

Green Educator Lesson Plan: Garbage Pie





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Materials

(per student group)

- 1 protractor
- Drafting compass w/pencil
- 1 ruler
- Simple Calculator
- 1 pizza box
- 11" x 14" sheet of red paper
- 1 sheet of notebook paper
- Scissors
- 1 medium sized pizza box
- Yellow Yarn (for the crust)
- Black marker
- White glue
- Hot glue gun and sticks (or use a strong glue and allow to set 24 hours)

- Small pieces of material to represent each of the eight categories of trash *see chart in step # 13

Time:	2 hours
Age Level:	10 and up
Supervision required:	Yes, while using the hot glue gun
Can be used in conjunction with curricula about:	Math: percentages, pie charts, using a protractor; waste reduction, environmental awareness

Before you begin the craft:

1. Brainstorm with your students about what they think goes into American landfills. You can make a diagram or list on the whiteboard/chalkboard as the students name items.
2. After the brainstorming exercise, make 8 columns on the whiteboard/chalkboard. Label each column with one of the categories of waste: food scraps and lawn trimmings, paper, plastic, glass, metal, wood, rubber/leather/textile, and other. Then, have the students guess which categories are the top three highest proportions of trash in landfills. Label the columns with their proper percentages (provided in the chart below).



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Materials	Percentage
food waste and yard trimmings	28.00%
paper	27.00%
plastics	13.00%
rubber, leather, textile	9.00%
metals	9.00%
wood	6.00%
glass	5.00%
other	3.00%
Grand Total	100.00%

3. Have the students make 8 sections on their paper by folding the paper into quarters width-wise; then, fold the paper in half length-wise. The students should label each of the 8 sections with a category and percentage from the list.
4. Have the students pair up and brainstorm examples of each type of trash and write it down on their paper.
5. Regroup with the class, and have each student pair write one example for each category on the white board.

Now prepare to start the craft:

6. Have the students form small groups.
7. Distribute a protractor, compass, ruler, calculator, scissors, black marker, and red paper to each group.
8. Demonstrate how to use the compass and protractor.
9. Have the students use the compass to draw a circle on the red paper that is about 10 inches in diameter. Mark the center of the circle where the indent from the compass is. Cut out the red circle.
10. Then, show the students how to convert the percentages into degrees on a circle. For example, to find out how to show 28% yard trimmings and food waste on the pie chart, plug into the calculator:

$$.28 \times 360 = 100.8$$



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Have the students do this calculation for all of the category percentages:

$$.27 \times 360 = 97.2$$

$$.13 \times 360 = 46.8$$

$$.09 \times 360 = 32.4$$

$$.06 \times 360 = 21.6$$

$$.05 \times 360 = 18$$

$$.03 \times 360 = 10.8$$

Afterwards, do the calculations as a class to be sure that everyone has the same answers.

