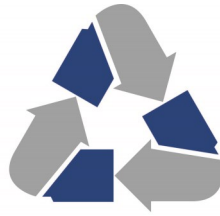




NEVADA DIVISION OF

**ENVIRONMENTAL  
PROTECTION**



Nevada Recycles

**RECYCLING & WASTE REDUCTION  
STUDENT WORKBOOK**

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

## Exercise 1—Introduction

1. How do your everyday actions like flushing the toilet or throwing away trash affect the world and those around you?

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2. What kind of environmental issues does Walter see in his dream about the future? How does seeing those issues change Walter's ideas about the world?

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3. What changes can you make in your everyday life to reduce the impact you have on the environment (recycling more, using a reusable lunchbox, etc.)?

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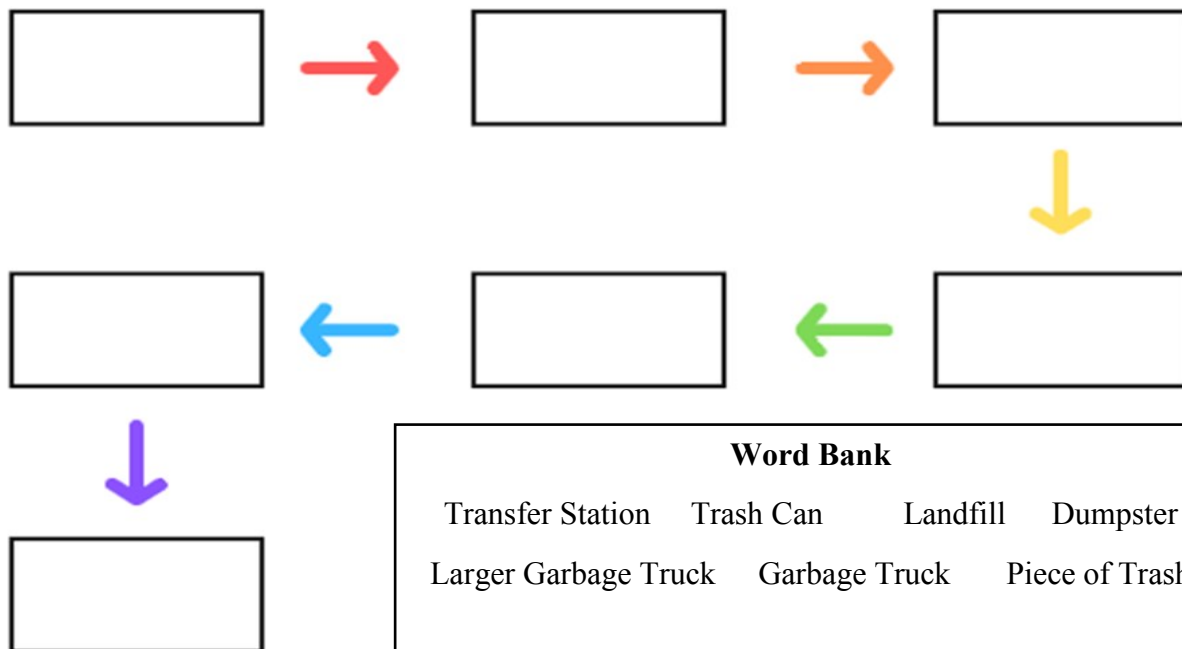
## Exercise 2: The Journey of Trash

A **landfill** is where our trash, also referred to as **municipal solid waste (MSW)**, is buried. There are two different types of landfills: an **unlined landfill**, which does not have a liner, and a **lined landfill**, which has a liner system underneath all of the MSW. Lined landfills are a great example of using science, technology, engineering, and math to improve the safe placement and compaction of the public's trash. Once the garbage truck picks up your trash can, they either bring the waste to a **transfer station** or deliver it straight to the landfill. A transfer station is a location where trash trucks and residents unload their trash and then the trash is reloaded onto a larger truck to be sent to a landfill. This reduces the amount of trips that garbage trucks have to take to the landfill if the landfill is located far away from the city.

