Recycling with Mr. Murph—Grade level K-5

Lesson Objectives over Recycling with Mr. Murph:

- Lesson One Objective: Identify the problems with maintaining growing landfills, discuss the importance of recycling, and describe the importance of Tulsa Recycle and Transfer's MRF (Mr. Murph).
- Lesson Two Objective: Describe the significance of the 10 different phases Mr. Murph goes through in order to separate the various recyclables, and identify 10 ways to promote recycling at school.

Lesson One Objective: Identify the problems with maintaining growing landfills, discuss the importance of recycling, and describe the purpose of Tulsa Recycle and Transfer's MRF (Mr. Murph).

Materials Required for Lesson One:

1. Video of Tulsa Recycle and Transfer's Mr. Murph.
2. Picture of Mr. Murph.
3. Pictures of Landfills.
4. Pictures of Recycling Plants (Plastic, Paper, Ferrous Metals, Aluminum Metals).
5. Charts that illustrate how much waste going to landfills are truly recyclable materials.
6. Charts that illustrate how recycling benefits families and our community.
7. Jar of something stinky like sauerkraut or horseradish.
8. Two bags with one of the following common trash items in each bag—plastic bottle, pop can, newspaper, cereal box, tin foil ball, old tee-shirt, and a baggy full of leaves/grass.
9. Supplemental review questions for in-class activity or homework.
10. Supplemental identifying problems and solutions worksheet for in-class activity or homework.
11. Supplemental coloring sheet of Mr. Murph.

Lesson One Procedures:

1. **Gather** class around a central table. **Dump** one of the bags of trash and recyclables on the table. (Please note, it is up to the teacher's discretion whether he or she wishes to clean the items beforehand or leave the items dirty for a greater effect. If items are left dirty, the teacher should wear rubber gloves.)
2. **Open up** the discussion by asking the following questions:
   A. *What is all this stuff*?
   B. *Do you use any of these items at your house*?
   C. *Where does all this stuff end up*?
3. **Show** the pictures of landfills. **Ask** *does any of this stuff I just dump end up at a landfill, do you think*? To emphasize the point that trash continues to accumulate, **dump** the second bag of trash on the table. **Ask** *do you think any of this should recycled?*

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4. **Show** a chart that illustrates that anywhere between 60% - 80% of the trash going to landfills should be recycled.
5. **Ask** *If we should be recycling these materials, then why aren't they being recycled*? **Show** the picture of recyclable materials going into landfills. **Discuss** the statistics of 60%-80% of materials being thrown away should be recycled.
6. **Bring out** the jar of stinky stuff. Ask if anyone would like to smell it, or worse, everyday at home.
7. **Ask** *how can we solve any of the problems due to excess trash at landfills*? **Show** pictures of various recycling plants. **Lead** the students through the following questions:
    A. Who can tell me what recycling is?
    B. Which of these items can be recycled?
    C. If you leave these items on your curb in the regular trash can, will they be recycled? (If the students say yes, then ask them how and lead the discussion to the introduction of Mr. Murph. If the students say no, then introduce Mr. Murph.)
8. **Show** the students a picture of Mr. Murph. **Introduce** Mr. Murph as the kind of character that likes solving problems. **Ask** the students if they like solving problems, too.
9. **Tell** the students that Mr. Murph has solved several aspects of the problem of valuable recyclables going to landfills without the public having to sort through their own trash; Mr. Murph sorts out the recyclables for everyone.
10. **Have** student watch the TRT Mr. Murph Video.
11. **Revisit** the dumped trash on the table. **Ask** the students to tell you which trash Mr. Murph would sort out to various recycling plants. **Separate** the trash. **Ask** them to compare the amount of trash going to the landfill before and after a visit to Mr. Murph. **Show** the students the chart of how recycling benefits families and the community.
12. **Hold up** the picture of Mr. Murph, again. **Ask** for volunteers to summarize the purpose of Mr. Murph.
13. **Pass out** supplemental review questions for in-class activity or homework.
14. **Pass out** supplemental identifying problems and solutions worksheet for in-class activity or homework.
15. **Pass out** supplemental coloring sheet of Mr. Murph.

