4Rs from Home

Grade: 4-5
State Standards:
Grade: 4; Science: Investigation and Experimentation 6.e Students construct and interpret graphs from measurements. Grade: 5; Science, Investigation and Experimentation 6.e Grade: 4; Math: Mathematical Reasoning 2.3 Students use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to explain mathematical reasoning. Grade: 5; 2.3 Students use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
Groups of 4
Preparation Time: 25 minutes
Activity Time: 50 minutes
Key Words: garbage, hierarchy, litter, waste prevention, and organic litter

OBJECTIVE

In this lesson, students will learn about the 4Rs hierarchy (Reduce, Reuse, Recycle, Rot/Compost) by bringing in waste items from home that they will classify into groups according to the 4Rs hierarchy. They will justify why they placed each item into its category in writing and report their findings to the class.

MATERIALS

Students: Three to four items from home that were destined for the garbage, recycling, or composting bin "Group Predictions" worksheet (one per student) "Highest and Best Use of Resources" worksheet (one per student).
Teacher: Bags (one per group of four) Items to supplement what the students bring to class so that each group will have ten items (and at least two from each of the 4Rs categories) "Group Predictions" worksheet overhead. Extension: 'Waste Composition' worksheet overhead.

BACKGROUND

The 4Rs are placed in a hierarchy: Reduce, Reuse, Recycle, and Rot/Compost. The most important practice is to reduce waste by not creating waste in the first place. Reuse is next in the hierarchy because if an item is reused, resources are not required to produce the same item again. Recycle is next in the hierarchy since this extends the life of existing resources by turning old materials into new products. Composting is a way of recycling food and yardwaste into fertilizer for plants.

Vocabulary
Garbage: things that people throw away.
Hierarchy: a ranking system according to relative importance.
Litter: waste materials that are carelessly discarded or put in the wrong place.
Organic: materials that were once living or material produced by a living organism such

as food, leaves, plant trimmings, hair, clothing fibers, paper, etc. Organic may also be used to describe food grown using sustainable agricultural methods.
Waste prevention: not making so much waste in the first place

PROCEDURE

The in-class activity will need to be done two days after the initial in-class discussion because you will need to see what kind of items to bring into class to supplement what the students bring from home.

1. Ask the students what the 4Rs are and whether one is more important to practice than another. Guide the students toward putting the 4Rs in the correct hierarchy (order) and explain what a hierarchy is. (You can have student volunteers post the 4Rs pictographs in its hierarchy.)

2. Discuss Reduce choices. (What we need, how much we use, etc.).

3. Discuss with the students that many items of waste need not be discarded in landfills. Some items may be reused for the same or different purpose; other items can be recycled. Gardens can be greatly improved by using compost as a natural fertilizer to amend the soil instead of chemical fertilizers. Compost is made by decomposing organic materials.

4. Discuss why it's important to practice the 4Rs (conservation of natural resources, energy conservation, and less waste destined for the landfill).

Activity

1. Have students bring three or four items from home that were destined for the garbage, recycling or compost bin to class. Remind students that the items should be cleaned or rinsed.

2. Organize the students into groups of four. Give each group a bag with at least ten waste items (at least two from each category; you may need to supplement the bag with additional items). Hand out the student worksheet "Group Predictions." Have the group quickly estimate what percentage of their items can be reduced, reused, recycled, composted or placed in a landfill and record their predictions on the student worksheet.

3. Explain that the goal is to classify the items according to the 4Rs hierarchy. This means making the best use of each item even though there may be more than one choice. Review the definitions of reduce, reuse, recycle and rot/compost.

4. Put up the overhead of the student worksheet garbage can and model how to complete it. Pass out one worksheet per student, and have them fill it out.

- Place all the waste items on the floor
- Have the students group like items
- On the board write the formula to use fractions (# of items in category) ÷ (total # of items) x 100 = _____ %
- Have the students write their answers on the worksheet

5. In groups, ask students to compare their predictions to the data they have collected. Have the groups discuss why their predictions and results were similar or not.

