

Gr. 6 Aloha 'Āina - Pre-Post Test

1. How does **recycling** help to prevent overflowing landfills?
 - A. Manufacturing companies create new products from discarded plastics, metals, glass and paper.
 - B. Manufacturing companies produce ash and exhaust gas that can be recycled.
 - C. Recycled plastics are being used to generate electricity.
 - D. The technology of recycling does not help solve the problem of overflowing landfills.
2. How does **composting** help to prevent overflowing landfills?
 - A. Local companies are planting gardens to conserve water and reduce green waste.
 - B. Composting does not address the problem of overflowing landfills.
 - C. Local companies are recycling yard waste to produce composted green waste for schools, parks and other facilities.
 - D. Local companies are recycling cans, papers, plastics and glass to reduce their waste.
3. Why is source reduction the best way to *mālama* our 'āina (take care of our environment)?
 - A. Buying fewer products produces less waste.
 - B. Producing less waste decreases the amount of 'ōpala (rubbish) that ends up in our landfills and waste-to-energy plants.
 - C. Buying food items in bulk reduces the amount of packaging material that ends up as waste.
 - D. All of the above
4. Which is true about our wastes today?
 - A. We use many modern tools and products that decay easily, or biodegrade in a short time.
 - B. The 'ōpala (rubbish) that we recycle is taken to our landfills or to the H-Power plant.
 - C. Many products are disposable or come heavily wrapped in packaging.
 - D. Old carpets, furniture, mattresses, sewage sludge and dead animals
5. How does the H-Power waste-to-energy plant transfer energy?
 - A. Reused, recycled and composted materials are burned to produce smoke that drives a turbine to make electricity.
 - B. Waste materials are burned in a furnace to produce steam (heat energy) that drives a turbine, using mechanical energy to make electrical energy.
 - C. Green waste is blended into a liquid that drives a turbine to make electricity.
 - D. Waste materials are burned using mechanical energy to make heat energy that drives a turbine and makes electrical energy.

6. Name three by-products of the H-Power waste-to-energy plant.
 - A. Electrical energy, mechanical energy, ash
 - B. Electrical energy, heat energy, garbage
 - C. Electrical energy, ash, exhaust gas
 - D. Electrical energy, exhaust gas, water

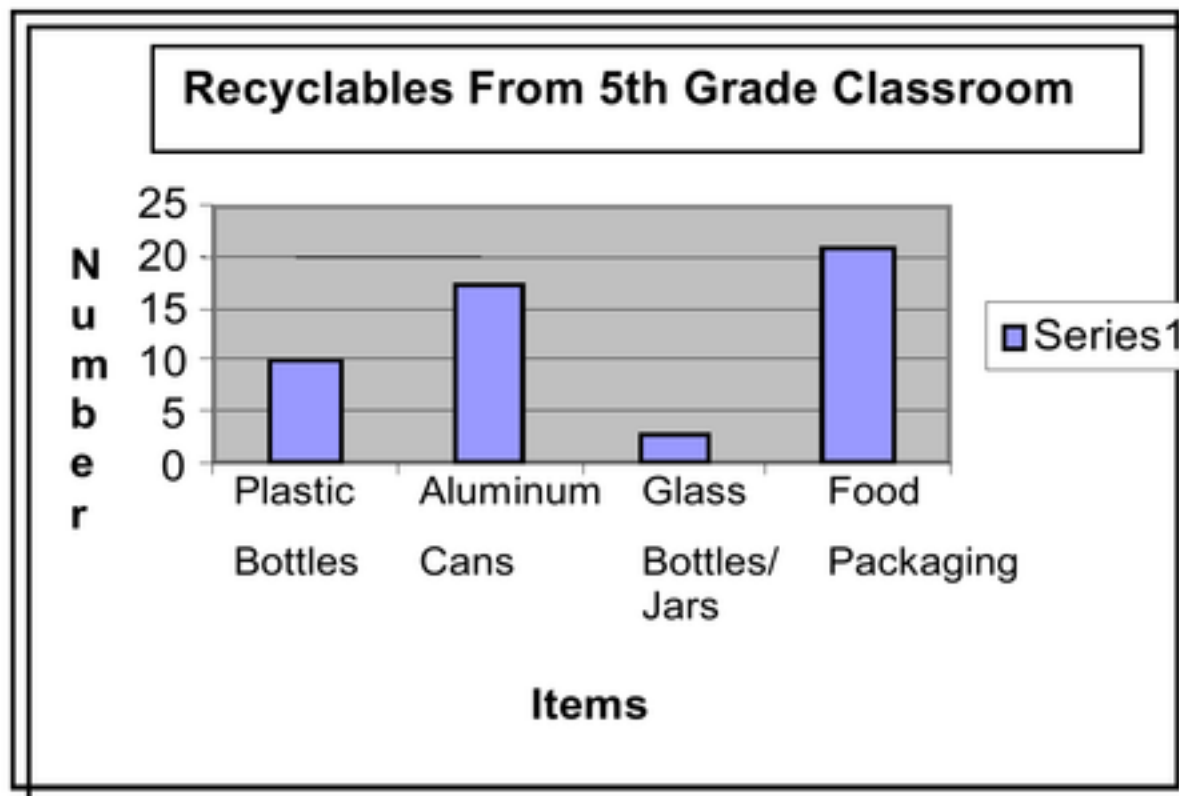
7. How does the H-Power waste-to-energy plant have a negative impact on society?
 - A. H-Power may release pollutants into the air.
 - B. H-Power causes water pollution.
 - C. H-Power causes warming of ocean waters.
 - D. H-Power causes global warming.