There are several problems that landfills have to be aware about to protect the environment from the waste that they store. Here are some examples:

- When water flows through a landfill, the water picks up toxic substances from the waste.. This tainted water is called **leachate**, or the toxic liquid that seeps from the trash in a landfill. Leachate may lead to **groundwater contamination**, which is a problem because most of our drinking sources in our communities come from the groundwater. While older landfills do not have a protective layer in place, new landfills are required to line landfills with a plastic liner to prevent the leachate from reaching to groundwater.
- Another issue that landfill managers face is **vectors**, or pests that are attracted to landfills and that spread disease, such as mosquitos, mice, or birds. Landfills must cover the trash daily to prevent odors that attract these vectors.
- Landfill managers deal with the trash that you send to the landfill. There are many unsafe items that people put in their trash can, such as **hazardous** chemicals, waste that can pose a hazard to human health or the environment. What can you put in the trash that could harm the landfill employees or the environment?

**Fill out the flowchart below to show how the trash you create makes its journey to the landfill.**



## Exercise 2 - continued

1. What happens to trash after it goes in the garbage can?

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2. How does it get in the garbage truck?

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3. Where does the garbage truck take the trash?

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4. Where does it ultimately end up?

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5. What are the benefits of using a lined landfill?

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6. Why is it important to prevent leachate from getting into the groundwater?

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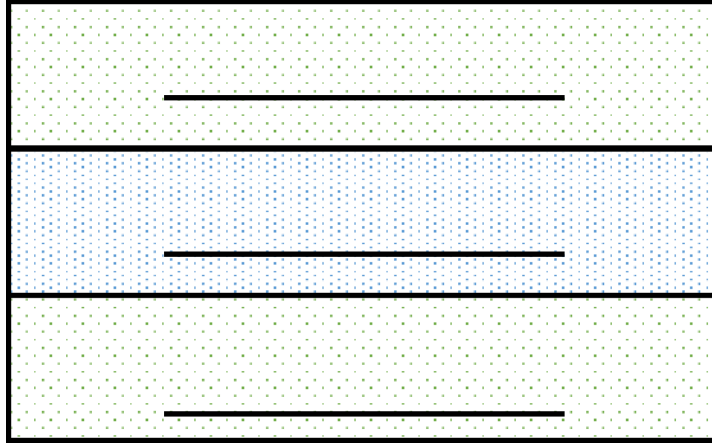
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### Exercise 3: Layers of Landfills

Fill in the blanks with the material that fills each spot in the landfill from the word bank. Each word may be used more than once.

