



# Lesson 1: Local Ecosystems

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

## Objectives

Students will:

- understand the basic elements of natural ecosystems
- be able to explain the relationships among parts of local ecosystems.

## Materials

- images of plants, animals, rocks, etc. local to area
- uncoated paper plates (we used 6" diameter)
- markers, colored pencils, and/or crayons
- cut-out arrows

## Vocabulary

- nature
- living/nonliving
- habitat
- ecosystem
- community

## Resources

- pond ecosystem illustration: <http://bit.ly/pond-ecosystem>
- printable arrows: <http://www.earthconservancy.org/wp-content/uploads/2023/07/wereclaim-ecosystem-arrows-printable.pdf>

## Lesson Plan

### 1. Understanding Nature

- Ask, "What is **nature**?" Discuss things found in nature. Can also discuss how humans use natural things as resources (e.g., sand and gravel used to make concrete, although in that form, no longer nature).
- In nature there are **living** and **nonliving** things. How do we know that something is alive?
- Ask, "Can any animal (or plant) live in any place?" Discuss examples of why not (we used the example of a polar bear living in northeastern PA). The place a creature exists is called its **habitat**. Brainstorm major types of habitat on earth (e.g., arctic, savannah, rainforest, ocean). Then discuss types of local habitats (e.g., forest, meadow, stream).
- Explain that when living (plants, animals, microbes, fungi) *and* nonliving (heat, soil, water, space) things combine in a certain place in a certain way, they create an **ecosystem**. An ecosystem is a type of **community** (explore community). In a community, each element is connected to the other parts; together, they support the successful existence of the whole. Using an image of a local ecosystem, talk about what living and nonliving things are present and the each's role (we showed an illustration of a pond). We also discussed what would happen if changes are made in the ecosystem (e.g., the bugs disappeared). This could also lead into a deeper discussion of human impacts on ecosystems.

## 2. Activity & Discussion

- Distribute identification guides for animals, plants, and rocks in local ecosystem (we made our own sheets, but you could use field guides or, to extend the activity, have students research online).
- Have each student select one item and draw it in the center of the paper plate.
- When all students are finished, gather everyone around a large table (or the floor). Begin to discuss relationships among their selected items. While there are many ways to do this, we often started with an insect or plant. Place arrows between the plates to show connections. Older students may be able to do this independently.
- Discuss what happens if one of the elements is taken away (e.g., a berry bush). Also discuss the significance of changes to the nonliving parts of ecosystems (e.g., temperature, water quality).

## 3. Conclusion & Preview

- Review the importance of stability in an ecosystem; that each element supports balance and survival.
- Explain that in the next lesson, students will explore one item from the local ecosystem that was particularly important to settlers in the region, and how this natural resource supported the community's existence and growth.



Instructor Laura Rinehimer, on left, works out connections among the animals, plants, and other natural elements drawn by students to show relationships in a local ecosystem.



## Lesson 2: Local Resources & Industry

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

### Objectives

Students will:

- understand the role of anthracite coal in the history of northeastern Pennsylvania
- learn about the mining process (and miners)
- gain awareness of the economics of mining
- learn what reclamation is

### Materials

- wild birdseed (with sunflower seeds)
- plastic containers with lids (ours were approx. 10" x 10" x 2½")
- beads (see original lesson plan for color/number breakdown)
- penalty cards
- calculation worksheets
- cut-out arrows

### Vocabulary

- resource/natural resource
- anthracite coal
- breaker
- breaker boys
- waste rock
- reclamation

### Resources

- source lesson plan: Kentucky Foundation, <http://www.coaleducation.org/lessons/wim/1.htm>
- environmental penalty/fine cards: <http://www.earthconservancy.org/wp-content/uploads/2023/07/wereclaim-mining-violation-printable.pdf>
- mining calculation worksheet: <http://www.earthconservancy.org/wp-content/uploads/2023/07/wereclaim-birdseed-mining-worksheet.pdf>

### Lesson Plan

#### 1. Anticipatory Set

- Ask, "What is a **resource**?" (Something that can be used to fulfill a need.) Talk about resources people use every day (e.g., lamp, cell phone)
- Ask, "What is a **natural resource**?" (Something from nature that is used by humans to fulfill a need.) Brainstorm examples and discuss how they may be used (e.g., trees = construction materials, paper, heat, food).

#### 2. Anthracite Coal in Northeastern Pennsylvania

- The way humans interact with the world can be very specific to a place. Where we live, one of the most important things that affected how this area developed was the discovery

of anthracite coal. Anthracite coal was a very important resource.

