

# BEST Composting

The Bio-Ethical Solid-waste Treatments (BEST) organization publishes a composting guide with the following steps:

## Composting

1. Choose a container, such as chicken wire or a wooden box, for making your compost.
2. Place a variety of organic kitchen or yard wastes over the bottom of the container. Chop or shred the organic matter to speed up the composting reactions.
3. Spread some soil over the organic material. Make sure that the container is filled to maximum capacity.
4. Adjust the moisture so that the material is damp to the touch but not soggy.
5. Allow the compost to heat up.
6. Mix up the compost every few days for several weeks and add water as needed.
7. Compost is ready for use when it looks like dark, crumbly soil. Some small pieces of organic material might still be present. It should smell earthy and sweet.

Some members of the BEST organization would like to see if the process could be simplified. They would like to find out if any of these steps could be eliminated: adding soil, adding water, or mixing. They also want to know if a single type of organic material could be used instead of a mixture. But the members do not want the quality of the compost to decrease or the time to make it increase.

BEST has contracted your solid waste research company to test and compile data on the effects of changing the composting procedure. Your job is to work with a team of other scientists to test the suggested changes in the composting procedure. The criteria the organization wants you to use for determining the success of a compost pile are compost temperature and settling over time, known as settle depth. Higher temperatures and more settling indicate that better composting is occurring.

## OBJECTIVES

**Design** an experiment to test the effects of different variables on composting.

**Graph** indicators of composting activity over time.

**Compare** the original BEST compost procedure with test procedures.

## BEST Composting *continued*

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### MATERIALS

- buckets, large (6)
- grass clippings
- leaves
- ruler
- soil
- spade, hand
- spray bottle
- thermometer
- vegetable waste, variety
- water



### Procedure

#### PART I—FORMING A HYPOTHESIS

1. Review the steps in the current composting procedure. What step(s) do you think could be eliminated without affecting the quality of the compost? Based on your thinking, write a hypothesis that you would like to test.

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#### PART II—DESIGNING THE EXPERIMENT

2. With your team, design an experiment to test your hypothesis. Write your procedure on a separate sheet of paper. Be sure to include a control and to identify the criteria you will use to compare the results.
3. Select the materials you will use, and identify any safety cautions. Add these to your procedure.
4. Decide where you will place the test materials as they form compost. Keep in mind that compost gets hot as it forms, and that it also gives off an unpleasant odor.
5. Construct tables to record your data.
6. Have your teacher approve your plan.

#### PART III—TEST YOUR HYPOTHESIS

7. Perform your experiment. Record your observations and data in the data table you made. When you finish your experiment, clean up and dispose of materials properly. Then use the following questions to help you analyze the data and draw conclusions on the effects of the variables on composting.

**BEST Composting** *continued*

**Analysis**

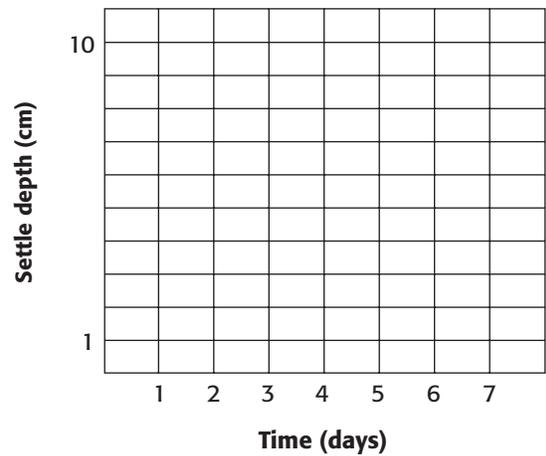
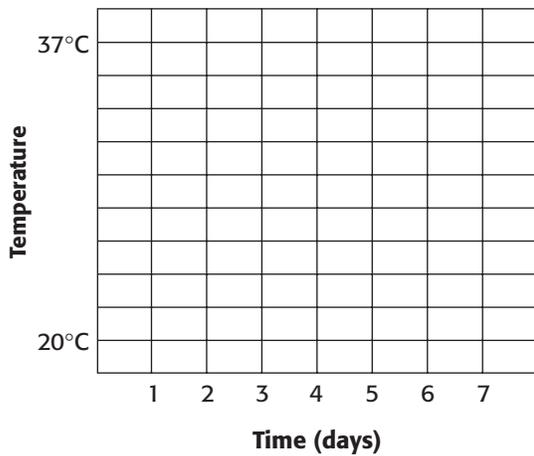
**1. Explaining Events** Describe the control you used in your experiment. What was its purpose?

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**2. Organizing Data** Use the data you collected to make line graphs on the grids below. One graph should show the recorded temperatures of the compost piles. The other should show the settle depth.



**3. Identifying/Recognizing Patterns** Compare your data and graphs with those of other teams. Do your data and graphs indicate the same trends? Explain.

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**4. Analyzing Graphs** Which compost pile appears to be the most successful?

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**5. Analyzing Results** Do your test results support your hypothesis? Explain.

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**BEST Composting** *continued*

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## Conclusions

**6. Drawing Conclusions** What conclusion can you draw from the class results?

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**7. Evaluating Methods** Do you think the procedure you used gives reliable information? Explain.

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**8. Defending Conclusions** On a separate sheet of paper, write a draft letter to the BEST organization, in which you report your test results and recommendations.

## Extension

**1. Design Experiments** Design an experiment to test the quality of the different composts you made during this experiment. In your experiment, evaluate which compost supports the best growth in plants.