8. How is early Hawaiian technology different from modern technology?
 - A. Early Hawaiians buried their metals in deep pits so that the metals would break down.
 - B. In early Hawai'i, trash was burned to produce steam for energy.
 - C. In early Hawai'i, tools were made of materials that broke down naturally (decomposed) in the soil.
 - D. All of the above

9. How does the H-Power waste-to-energy plant have a positive impact on society?
 - A. The steam from H-Power may be used by restaurants, homes and other businesses.
 - B. H-Power reduces the amount of waste in Hawai'i landfills and it produces energy.
 - C. The turbines used at H-Power are made from recycled metals.
 - D. The power generated by H-Power saves the equivalent of 80,000 barrels of oil each year.

Questions #10-11

Students conducted a "School Waste Audit" on their campus. One team was instructed to collect recyclable material from the 6th grade classrooms. The team collected items from one 6th grade classroom, although there are four 6th grade classrooms in the school. Then they sorted the items into different categories and counted them. A record of their results is on the following page.



10. If students recorded recyclables from **all** of the classrooms in the school it would more accurately represent the school population because:
- We can only make inferences about the 6th grade class from this data.
 - We cannot make inferences about other grade levels from this data.
 - The total number of items could increase if we include all classrooms.
 - All of the above
11. What inferences can we make about the 6th graders from this data?
- Students buy more drinks in plastic bottles than in aluminum cans.
 - Drinks sold in aluminum cans are available through a vending machine on campus.
 - Students are saving glass jars for an art project.
 - We cannot make any inferences from this data.
12. In 1982, a Japanese scientist discovered a powerful group of beneficial microorganisms that ferment food wastes and speed up the decomposition process, providing a natural fertilizer for plants. He named this group of microorganisms Effective Microorganisms (EM). How can you design an experiment that will test the effectiveness of EM in decomposing your food wastes?
- Place the same type of food wastes into two different containers. Cover the wastes in both containers with EM and record observations for two weeks.
 - Place the same type and amount of food wastes in two different containers. Cover the wastes in one container with EM and label the other container "control". Record observations for two weeks.
 - Place food wastes in one container, and other recyclables in a different container. Cover the wastes in both containers with EM and record observations for two weeks.
 - Place vegetable foods in one container, and meat scraps in a different container. Cover the wastes in both containers with EM and record observations for two weeks.