6. On the back of their worksheet, assign each student to justify in a paragraph why each of the items were placed in that category. Model or scaffold how to write this paragraph, if necessary, to the class.

We placed _____ in the **reduce** category because _____.
_____ were in the **reuse** category because _____.
_____ were in the **recycle** category because _____.
_____were in the **rot/compost** category because _____.
_____ were in the **landfill** category because _____.

7. Have the students create a comic strip showing a character demonstrating different ways to practice the 4Rs. For example, a person buying bananas at the grocery store and choosing not to bag the bananas would demonstrate the concept of reduce. The comic strip should include four frames, one for each of the 4Rs, and they should be placed in the correct hierarchy.

Discussion

1. As a class, call on volunteers from groups to discuss and report their findings. Ask the class to agree or disagree with a few examples by putting their thumbs up if they agree or thumbs down if they disagree with the group's choice. If there is disagreement, discuss the best use of the item (reduce, reuse, recycle, rot/compost).

2. Put up the completed garbage can model. Lead a class discussion regarding ways to decrease (keep waste out of the landfill) the waste that's currently generated in Tehama County. Ask the students whether they think it's important to try to reduce the amount of waste we make and if so, why. Lead a class discussion about the importance of conserving natural resources by practicing the 4Rs hierarchy.

Extensions:

1. Empty the contents of one weeks worth of classroom garbage onto a tarp on the floor, and have students classify the items according to the 4Rs hierarchy. Brainstorm ways to reduce the amount of items by practicing the 4Rs in class. If there is a lot of scrap paper, create a scrap paper bin for the classroom that can be used for art projects, etc. Have groups discuss any items that could not be reused, recycled or composted. Ask them to share what these items are made out of or what natural resources are needed to produce

the item. Discuss the value of these natural resources. Brainstorm ways to save resources by buying differently and making choices that help reduce waste.

2. Empty the contents of one weeks worth of classroom garbage onto a tarp on the floor and classify the items according to the 4Rs hierarchy. Using the 'Waste Composition' worksheet, have students calculate the percentage of the waste by item.

ASSESSMENT

Students should have a clear understanding of landfill waste in Tehama County and the importance of reusing, reducing, recycling, and composting natural resources.

Group Predictions

Directions: Look at your bag of items and estimate/predict the percentage of items that will fit into the following categories:

Percent of items that can be reduced_____%
Percent of items that can be reused _____%
Percent of items that can be recycled_____%
Percent of items that can be composted____%

List: Group each item into one of the five categories listed below.
Write the name of each item in a blank space with a number.

Reduce	**Reuse**	**Recycle**	**Rot/Compost**	**Landfill**
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4

Bar Graph: Write the name of each item from the table above in one of the blank spaces below. Using your pencil, shade in each used space to see a bar graph

4				
3				
2				
1				
	Reduce	**Reuse**	**Rot/Compost**	**Landfill**

Conclusions: As a group, convert the data above into fractions and percentages.

Formula to use Fraction (# of items in category) ÷ (total # of items) x 100 = _____ %

Reduce _____ ÷ _____ x 100 = _____%

Reuse _____ ÷ _____ x 100 = _____%

Recycle _____ ÷ _____ x 100 = _____%

Rot/Compost _____ ÷ _____ x 100 = _____%

Landfill _____ ÷ _____ x 100 = _____%

Conclude: Write down why you placed each item into its category.

Highest and Best Use of Resources
Worksheet

I gathered waste items from home and brought them to class. We combined our waste and classified it using the 4R hierarchy, which includes _____, _____, _____ and _____.

Of the waste items I brought to class, _____ requires the least amount of energy and resources to *reduce*.

Of the waste items I brought to class, _____ requires the least amount of energy and resources to *reuse*.

Of the waste items I brought to class, _____ requires the least amount of energy and resources to *recycle*.

Of the waste items I brought to class, _____ requires the least amount of energy and resources by *rotting/composting*.

Waste Composition