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Review Questions for Lesson One

Directions: Based upon the material discussed during class or presented in the Mr. Murph video, answer the following questions.

1. What is a landfill?

2. Why is placing recyclable materials in a landfill a problem?

3. What is recycling?

4. Who is Mr. Murph?

5. What materials is Mr. Murph looking to recycle?

6. What are the benefits of Mr. Murph?

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Identifying Problems and Solutions Worksheet

Directions: Decide whether each of the issues below is a problem or solution and place an "**X**" in the appropriate column.

Issue	*Problem*	*Solution*
1. Increasing piles of trash		
2. Recycling paper products		
3. Using Mr. Murph to sort out metals		
4. Putting recyclable materials in landfills		
5. Recycling aluminum products		
6. Reducing the landfill footprint		
7. Stinky odors due to trash piling up at home		
8. Recycling ferrous metals		
9. Using Mr. Murph to help recycle plastics		

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Lesson Two Objective: Describe the significance of the 10 different phases Mr. Murph goes through in order to separate the various recyclables, and identify 10 ways to promote recycling at school.

Materials Required for Lesson Two:

1. Worksheets with blank diagrams of Mr. Murph to be distributed to the students.
2. Detailed pictures of each of Mr. Murph's 10 phases with the label of the phase only on the back: (1) Trucks Unloading; (2) Skid Loaders Picking Up Trash; (3) The Hooper Feeding the Conveyor Belt; (4) The V-screen Finger Separating Large and Fine Materials; (5) Items 3 Inches or Smaller Falling onto the Fine Material Belt; (6) Pickers Pulling the Recyclables off of the Larger Material Belt; (7) The Magnetic Separator Attracting Ferrous Metals from the Large Material Belt; (8) The Super Magnet Attracting Ferrous Metals off the Fine Material Belt; (9) Eddie Current Rotor Shooting Aluminum; and (10) Bins of Recyclables Bundled for Compaction and Shipment.
3. Video of Mr. Murph's 10 Phases of Recycling.
4. Large Horseshoe (U-shaped) Magnet
5. Small sampling of various items made of iron, tin, or steel. (Possible suggestions: nails, paper clips, scissors, smaller magnets, push tacks, etc.) Also, include a small ball of aluminum foil.
6. Roll of aluminum foil to make small foil balls for everyone in the class.
7. Rubber bands for everyone in the class.
8. Small Paper cups for everyone in the class.
9. Supplemental Lesson Two Review questions for in-class activity or homework.
10. Supplemental Small Group Discussion Topic List.

Lesson Two Procedures:

1. Review Mr. Murph's purpose in making recycling easier and the landfill's footprint smaller. (See discussion of lesson one for answers.)
2. **Tell** the students that today they are going to learn about the different parts of Mr. Murph that make it so easy for him to recycle. **Start** video about Mr. Murph's 10 Phases of Recycling.
3. **Show and describe** the pictures highlighting the 10 Phases of Mr. Murph in order.
4. **Mix up** the detailed pictures of the 10 phases so they are not in order. **Write** the 10 Phases in order across the board. **Give** 10 different students the opportunity to match the correct picture with its corresponding phase by lining up under the correct phase listed on the board. For older students, **have** the student summarize the activities occurring in the phase. For younger students, **remind** the students what activities are occurring in each phase.
5. **Hand out** the blank Mr. Murph diagram. Ask the students to **label** the diagram using the 10 Phases written on the board. For younger students, assign each phase a letter or number. **Check** the students' diagram for accuracy.