- This discussion will be specific to the industry that was important to your community. In our mini-lecture, we
  - Showed a map of Pennsylvania with the anthracite coalfields. Northeastern PA is home to the largest deposit of **anthracite coal** in the world.
  - Talked about the difference between anthracite and bituminous coal (we also passed around samples of anthracite coal).
  - Showed historical photographs of underground coal mining, strip mining, and how coal was processed at the **colliery**/in the **breaker**. This included a discussion of **breaker boys**, 8 to 12-year-olds who would sort fragments of **waste rock** from the coal.
- We then brainstormed the benefits of industry (e.g., jobs, availability of goods, higher standard of living, technological advancements).

### 3. Activity & Discussion

- Break students into small groups (no more than three per group works best). Each group receives container of birdseed with colored beads already buried. Instruct students to mine for beads PLUS sunflower seeds. Remind students to mine neatly. Any waste seeds on table, lid, etc. will result in an environmental fine (review “fine”, if needed) from the mining inspector.



Students neatly sort beads and sunflower seeds from “waste rock.” Items then will be counted and values calculated on worksheet in the foreground

- When the majority of groups have found their beads (or, based on a predetermined time limit), have students complete mining calculation sheet (assistance may be required depending on age/ability). Discuss the role of the white beads, i.e., **reclamation**: Mining companies are currently required to return mined land to a natural state/repair environmental damage.
- Draw chart on board and tally the totals for each group. Prizes may be awarded.
- Discuss students' experience with the activity, including
  - Was mining or hard? What made it so?
  - What did you notice about the value of certain items? How might this affect your mining approach?
  - Was it fair to get a penalty? Was it fair to have to complete reclamation? Why or why not?

#### 4. Conclusion & Preview

- Review the importance of coal for the local area; integral to industry, transit, heating, etc., as well as the employment of hundreds of thousands of people.
- However, coal mining also had a cost. In the next lesson, we'll discuss what some of those costs were.



# 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.





# Lesson 4: Collage, Part 1

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

## Objectives

Students will:

- learn what a work of collage is
- become familiar with artists who used collage
- begin the process of making their own collage artwork.

## Materials

- canvas (ours were hexagon-shaped)
- paint
- brushes
- water, containers

## Vocabulary

- collage
- background

## Resources

- Eric Carle: <https://eric-carle.com/>
- Hannah Höch: <https://www.moma.org/artists/2675>
- Romare Bearden: <https://beardenfoundation.org/learn/>
- Jesse Treece: <https://www.instagram.com/jesstreececollage/>

## Lesson Plan

### 1. What Is Collage?

- Review previous land use planning lesson and the request to think about what their ideal environment would look like. We are going to be making an artwork to show this place using a technique called **collage**. The word “collage” comes from the French word “to paste.” Collage is done by gluing different materials (e.g., paper, photographs, fabric) to a flat surface.
- Show examples of famous collage artists. We start with Eric Carle, as his work usually is familiar to students. We emphasize looking closely at how his animals (say, the hungry caterpillar) are made using multiple cut-out shapes from painter paper. We do similar technical discussions with the other artists and explore symbols and meanings in the example artworks.

### 2. Activity

- The first step of the students’ artworks is painting the **background** (the area behind the main object). Show images of artworks that make it easy to distinguish the background from the collaged images (Eric Carle has some good ones).
- To help with color choice, we ask students to close their eyes and imagine a favorite place in nature (e.g., forest, beach). You can ask for additional details like time of day, season. We list

these on the board. We then ask students to brainstorm what colors they associate with each environment (e.g., beach = yellow, orange, pink, aqua blue) and write these down. This is a great opportunity to talk about warm/cool colors.

- Students pick three colors related to the place they imagined and then use them to paint the canvas. Suggestions for the activity:
  - Emphasize students are not painting a specific object; they are only painting an abstract background.
  - Try to limit the number of colors used; lots of colors often ends up as a muddy gray.
  - Students can experiment with types of brush strokes, drip or spatter painting, texturizing paint, or accent marks.

### 3. Conclusion & Preview

- Ask students to continue thinking about what their ideal environment looks like.
- In the next lesson, students will work on depicting this place using collage.



Students working on first step of mixed-media collage – painting background according to selected color scheme.