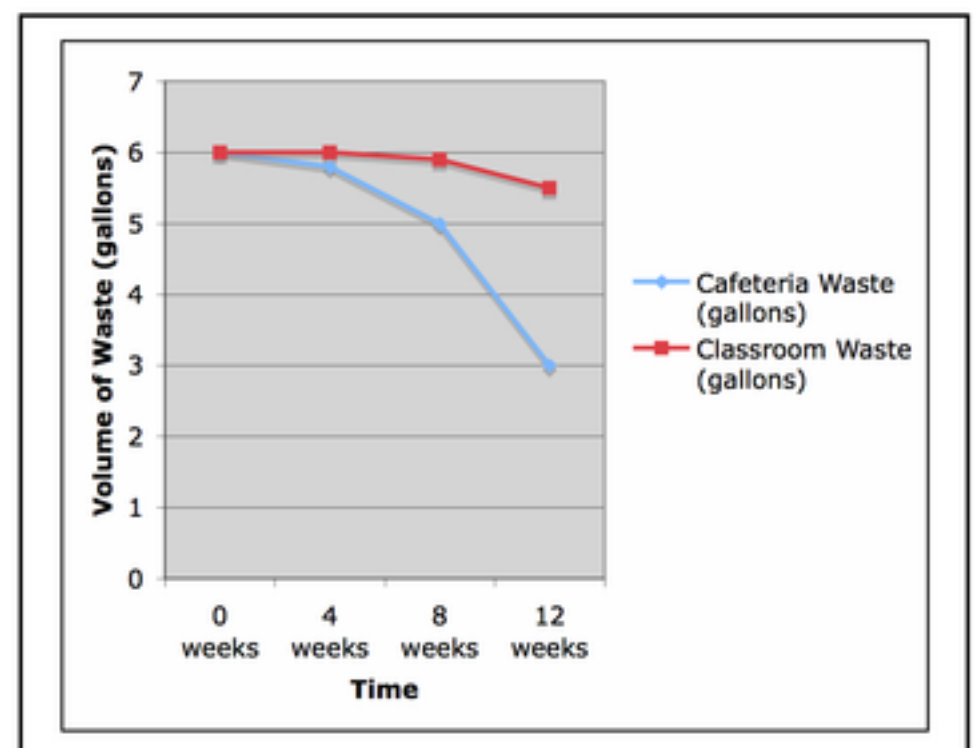
Sixth grade students have designed an experiment to compare the decomposition rates of waste from the cafeteria (vegetable waste) and waste from the classroom (paper, plastic). Students place five gallons of waste from each source in separate containers. Then they mix the waste in each container with one gallon of soil. The students measure the volume of contents in each container every four weeks for three months. The following table represents their findings:

Change in Waste Volume Over Time

<u>Time</u>	<u>Cafeteria Waste (gallons)</u>	<u>Classroom Waste (gallons)</u>
0 weeks	6.0	6.0
4 weeks	5.8	6.0
8 weeks	5.0	5.9
12 weeks	3.0	5.5

13. Which is the **best** hypothesis for this experiment?
- If waste from the cafeteria is placed in a container with soil, then the volume will decrease because microorganisms will break down the vegetables.
 - If waste from the classroom is placed in a container with soil and vegetables, then the volume will decrease faster.
 - If waste from the cafeteria and classroom are placed in containers with soil, then the volume of classroom waste will be less than the cafeteria waste after a three week period because the materials break down faster.
 - If waste from the cafeteria and classroom are placed in containers with soil, then the volume of cafeteria waste will be less than the classroom waste after a three-week period because the materials break down faster.
14. Students created a graph to help them display and analyze their data. Which of the following statements is supported by this data?