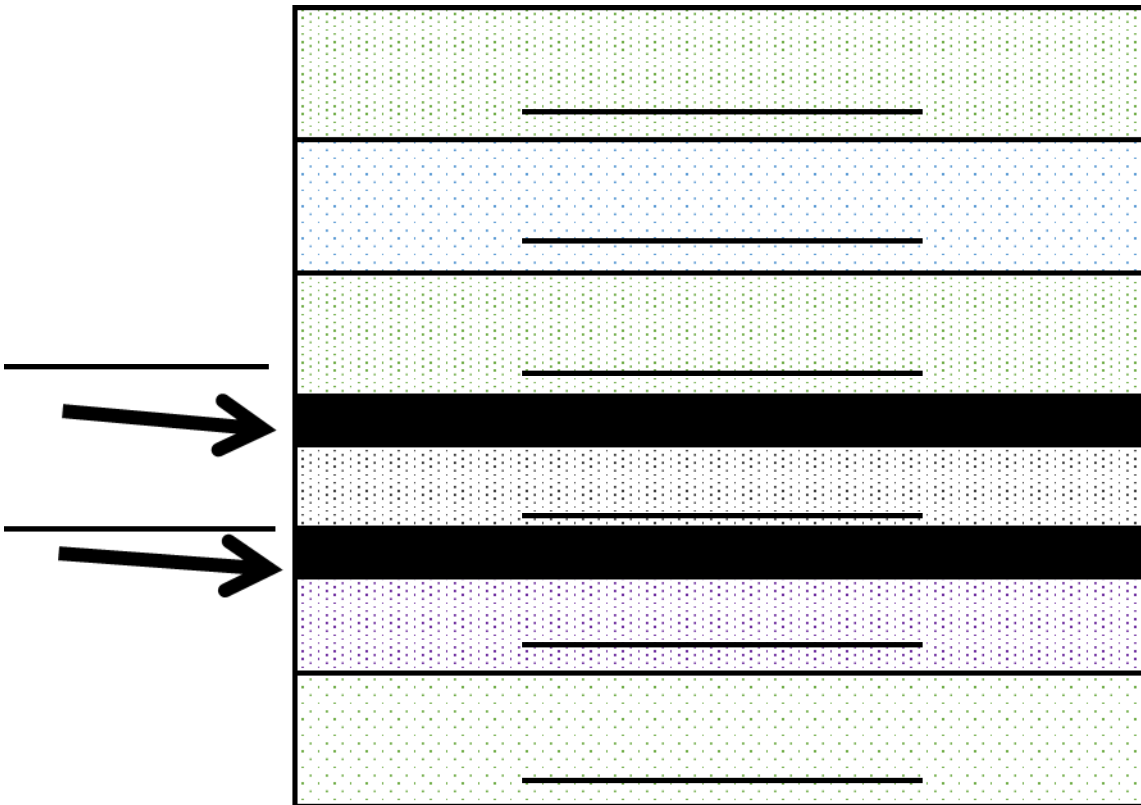
#### Unlined Landfill



#### **Word Bank**

- Soil/daily cover
- Trash
- Liner
- Soil/ground
- Soil
- Gravel
- Clay
- Geotextile

#### Lined Landfill



## Exercise 4 - How Much Trash Do You Make?

In 2017, Nevada produced about 7.4 pounds of MSW a day per capita. This is based on the following calculations:

Nevada produced 4,062,637 tons of waste in 2017. The US Census Bureau estimates that Nevada's population was 2,998,000 in 2012.

$3,222,167 \text{ tons} / 2,998,000 \text{ people} = \text{about } 1.36 \text{ tons per person per year}$

$1.07 \text{ tons} * 2,000\text{lbs/ton} = 2,700 \text{ lbs. per person per year}$

$2,150\text{lb} / 365 \text{ days in a year} = 7.4 \text{ lbs. per person per day}$

Of the 7.4 lbs. created per person each day in Nevada, only 1.5 lbs. are recycled, while 5.9 lbs. are buried in a land-fill. This is based on Nevada's 2017 recycling rate of 20.7%.

### Let's see how much trash you make!

How many students are in your class? \_\_\_\_\_

How many people live in your city? \_\_\_\_\_

How many people live in Nevada? \_\_\_\_\_

You may use a calculator to solve the following problems, but must write out every equation.

1.

Calculate the waste produced by the students in this class each day, in **pounds**. Round your answer to the nearest **tenth place**. \_\_\_\_\_

3. How much trash is produced in Nevada per capita each day, in **tons**? Round your answer to the nearest **whole number**. \_\_\_\_\_

4. Calculate the waste produced by the people city each week, in **tons**. Round your answer to the nearest **hundreds place**. \_\_\_\_\_

5. Calculate the waste produced by the people in your city each month, in **tons**. Round your answer to the nearest **tenth place**. \_\_\_\_\_

6. Calculate the waste produced by the people in city each year, in **tons**. Round your answer to the nearest **hundreds place**. \_\_\_\_\_

## Exercise 5 - Dumptown and Recycle City

On a computer that has access to the internet, please visit <http://www.epa.gov/recyclecity/mainmap.htm>.

*Find the landfill within the city. Use the information you find to answer the following questions:*

1. When Recycle City was called Dumptown, the Old Landfill was used. What was put in the landfill?

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2. What happened when poisonous liquids (caused by the trash) seeped into the soil?

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3. When Dumptown became Recycle City, how did the government fix the groundwater problem?

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4. When Recycle City set up the New Landfill, they also set up a Materials Recovery Facility. What does this facility do?

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5. Besides the reduction of waste, what is the biggest difference between the Old Landfill and the New Landfill?

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## Exercise 6 - Waste Decomposition

What does it mean to decompose? Why does it take so long for items to decompose in a landfill? Remember, air and water are necessary for decomposition.

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Based on what you learned in class about the rate of decomposition of trash in landfills, why is it important to reduce, reuse, and recycle?

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How does Nevada's dry climate affects the decomposition rates of litter?

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## Exercise 7 - Composting

**Compost** is organic material that can be used as soil to grow plants. It is created by mixing grass clippings and leaves, fruits and vegetables, woody material, and other natural, non-animal products together. Through proper mixing and the right amount of time, this material will decompose and turn into soil.

