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Urban EcoLab

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Lesson Plan - Where Does Our Garbage Go?

Center for Urban Resilience

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Lesson 2: Where Does Our Garbage Go?

OVERVIEW:

In this lesson, students will explore what happens to garbage after it is thrown away. The first activity looks at the garbage itself. Garbage will be classified as either biodegradable or not, and connected to the principle of the conservation of matter. The second activity concerns garbage disposal methods. Students will participate in a jigsaw activity where they learn about one garbage disposal system, and then will teach their peers about the different systems. The focus will be on the advantages and disadvantages of each method. The third activity is a debate which shows that garbage disposal issues can disproportionately impact low income communities.

SUB-QUESTION:

What happens to garbage once it is thrown out and where does it go?

WAYS OF KNOWING URBAN ECOLOGY:



Students will...

Understand

- Understand that garbage can be classified as biodegradable or non-biodegradable. (*ecosystem state and structure, ecosystem change*)
- Understand that there are advantages and disadvantages associated with four different garbage disposal systems: landfilling, incinerating, ocean dumping and recycling. (*ecosystem state and structure, ecosystem change, scale*)

Talk

- Argue for or against building an incinerator based on ecological, social, and economic factors.

Do

No specific goals connected with acting on urban ecology in this lesson.

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:

2 class periods:

Day 1: Activity 2.1

Activity 2.2

Day 2: Activity 2.3

Materials:

Activity 2.1

Chalk Board/ White Board

Activity 2.2

Copies of Student Sheets

PowerPoint- Where does garbage go in MA?

Activity 2.3

Image of Municipal Garbage
Copies of Student Sheets

Instructional Sequence

Activity 2.1: What happens to garbage?

1. Review the concept of the Conservation of Matter
 - Matter is neither created nor destroyed
 - If this is the case then what happens to all the garbage that we produce? Ask students to brainstorm some ideas about what happens to garbage if it is not destroyed
 - *Possible student responses: garbage sits around, it changes forms like if we burn it, we reuse the materials.* Use the student responses to introduce and guide the lesson.
2. Have students call out different garbage items. Write these items on the board in two unlabeled groups. One group will be biodegradable materials, like food and paper and the other group will be non-biodegradable, like plastic and glass. If you are unsure of an item you can make a third column and have students look up these materials.
 - Once all garbage items are listed have students analyze the different groups. Ask what types of materials are in each group?
 - Have students try to come up with category headings. Write their ideas by the appropriate grouping of items.
 - At the end of the brainstorming write “biodegradable” and “non-biodegradable” on the board for the appropriate groups.
3. Define biodegradable- capable of being broken down into non harmful products by air, water, and bacteria
 - Even though an item may be biodegradable it still may take a long time to break down

Teacher Background

Although there are many materials that decompose, it can take a very long time. It might be useful to share some time ranges with students so they better understand the biodegradation process. If it takes longer than a person’s lifetime to decompose we do not consider the material to be biodegradable.

Material	Time to Break Down
Cotton Rags	1-5 months
Paper	2-5 months
Rope	3-14 months
Wool Socks	1-5 years
Cigarette butts	1-12 years
Leather Shoes	25-40 years
Nylon Fabric	30-40 years
Tin Cans	50-100 years
Aluminum Cans	80-100 years
6 pack holder rings	450 years

Diapers	500 years
Styrofoam	2000 years
Glass Bottles	1 mill years

Activity 2.2: Where does our garbage go?

1. Introduce the Jigsaw activity. Tell students that they are going to be learning about 4 different ways to dispose garbage. These are not the only 4 ways to dispose garbage and these methods do not necessarily exist in isolation from each other.
 - Each student will read about a disposal method. They will then meet with other students who read about the same method. Students should discuss what the method is, advantages, and disadvantages. They should fill out their organizer for this particular method.
 - Form new student groups so there is at least one representative from each disposal method in a group. Each representative should teach the other students about their disposal method. Students should complete their organizers.
2. Hand out the Activity 2.2 Student Sheets. Have students complete the activity. Emphasize that the students need to be teaching their group members, not allowing them to copy their sheets.
3. Discuss as a class each of the disposal methods. Have students share their ideas from their worksheets and add any pieces that they might be missing.
 - Ask students to think about the differences in scale of the impacts of each disposal method. Who and what is being affected?

Conclusion

1. PowerPoint- Where Does Garbage Go in MA?
2. (Optional) For homework have students research what happens with their garbage once it leaves their house. A good starting point for finding this information is on the website for their city or town.

Activity 2.3: Not In My Back Yard

1. Opening- what makes up municipal garbage
 - Project the image of Municipal Garbage. Tell students that these are the relative percentages of what you throw away at home.
 - Have each student choose 3 types of garbage and answer the following question: What disposal method should be used to dispose of this garbage that will have the lowest ecological impact? Why?
2. Introduce the debate and hand out the Student Sheets. Tell students that the NIMBY issue is one of the most popular debates involving almost all environmental issues. These debates involve social, political, and economical factors in addition to the ecological sciences.
 - Today the students will get to experience the pros and cons of making garbage disposal decisions. These decisions involve the whole community, and many people have strong, conflicting opinions.
3. Go over the debate directions with the students. The debate on what to do with garbage must be resolved today.
 - Have students independently read the situation and background information
 - Hand out the role cards, one for each student. You can do this randomly or assign roles to set up the debate dynamic based on your class.

- After students have an understanding of their own debate position, have the students meet in groups according to the color of their cards. As a group they should share their ideas and opinions. Each group is representing a particular sector of the city. If the group is opposed to building the incinerator they must come up with alternative proposals.
4. Conduct the debate. All students should participate, speaking only one at a time. Members of the same group should not speak more than once before the other groups get the chance to respond.
 5. At the end of the debate take a class vote. Each student should be voting individually according to the person they are representing. If other proposals came up during the debate, also vote on those options. The winners of this debate will be determined by majority rules.

Conclusion

1. Discuss the realistic components of the debate. Emphasize that waste and its corresponding effects disproportionately impact low income communities. In a “real world” NIMBY debate, “majority rules” is rarely followed.
 - The political influence of particular individuals or groups is taken into account. For instance, the opinion of a council member or scientist may be more influential than a resident.
 - In order to get their opinion heard, people also need to be active in their community. Even though many residents may be against the idea of an incinerator they may not be organized or well represented at a similar type of meeting like this debate.
2. Discuss components of the debate that may not be realistic. The Pro and Con groups might not be as clearly defined. It is not likely to get everyone from one group to feel the same way about the issue.
 - You will often have many people that have a conflict of interest, such as a person who works in the industrial sector but lives in low income residential area.
3. Reflection question: Today you were representing a particular person in the debate. How would you react if you lived in Trashville? Would you change your vote? Why?