Change in Waste Volume Over Time



- At 12 weeks, the volume of cafeteria waste was 2.5 gallons less than the volume of classroom waste.
 - At 8 weeks, the volume of classroom waste was less than the volume of cafeteria waste.
 - The volume of cafeteria waste did not change over 12 weeks.
 - The volume of the cafeteria waste was reduced by one third.
15. Which of the following is an appropriate inference from this data set?
- Over time, plastics will decompose faster if you add more soil.
 - Over time, cafeteria waste decomposes too slowly to be a good fertilizer.
 - Over time, paper will decompose faster if you add more soil.
 - Over time, paper and plastics will fill more of a landfill than vegetable wastes.

16. Which is true about how matter and energy are transferred in living systems and their environment?
- A. Plants use nutrients that decomposers release into the soil.
 - B. Plants convert energy from the sun into food in the process of photosynthesis.
 - C. Large decomposers break up organic matter into smaller pieces. Microorganisms, such as fungi and bacteria, feed on these smaller pieces.
 - D. All of the above.
17. Beneficial microorganisms are important to bring *lōkahi* (harmony or balance) to the environment because:
- A. They provide energy to plants in the same way that the sun does.
 - B. They slow down decomposition of food waste.
 - C. They break down our wastes in the process of decomposition.
 - D. They produce disease, decay and pollution.
18. Which is true about wastes in early Hawai'i?
- A. Materials such as glass bottles or disposable diapers were manufactured using natural materials that broke down naturally in the soil.
 - B. Disposal of garbage and human wastes was not regulated.
 - C. It was uncommon for early Hawaiians to toss away items that could be fixed or reused. Waste was rare.
 - D. Technology in early Hawai'i made waste disposal very convenient.
19. What can we do to reduce waste to *ho'ōla* (to heal) our *ahupua'a*?
- A. We could develop a plan to reduce waste in our school, implement it and educate others about it.
 - B. We could create a food waste recycling program and use effective microorganisms to turn the organic waste into plant fertilizer.
 - C. We could practice Hawaiian values such as *kuleana* and *mālama*.
 - D. All of the above
20. Some companies on O'ahu use recycling technologies that turn waste into reusable products. Which of the following are examples of these technologies?
- A. Green wastes such as yard trimmings and wood chips are composted to make park benches.
 - B. Old tires are recycled and used on playground surfaces, and recycled plastics are used to build picnic tables and park benches.
 - C. Scrap metal is recycled into green waste and used as fertilizer on baseball and football fields and in parks.
 - D. Garbage is dumped into a large hole in the earth, and then the waste is spread into thin layers, packed down firmly and covered every day with a fresh layer of soil or plastic foam.

Grade 6 Healing Our *Ahupua'a* - *Aloha 'Āina* Test Answer Sheet

SC.6.2.2 Explain how the needs of society have influenced the development and use of technologies

1. A
2. C
3. D
4. C

SC.6.6.2 Describe the different types of energy transformation.

5. B
6. C

SC.6.2.1 Explain how technology has an impact on society and science.

7. A
8. C
9. B

MA.6.13.1 Make inferences about a population based on the interpretation of a sample data set.

10. C
11. D

SC.6.1.1 Formulate a testable hypothesis that can be answered through a controlled experiment.

12. B
13. D

SC.6.1.2 Use appropriate tools, equipment, and techniques safely to collect, display, and analyze data.

14. A
15. B (Also MA.6.13.1)

SC.6.3.1 Describe how matter and energy are transferred within and among living systems and their physical environment.

16. D
17. C

***Nā Honua Mauli Ola* (NHMO)**

18. D
19. C

SC.6.2.2

20. D

Name: _____ Date: _____

Period: _____ Pre _____ Post _____

Aloha 'Āina Grade 6 Pre-Post Assessment

Answer Sheet

Use pencil to completely darken the appropriate circle for each question.

1. A B C D

14. A B C D

2. A B C D

15. A B C D

3. A B C D

16. A B C D

4. A B C D

17. A B C D

5. A B C D

18. A B C D

6. A B C D

19. A B C D

7. A B C D

20. A B C D

8. A B C D

9. A B C D

10. A B C D

11. A B C D

12. A B C D

13. A B C D