

Bug Off!

You are the lead research scientist for Bug Off! Corporation, the world's leading producer of insect repellents, and you have just received the following memo:

To: Director of Research and Development

From: Director of Marketing

cc: Director of Production

Subject: NEED FOR A NEW CONSUMER REPELLENT

We are getting reports from many states that the ant population is soaring and is causing many problems to homeowners. Existing ant repellents are not effective enough. We have an opportunity to increase our market share if we are first to the store shelves with a new product. Information I have says that Insects Be Gone!, our major competitor, is two weeks from production of their new product. Bug Off! needs to produce an effective, inexpensive and environmentally friendly ant repellent. During your research, please remember that every step of the scientific method must be considered and adapted to your development efforts.

I also urge you to use only common, readily accessible ingredients. This keeps the cost of materials down. The success of our efforts will also be determined by our decision to use nonhazardous, environmentally safe materials that help keep the cost of production low and protect the environment. Good luck!

OBJECTIVES

Collect data on the effects of your newly developed repellent on individual ants.

Construct and **test** a model of a home being invaded by ants to determine if the repellent is effective.

MATERIALS

- ants
- graph paper
- modeling supplies, common (cardboard, glue, adhesive tape, etc.)
- natural, nonhazardous ant repellent materials, such as peppermint, garlic, ground cinnamon, or spearmint plants
- standard lab equipment for measuring and mixing



Bug Off! *continued***Procedure**

1. Brainstorm with your lab team and develop a procedure that uses each of the steps of the scientific method and helps you meet your objectives. After you have designed the procedure, write the steps in the space provided below. The questions that start on the next page allow you to present key pieces of information that you should learn while following your procedure.

Analysis

1. **Constructing Graphs** Create a table, chart, or graph to document the data you collected on the effectiveness of the repellent on the ants. Present your table, chart, or graph on a separate sheet of graph paper.
2. **Analyzing Results** What percentage of individual ants were repelled by your product? Explain your analysis.

Conclusions

3. **Analyzing Graphs** Explain the data that shows the ability of your product to keep ants away. If the repellent worked on ants in the laboratory, will it work in a real life situation? Explain your analysis.

Bug Off! *continued*

4. Evaluating Models Evaluate the effectiveness of your cardboard model. Use the space provided below to explain the model you used in pictures and words. Write the explanation on the lines provided below the space.

Extension

1. Building Models How effective would your repellent be if the ants were twice as big as those you used in your experiment and model?
