MARK

Underline two details that make the satellite images comparable, circle two clues from other sources, and write a 1 beside one action that could reduce land damage. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Using the table, how did tree cover and exposed soil change from 2005 to 2025? Give both changes in percentage points.	**Tree cover fell by 27 percentage points, from 71% to 44%. Exposed soil rose by 20 percentage points, from 10% to 30%.**
2	How do the satellite results from 2015 to 2025 and one other source together support a possible human cause of the change?	**Tree cover fell and exposed soil rose during that period. Land records show new cattle pastures, which suggests pasture expansion may have contributed.**
3	Why would the satellite results not prove that the entire district became a desert?	**The results show more exposed soil in the study area, not that all its land became desert. Bare patches can also have different causes.**
4	How could you use rainfall records and land records to test whether low rainfall, rather than pasture expansion, best explains the satellite changes?	**Compare rainfall in the image years with the land-cover results, then check where land records show new pasture. No steady rainfall decline alongside pasture expansion would weaken a rainfall-only explanation.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would restrict cattle on damaged hillsides so plants can recover and keep soil covered. The table shows exposed soil rising from 10% to 30% between 2005 and 2025. After several years, I would compare satellite images of the same hillsides taken in the same dry-season month to check for less exposed soil. Field surveys of plant cover would help confirm whether the hillsides recovered.

Accept either proposed option if the student links it to a measured land-cover change and names both a later satellite comparison and a relevant field record. Treat pasture expansion as a possible contributor, not a proven cause of every bare patch.