For general outdoor composting use the following guide:

### Items that CAN go into a compost pile

Grass clippings and leaves

Newspapers

Kitchen waste

Fruits and vegetables

Woody material

### Items that CANNOT go into a compost pile

Meats

Dairy products

Vegetables cooked with animal fats

Animal fat

Human and pet fecal matter

**“Greens”** are organic matter that contain large amounts of nitrogen. They are generally items that are freshly cut and include most of the food scraps thrown away from the kitchen (fruits and vegetables).

**“Browns”** are organic matter that contains large amounts of carbon. These are woody type matter including twigs, dried leaves, dead plants, and paper.

Compost Ingredients:

2½ cups food waste  
½ cup dried leaves  
½ cup pencil shavings  
1 cup shredded paper  
1 cup water  
1 cup soil

List the green materials in the compost ingredients.

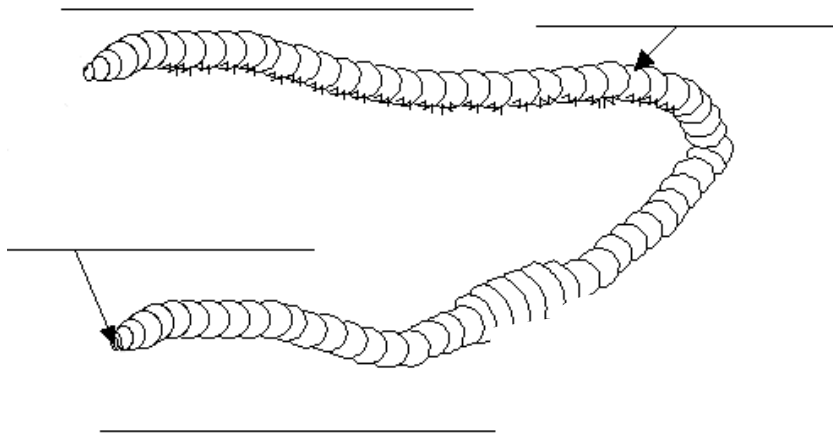
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List the brown materials in the compost ingredients.

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## Exercise 8 - Vermiculture

**Identify the following parts on the diagram below: anterior, posterior, segments, and mouth.**



- |                        |  |
|------------------------|--|
| 1. Vermicompost: _____ | A: The back end, or tail of a worm.  |
| 2. Red Wiggler: _____  | B: Compost created by worms. Compost is the result of the process of decomposition of organic material. It is generally used for fertilizer or soil conditioning. The worm castings (manure) are a vital part of the soil's nutrition. |
| 3. Anterior: _____     | C: The many rings worms have that contract and expand during movement.   |
| 4. Posterior: _____    | D: The front end, or head of a worm.   |
| 5. Segments: _____     | E: The type of worm that is used in composting. It is smaller than the aver-   |

The anterior (head end) of the Red Wiggler is narrower than the posterior (tail end).

6. What color is the anterior? \_\_\_\_\_
7. What color is the posterior? \_\_\_\_\_
8. Red Wigglers are made up of many rings called segments. Compare your worm to your neighbor's. Which worm has more segments? \_\_\_\_\_
9. Lightly touch the worm's anterior. What does it do?  
\_\_\_\_\_
10. Lightly touch the worm's posterior. What does it do?  
\_\_\_\_\_
11. How does the worm feel to you when you touch it?  
\_\_\_\_\_

12. When the worm moves forward, does it move head first or tail first ? \_\_\_\_\_

13. Place some bedding material near the worm. Watch the worm for 1- 2 minutes. Describe the worm's activity.

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### **The Scientific Method**

Brainstorm your own scientific experiment with the worms!

1. Ask a question.

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2. State your hypothesis.

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3. Test your hypothesis.

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4. Record your results.

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## Exercise 9 - Reduce

**Please answer the following questions:**

1. The large bag of chips holds the same amount as the total contents of the smaller bags. Which option produces more waste-the single bag or the combined smaller bags?

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2. Knowing that a single large bag takes up less landfill space than many small ones, why might a shopper choose to buy many small bags instead of one large one?

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3. Why should we reduce the amount of waste we produce?