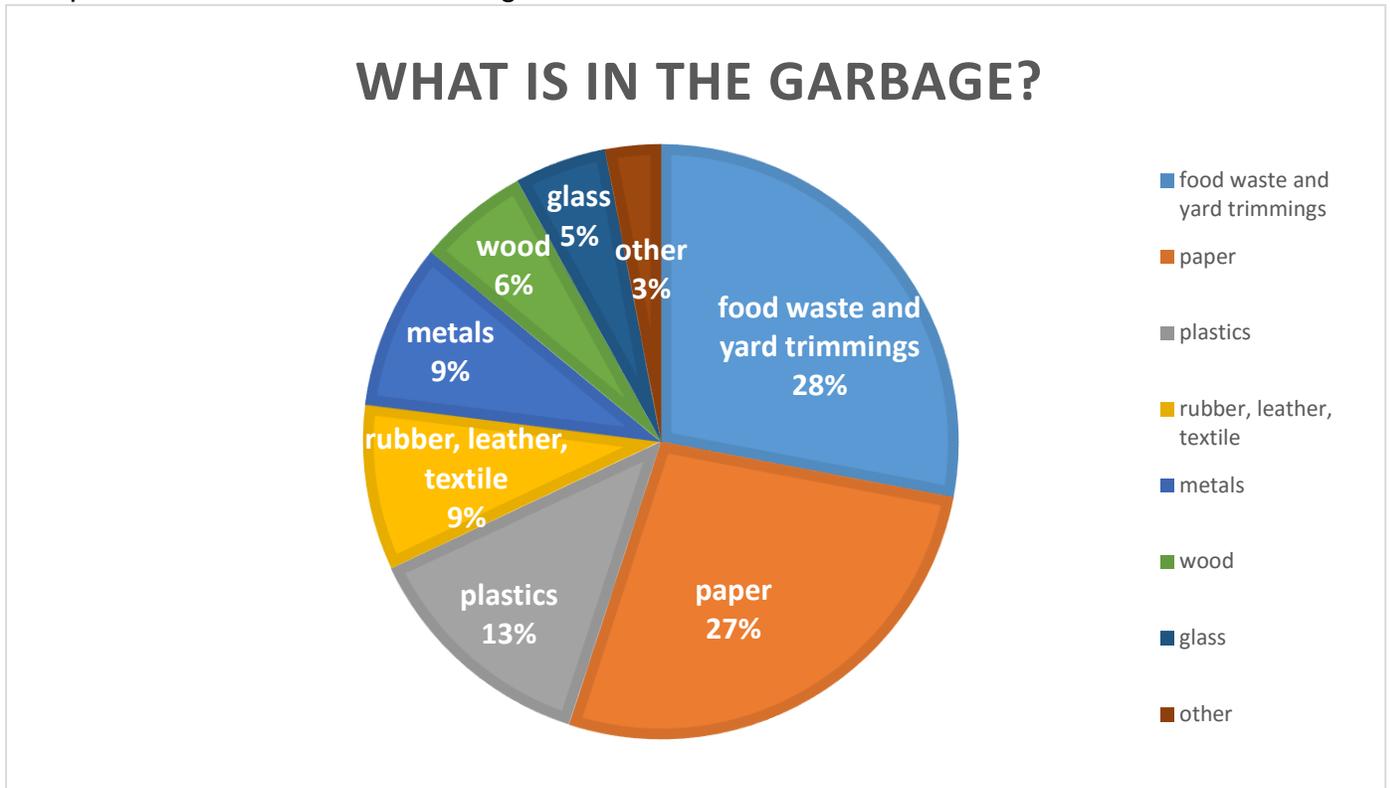
11. Now we can build the pie chart. Place the protractor in the center of the red circle, so that the bottom of the tool marks the center line. Use the data from step 5 to draw the pie chart. For example, the 28% of yard trimmings and food waste is represented by 100.8° on the circle. Draw a tick mark just before 101° , and one at 0° . Then, remove the protractor and use the ruler to draw a line connecting the center circle dot to the 0° tick mark. Draw a second line running from the center circle dot to the 100.8° tick mark. This is your first pie section, representing yard trimmings and food waste at 28% of the whole.

12. For the next 7 sections, move the protractor and rotate the circle so that the bottom flat line of the protractor matches up with the last line that was drawn in pencil. For all the following sections, the students will only have to make one line because the previous line acts as the second border. Have the students use their black marker to go back over the pencil lines when they are finished.



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The pie chart should look something like this when done:



Time to Craft:

13. Distribute the white glue, hot glue guns (or strong glue, if your class is not ready for glue gun responsibility), and yarn. Set up eight containers of material that represent each of the categories. The students can collect a small amount of materials from each category and bring them back to their stations. Let the materials be diverse and have them pick their own.

YARD TRIMMINGS/FOOD WASTE	PAPER	PLASTICS	RUBBER, LEATHER, TEXTILE	METALS	WOOD	GLASS	OTHER
Magazine pictures of food	Newspaper pieces	Plastic spoons/forks	Pictures of shoes / doll shoes	Broken jewelry	Popsicle sticks	marbles	Styrofoam packing peanuts
Fake flowers	Wrapping paper	straws	Leather scraps	Bottle caps	Wooden toy parts	Glass beads	Pencil stubs (mixed materials)
Twigs, dried leaves	Puzzle pieces	Plastic toy parts	Fabric scraps	Can tabs	Wine corks	Bulbs from x-mas lights	Birthday candles/wax



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14. The students can use the white glue to attach the red pie chart to their pizza box in the center, where the pizza once sat.
15. The students should arrange the materials into the appropriate categories on the pie chart and place them where they want them to stay.
16. Heat up the glue guns. Remind the students to be very careful while using the glue gun.
17. Glue the trash pieces in place on the garbage pie.
18. Then, glue the yarn around the outside of the pie to represent the crust.

Discussion:

When the craft is complete, have the students display their garbage pies on their desks like a little exhibit. Then, everyone can walk around and look at the different versions. Afterwards, come back together and discuss the project. Share the EPA statistics: Americans throw out 251 million tons of garbage. In California, we are trying to reduce this amount by 75% by the year 2020: that's about 188 tons less. A few questions to have the students reflect on:

Which types of trash do not belong in the landfill?

Why is it a problem when things that are recyclable go to the landfill?

How can we keep paper/plastic/food waste out of our trash?

If you live in California:

How can you help California meet the 75% reduction goal?

What could we do at our school to help meet California's goal?