## Lesson 5: Collage, Part 2

Time: minimum 45 minutes  
Grades: adaptable to grades K-12

### Objectives

Students will:

- Become familiar with the Interdependence Hexagon Project
- Understand the concept of a human right, including those defined in the United Nations' *Children's Rights & the Environment*
- Describe what a healthy environment means to them, and depict that vision using collage

### Materials

- magazines (other media such as scrapbook paper, newspaper, fabric, foil, also can be used)
- Modge-Podge, containers
- sponge brushes

### Vocabulary

- hexagon
- environmental justice
- right

### Resources

- Interdependence Hexagon Project: <https://hexagonproject.org/>
- UN *Children's Rights & the Environment*: <https://www.unep.org/resources/other-evaluation-reportsdocuments/childrens-rights-and-environment>
- artist statement card: <http://www.earthconservancy.org/wp-content/uploads/2023/07/wereclaim-artist-statement-printable.pdf>

### Lesson Plan

#### 1. Hexagons, the Interdependence Hexagon Project, & Environmental Justice

- Discuss Hexagons: Ask if anyone knows the shape of the canvas. It is a hexagon, a polygon with six sides. Can anyone think of a place we might see this shape?
  - Common answer is in a beehive. Discuss further how hexagons often are found in nature (e.g., turtle shell, fly eyes, snake scales).
  - Ask students to compare an array of hexagons vs. circles. Hexagons fit together perfectly. In a beehive, this is important. Hexagon cells use the least amount of space and building materials, and their structure is light, yet very strong.
  - Bees have an innate knowledge of making the hexagon shape. Each worker bee creates an individual cell, but many bees are working at the same time to create the honeycomb. All bees are required to support the survival of the hive. A beehive is its own ecosystem.
- Discuss Hexagon Project: Started in 2006, the Interdependence Hexagon Project is an all-volunteer non-profit community arts organization based in Scranton, PA. Every year, the Project invites the public worldwide to contemplate social and global challenges facing the

world, and use art as a vehicle to reimagine how these challenges can be addressed through critical thinking, research, and creative expression.

- Discuss Environmental Justice: The theme of the Interdependence Hexagon Project for 2023 is **environmental justice**. Ask students to think back to the discussion of abandoned mine lands and the **right** people have not to live near polluted lands. Oftentimes, some people have more pollution to deal with than others. Everyone has the right to a clean earth. The United Nations outlined several rights children have in regard to the environment. They include rights to life, health, basic needs, and play. *Rights* declares that there should be respect for *all* children's views and that concerns should be addressed.

## 2. Activity

- Review with students the places they brainstormed when choosing the background for their artwork. Now brainstorm what things would make that place ideal. What would it need to support a happy and healthy life? List these on the board.
- Show examples of and/or demonstrate to students ways of creating a collage. Techniques can include filling in a shape, cutting out a picture, tearing paper, and building a picture. Students may also want to add found words, add drawings, or color shapes in.
- Students start collaging on canvas, using the magazines as their media. As they glue, make students aware the Modge-Podge will dry clear. Instructors will want to coat entire canvas with Modge-Podge when completed to ensure everything adheres.
  - **Note:** For WeReclaim!, we took a picture of each student prior to the activity. These were printed in multiple various sizes, and students could cut them out and incorporate them into their artworks. This not only emphasized their role as artist, but also that they were part of/have a role in the world envisioned.





Previous page: Student working on her collage; Above: Examples of artworks with student photos included.

### 3. Conclusion & Extensions

- After artworks were completed, an exhibit was held during a family night. Artworks were hung on the wall in a honeycomb pattern, flanked by artists' statements the students had composed. Knowing artworks will be shared publicly often adds to motivation. Public display also draws attention to students' efforts, which can boost their confidence. In relation to this project, seeing artworks grouped together underscores the Hexagon Project's theme of interconnectedness.
- Because of time limitations, we had to shorten/eliminate several activities. Based on our experience, we would recommend including them, if possible.
  - **Artist Statements:** These were done after artworks were complete, with students completing the statement, "I have the right to an earth where...." It may be appropriate to do this prior to the start of collage, so that students can firm up what they want to represent in their artworks.
  - **Preliminary Sketch:** Similar to the artist statement, allotting a period to sketching may strengthen students' ideas, as well as offer the opportunity to think about how they will use collage to depict them (or even practice basic collage techniques).
  - **Critique:** In art, critique does not equate with criticism; it is a process of looking at and talking about art with others. The artist can describe his/her process and motivation. Viewers can provide affirmations, ask questions, and offer suggestions. It truly is an important part of the creative process, allowing for clarifications, amplifications, and revisions. For this project, having a critique on initial sketches (or prior to gluing) would be most beneficial.

- **Public Presentation:** Whether doing an in-class, school-wide, or parent exhibit, having each student verbally describe his/her artwork to others is an excellent opportunity to build presentation skills.



Above: Student exhibit during Family Night; Below: Example of artist statement card.