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4. What can you do with your family to reduce the waste that must be landfilled?

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5. Please take this page home and discuss it with your family. Your assignment is to come up with a way to generate as little landfill waste as possible. When you are formulating your answer, think outside the box. Remember to apply the concepts of reduce and reuse.

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## Exercise 10 - Reuse

### Create Treasure from your Trash!

**Please circle one of the following:**

Shoe Box

Flower Pot

Tin Can

Eyeglass Lens

Paper Towel Tube

Newspaper

Tissue Box

Milk Container

Other

Reuse / transform the item into something that will have a different use. Write that new “final product” in the space below.

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Take one sheet of printer paper and fold it into 3 equal sections with the left panel flap over / on top.

- Write your name on the bottom of the cover
- Write “What” on the bottom of the left inside panel and describe what your final product will be used for.
- Write “Who” on the bottom of the center inside panel and describe who will use your product.
- Write “Where” on the bottom of the right inside panel and describe where this product will be used.
- Write “How” on the bottom of the flap panel and describe how your product will be used.
- Write “Why” on the bottom of the back center panel and describe why your product will be useful and reduce future waste.

## Exercise 11 - Recycling Project

Group Members: \_\_\_\_\_

Assigned material: \_\_\_\_\_

As a group, create a poster to present to the class. Posters should be informative and help others understand how to recycle your assigned material. Your poster must include the following items:

- Your group's assigned material (plastic, aluminum or glass)
- Examples of common items made of this material that are accepted for recycling (add to rubric)
- Examples of common items made of this recycled material
- At least 1 reason to recycle your assigned material
- Posters may also include drawings.

You will be graded based on the following rubrics:

Presentation Rubric

	0	1	2
<b>Title with group's assigned material</b>	Does not include title		Includes title
<b>Where/how to recycle the material</b>	Does not include where or how to recycle the material	Includes 1 of the 2 requirements	Includes both where and how to recycle the material
<b>Examples of common items made of this material that are accepted for recycling</b>	Does not include what the material gets recycled into	Includes only one product into which the material can be recycled	Includes at least two products into which the material can be recycled
<b>1 reason to recycle the material</b>	Does not provide a reason to recycle	Reason is unclear or inaccurately stated	Provides at least 1 reason to recycle
<b>Grammar/presentation</b>	There are grammar errors <u>and</u> it is difficult to read or understand	There are grammar errors or it is difficult to read or understand	There are no grammar errors and it is easy to read and understand

Poster Rubric

	0	1	2
<b>Title with group's assigned material</b>	Does not include title		Includes title
<b>Where/how to recycle the material</b>	Does not include where or how to recycle the material	Includes 1 of the 2 requirements	Includes both where and how to recycle the material
<b>Examples of common items made of this material that are accepted for recycling</b>	Does not include what the material gets recycled into	Includes only one product into which the material can be recycled	Includes at least two products into which the material can be recycled
<b>1 reason to recycle the material</b>	Does not provide a reason to recycle	Reason is unclear or inaccurately stated	Provides at least 1 reason to recycle
<b>Grammar/presentation</b>	There are grammar errors <u>and</u> it is difficult to read or understand	There are grammar errors or it is difficult to read or understand	There are no grammar errors and it is easy to read and understand

## Exercise 12 - Create Your Own Recycling Plan!

Through this past unit, you have learned about landfills, waste decomposition, composting, vermicomposting, reducing, reusing, and recycling. Every community has different recycling methods that work best for them. This is your chance to create a recycling program of your own!

This recycling plan must answer these questions:

- Design your plan for one of the following: your house, your classroom, your school, your community.
- Who is involved in leading this plan and making sure it is successful?
- What materials are being recycled?
- Where are the materials being delivered to?
- When will the materials be collected and then diverted?
- Why are you implementing this recycling plan?
- How will your plan benefit those who implement your ideas?

Include details from each lesson:

- How is the landfill involved?
- How is waste decomposition being accounted for?
- Is composting or vermiculture part of your plan?
- What materials are being recycled?
- What materials are being reduced by this plan, and are there any items being reused?

Your plan does not have to include every recycling opportunity, however if something is being excluded, explain why. You are allowed to invent facilities that will accept the recycled material if none exist around you.

This report is due by: \_\_\_\_\_