April 2021

Lesson Plan - Garbage and the Impact of Scale

Center for Urban Resilience

LESSON 1: GARBAGE AND THE IMPACT OF SCALE

OVERVIEW:

The main purpose of this lesson is to introduce garbage by way of exploring the concept of scale. The lesson begins by having students define garbage. Students will then think about their own garbage production. Their individual production will then be used to estimate garbage production at different spatial scales. In an optional activity, students can also explore how garbage and its management have changed over time.

SUB-QUESTION:

What is my role in garbage production?

WAYS OF KNOWING URBAN ECOLOGY:

	Students will…
Understand	• Understand that scale is an important factor when investigating the impact of garbage on the environment. *(scale)* • Understand that the definition of garbage is context dependent. *(ecosystem state and structure)* • Understand that the management of garbage has changed over time and continues to evolve. *(ecosystem change)*
Talk	• Define garbage through class discussion.
Do	• Estimate the amount of garbage they produce taking into account different temporal scales.
Act	*No specific goals connected with acting on urban ecology in this lesson.*

SAFETY GUIDELINES

No specific safety issues are associated with this lesson.

PREPARATION:

Time:

1-2 class periods

Day 1: Activity 1.1
Activity 1.2
Day 2: Activity 1.3 (Optional)

Materials:

Activity 1.1

Blackboard/ Butcher Paper

Activity 1.2

PowerPoint presentation Garbage and Scale
64 oz. plastic storage container
Copies of Student Sheets
Calculators

Activity 1.3

Internet Access
Newspaper print

Conclusion

Student Notebooks

Instructional Sequence

Activity 1.1: What is garbage?

1. Opening Introduction
    - State or write on the board the proverb "One man's trash is another man's treasure" or "One man's garbage is another man's gold". Ask students to write an explanation for the meaning of this quote.
2. Ask students to brainstorm a definition for garbage

> **Teaching Strategy**
> **Some questions that may help to spur the discussion are included below.**
> - If you were to look into a garbage bin, what would you expect to find?
> - Are all items placed in the garbage bin necessarily garbage?
> - Are there different types of garbage? If so, what might they be?

    - The purpose of this activity is just to get students thinking about what garbage is. No one definition of garbage is expected, but there should be an understanding that garbage is defined individualistically by the person that disposes of the items. In other words, it's garbage to me if I throw it away because I have no use for it anymore.
    - Write students ideas on the board or on a piece of butcher paper
    - Students should come to the understanding that garbage is material believed to be useless or disposable

Activity 1.2 How much garbage is produced and at what scale?

1. Show students the PowerPoint presentation Garbage and Scale
    - For each image have students guess what is being portrayed. The following slide will be a zoomed in image of what type of garbage it is. This will show students that different things, like trash, can be looked at from different perspectives.
    - Tell students that studying different levels or scales of the ecosystem give scientists different perspectives that provide different information. Using all of the information, scientists get a more complete picture of that which is being studied. Today we are going to be studying garbage production at different scales.
2. Distribute the activity 1.2 student sheet. Break students into groups. Have them read the directions before moving on to the calculations.
    - Have a 64 oz. plastic storage container in the room. Walk around the room with it to show students that this is an estimate of the amount of garbage they produce in a given day.
    - Have students complete worksheet 1.2
3. Discuss the students' results and their responses to the worksheet questions

Conclusion

1. Either as discussion or a written reflection have students consider why it is important to look at garbage through different perspectives and scales

Activity 1.3 Garbage and Management (Optional)

1. Ask students to brainstorm how garbage has changed over time. Write these ideas on the board
    - Some prompting questions might be… What types of things are used now that did not exist 100 years ago? *Technological advances like cell phones and computers, increased use of plastics.* What does food come in? How is food stored? *Packaging of food products contributes greatly to garbage.*
    - To follow up, ask students to think about the consequences of this changing garbage. It is important to think about the change in garbage to understand the changes in management and disposal of garbage over time.
    - Ask students to give some reasons why garbage and its management would be an important topic to study in urban ecology.

> **Teaching Strategy**
> You may want to remind students of the idea of a city as a system and mention garbage as an output.

2. Students Complete Activity 1.3
    - Divide students into 5 groups and give each group a different piece of the timeline to research (e.g., 1800-1900, 1900-1920, 1920-1950, 1950-1980, and 1980 – present). Students will write 5 main points on a sheet of newsprint that can be posted in the class. These points should summarize what they think is important about garbage within the time period they were assigned. Sample questions they could focus on
        - What type of trash was being produced most?
        - How was this trash being disposed of?
        - What typing of recycling might have been taking place?
        - What type of laws were in place regarding garbage disposal?
    - When the groups are ready, they should present their summaries to the class starting with the beginning of the timeline and moving chronologically towards the end of the timeline. They should also be able to explain why they selected the 5 points to represent their time period.
3. Have students discuss possible trends or shifts that garbage and its management have taken over time
    - Some questions that may help to spur the discussion are:
        - How has industry and marketing played a role in the evolution of garbage?
        - Were there any surprises in the timeline?
        - How has garbage management changed over the years?

- Students may have some questions about how garbage from their community is managed. This could become a question which guides further independent investigation.

Conclusion

1. Students should write 2-4 statements that answer the question "Why should I care about garbage and its management?"
    - Some possible answers may include such concepts as limiting disease, limited space, recycling to save non-renewable resources, and protecting the ecosystem.