



# Lesson 3: Intersection of Ecosystems & Industry

Time: minimum 45 minutes  
Grades: adaptable to grades K-4

## Objectives

Students will:

- learn about the environmental problems left by coal mining and how they can be repaired
- contemplate how planning for land use can create a more balanced and fair use of resources/land.

## Materials

- large gridded map
- squares sized to grid, color-coded to land uses
- land use guide

## Vocabulary

- culm bank
- acid mine drainage
- reclamation
- right
- land use plan/planning
- land use types (e.g., residential, industrial, utilities)

## Resources

- land use guide: <http://www.earthconservancy.org/wp-content/uploads/2023/07/wereclaim-land-use-printable.pdf>
- source lesson plan: *City by Design*, National Building Museum, <https://www.nbm.org/wp-content/uploads/2016/02/CBDERP.pdf>

## Lesson Plan

### 1. Anticipatory Set

- Yesterday we learned about anthracite coal mining and the benefits it created, but we did not discuss how mining this natural resource affected local ecosystems.
- If you remember, when we were counting our beads, there were white beads for reclamation. Who remembers what reclamation was?

### 2. Abandoned Mine Land in Northeastern Pennsylvania

- Like with the industry lesson, the resulting environmental impacts of coal mining are specific to the industry. In our mini-lecture, we discussed:
  - How, until about 50 years ago, mining companies were not required to clean up after themselves, i.e., **reclaim** the land (putting it back into a safe, stable, and useable state). Without reclamation, two HUGE problems resulted: mine-scarred lands (**culm banks**) and damaged waterways (**acid mine drainage**). We then showed pictures and discussed each of these, including how they pollute/destroy local habitat/ecosystems.

- On top of that, we discussed how the collapse of the mining industry affected our communities, with the loss of thousands of jobs and businesses. Many people left the area. Those who stayed had to live with the environmental impairments surrounding them. We emphasize that individuals who had financial resources – like owners of the coal companies – were able to move away from these sites.
- Now knowing that, is it fair to ask for reclamation to be done?
- At this point, we underscore the belief that no one should be forced to live in an unhealthy environment and introduce the statement, “Everyone has the right to a clean earth.” We briefly explore what a human **right** is (principles and/or beliefs that people have simply because we exist as human beings). We also communicate that there are organizations working in our area to improve the land and water, including Earth Conservancy. We then show images of the reclamation process.

### 3. Activity & Discussion

- We end our reclamation images with redeveloped sites (e.g., industrial buildings, houses, parks). We ask, “How do you think Earth Conservancy decides what to do with the land?” Earth Conservancy works with people in the community to figure out their needs and wants to help guide the land’s reuse. This is called **land use planning**. Land use planning is often like a puzzle, figuring out how the land can accommodate people’s needs and wants in a fair way.
- Start by brainstorming with students the **types of land uses** (e.g., housing, parks, restaurants) and explain their overarching categories (e.g., residential, recreation, commercial). Ask students to think about where they live. What things do they like where they live? What would you change? What do you want more of? Less of?
- Discuss how a community is another type of ecosystem; that all types of uses are necessary to support the survival of the community. We give the example of the domination of the coal industry locally. When it failed, everything else was affected.
- Break students in groups (we usually had 10 per group, but we had a very large map). Each group gets a gridded map and squares representing different land use categories. Students must work together to develop an ideal city. Considerations included:
  - Placement of large utilities, landfills, and factories
  - Accessibility of schools and parks
  - Police and fire coverage
  - Mixed-use areas
  - Use of mass transit
  - Reuse of abandoned/brownfield sites
  - Building in greenspace/forests (vs conserving)

Independent work during the activity will depend on age/ability. Figuring out how each group will make decisions should be brainstormed/guided at the start (we had some groups take turns, others voted).

- Return to the large group. Discuss students’ experience with the activity, including
  - How they made decisions?
  - What aspects of planning for land use were challenging?
  - As the city developed, did you need to make changes?

With older grades, this can become more involved with budgets, assigned stakeholder groups, and/or costs for reclaiming land (we had mine-scarred land on our map).

#### 4. Conclusion & Preview

- When we started this activity, I asked you to tell me what you like in your community and what you might want to change. For our next lesson, you get to make those decisions. Think about what you'd like to see where you live. What colors do you imagine? What words would you describe it? Each of you will be creating an artwork to share your ideas.



Instructor Laura Rinehimer, left-center, guides students as they make decisions about land use in the development of their town.