6. **Draw** the students' attention to the part of the diagram that uses the magnets. **Ask** the students what they know about magnets. **Discuss** size, strength, and polarity. **Hold up** the horseshoe magnet and the sample of metal objects. **Ask** the students what items will be attracted to the magnet. **Test** the sample metal objects one at a time; be sure to include a rolled up ball of aluminum foil. **Discuss** how Mr. Murph's magnets pull multiple items at a time. **Ask** the students how Mr. Murph might get the ferrous metals off the magnets. **Discuss** efficiency of using magnets for this phase.
7. **Hold up** the picture of the Eddie Current Rotor and **explain** its purpose of targeting aluminum, saying that the strong fields of energy generated by the current kicks the aluminum into a collection bin. **Tell** the students that we cannot, at this time, make that kind of energy field, but we can mimic the operation by kicking aluminum foil into a paper cup with a rubber band. **Encourage** the students to act responsibly with their rubber bands or the rubber bands will be taken from them. **Create** a game to see how many baskets each student can make, using the rubber band to kick the aluminum foil ball into the paper cup. **Ask** the students how many baskets they think Mr. Murph makes in a minute, hour, or day.
8. **Go** to the board and write up the title, 10 Ways to Recycle at School. **Ask** the students what should be done with all the supplies they have used for this lesson. **Allow** the students to brainstorm of ways they can help recycle at school. **Consider using** the Small Group Discussion Topics worksheet to spark insightful thinking. **Tell** them that Mr. Murph would be proud of them if they could do their part to reduce the size of landfills.
9. **Pass out** supplemental Lesson Two Review Questions.
10. **Color** labeled diagram of Mr. Murph.

Review Questions for Lesson Two

Directions: Based upon the material discussed during class or presented in the Mr. Murph video, identify if the following statements are correct by circling TRUE or FALSE.

TRUE FALSE 1. Mr. Murph needs 12 phases to help him recycle.

TRUE FALSE 2. Mr. Murph's first phase begins by trucks dumping trash into the Hopper.

TRUE FALSE 3. In the V-screen Finger Separator, materials three inches or smaller fall down onto a different conveyor belt called the fine material belt.

TRUE FALSE 4. Workers, called Pickers, pull paper products, plastics, and aluminum off of the larger material belt.

TRUE FALSE 5. At the end of larger material picking belt, a magnetic process attracts all the glass items.

TRUE FALSE 6. The fine material belt goes through a 2-stage metal recovery system.

TRUE FALSE 7. Ferrous metals are made of iron, tin, steel, or aluminum.

TRUE FALSE 8. The Eddie Current Rotor shreds paper products.

TRUE FALSE 9. Mr. Murph sends recyclables off to be remanufactured.

TRUE FALSE 10. Only Mr. Murph can recycle.

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Small Group Discussion Topics

Directions: Use the following topics as small group break out questions. Assign a student leader to each group to keep the group on task and to take note, if needed. Consider assigning (or handing out if already collected) reading materials appropriate for the age levels to spark deeper thinking. Consider having panel discussions with each group so that the various groups could share their ideas with the whole class.

1. How much paper is not recycled at your school? What can each class do about this problem? What is a paper-drive? How could a paper-drive bring awareness to recycling? Is recycling paper products cost effective?

2. Other than plastic bottles, what plastic items is your school overlooking in its challenge to recycle? Create a list identifying recyclable plastic items that each classroom could post, urging others to recycle. What happens to all the plastic trash items left by sport teams and their fans after sporting events?

3. What happens to broken or discarded metals from student desks or other equipment? What are some ideas to collect even the smallest pieces of iron, tin, or steel? How could magnets play a part in recycling at your school?

4. How can aluminum can collection bins be better advertised? Should students be urged to bring cans from home to fill up recycling bins? Should teachers schedule fieldtrips so students could go out to find recyclables? Where should they go?

5. Should students receive fines for refusing to recycle? Would schools be wise to pay students to recycle paper products, aluminum, and plastic? How can students get their parents and teachers involved with recycling?

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