Mine Site Choices

Weighing land, water, and material impacts of solar power

ENV.2.4 "Examine solutions for developing, conserving, managing, recycling, and reusing energy and mineral resources to minimize impacts in natural systems (e.g., agricultural soil use, mining for coal, construction sites…"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three actions that protect land or water, circle two actions that reduce demand for newly mined materials, and write a 1 beside one impact the solar project cannot avoid.

A Second Use for a Coal Mine

1. A county wants to build a solar array on a closed coal mine. The site has little topsoil, and rain can wash loose rock into a nearby creek. Some exposed rock contains minerals that can form acidic runoff when they react with air and water. The county could instead clear a working farm field, but that would remove land from food production and disturb healthy soil. Building on the mine keeps the field in use. It does not automatically repair mine damage, however. Workers must test runoff and design the project so equipment does not break the site's protective soil cover.

2. Before construction, engineers map the covered areas and place solar panels on supports that require minimal digging. They route trucks along existing roads and plant native grasses on disturbed ground. The grasses' roots hold soil, while barriers slow muddy water until plants grow. Where tests find acidic runoff, the county collects and treats the water before it enters the creek. These steps cost money and require regular checks, but they limit erosion and water pollution. The array produces electricity without burning coal, although making its panels and supports still requires mined minerals and energy.

3. To reduce demand for new materials, builders use safe, inspected steel supports salvaged from another project. They send scrap metal from installation to a recycler instead of a landfill. When panels wear out, a specialized recycler may recover some glass and metals, but recovery depends on available facilities and panel design. Recycling does not erase the impacts of extracting the materials used in the first place. The county therefore plans for repair and long service life as well as recycling. Comparing land use, creek protection, and material demand helps residents judge whether the project truly reduces harm.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why might the closed mine be a better site than the farm field, and what problem would still need attention?

2. Choose two construction steps from the passage. Explain how each limits damage to land or water.

3. If tests find acidic runoff, what should the county do, and what impact would that action reduce?

4. How do salvaged steel and recycling reduce demand for mined minerals? Why are they not complete solutions?

3 YOUR TURN

Your own words

A town will build a community center on either an unused paved lot or a productive farm field. Propose a site and two ways to reduce impacts from its electricity supply and building materials, then explain one trade-off that remains.

ANSWER KEY

Mine Site Choices

HIGH SCHOOL · ENV.2.4

PART 1 · READ AND MARK

Underline three actions that protect land or water, circle two actions that reduce demand for newly mined materials, and write a 1 beside one impact the solar project cannot avoid. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why might the closed mine be a better site than the farm field, and what problem would still need attention?	**Using the mine keeps productive farmland and its healthy soil intact. Workers must still protect the mine's soil cover and address runoff that could pollute the creek.**
2	Choose two construction steps from the passage. Explain how each limits damage to land or water.	**Using existing roads limits new ground disturbance. Planting native grasses holds soil in place and reduces erosion.**
3	If tests find acidic runoff, what should the county do, and what impact would that action reduce?	**The county should collect and treat the runoff before it reaches the creek, reducing water pollution.**
4	How do salvaged steel and recycling reduce demand for mined minerals? Why are they not complete solutions?	**Salvaged steel replaces some new material, and recycling recovers material for future use. The project still needs mined minerals, and not every panel material can necessarily be recovered.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Build on the unused paved lot to keep the farm field productive. Install rooftop solar panels to supply some electricity without burning fuel during operation. Use inspected salvaged steel to lower demand for newly mined material. Solar panels still require mined minerals and energy to manufacture, so the town should maintain them for a long service life.

Accept other passage-supported construction steps and accurate explanations of their effects. For the open task, look for a justified site choice, one electricity measure, one building-material measure, and a realistic remaining trade-off.