

Using Math To Make Environmental Decisions

To The Teacher:

These problems are designed to help students understand that math is used in making real life decisions. The questions posed in the following situations are ones that businesses and people might realistically encounter. The numbers in these problems do not reflect actual costs but have been chosen based upon student instructional levels and needs. You may want to use these problems as part of math journals or integrate them into nonfiction writing assignments. They also lend themselves to cooperative learning groups and situations. If you are downloading these problems, you may choose to use the problem solving hints or you may want to delete these depending upon your student needs and your teaching purposes. The writing suggestions in the “Thinking About It” section are intended to help students use knowledge from a variety of subject areas to arrive at their own conclusions.

Name _____

Should the Richards Manufacturing Company Use Wind Power?

Maggie wants to help the owners of the Richards Manufacturing Company become more environmentally friendly. Right now they buy coal generated power. It **costs** the Richards Manufacturing Company **\$1000 a month** for its power.

Maggie has helped them to find a company that sells wind power. **For each wind generator that they install**, the company will **save \$150 per month** on their power bill. But it will **cost \$5,400 to buy each** wind generator.

If the Richards Manufacturing Company **buys 3 wind generators**, how many years will it take it to recover the amount of money it spent on converting to wind power?

To help you solve this problem, look at the words in bold and think about these things.....

- A. How much will the company save each month with 3 wind generators?
- B. How much will the company save each year with 3 wind generators?
- C. What figure in the story is really not important in helping you to make a decision?

Your Final Answer...

How many years will it take the Richards Manufacturing Company to recover the amount of money it spent on changing to wind power?

Think About It...

Do you think this is a good decision for the Richards Manufacturing Company to make? Explain your answer.

Name _____

What Car Should Lilly Saylor Buy?

Maggie and her friend Lilly Saylor go car shopping. They find a car with an **internal combustion engine** (one that burns fossil fuel, gasoline). The car **sells for \$18,660**. It will **cost Lilly \$115 each month** to buy fuel and maintain this car.

Lilly and Maggie also look at a **fuel cell car**. This car that is cleaner for the environment, **costs \$22,400**. It will **cost Lilly \$65 each month** to run and maintain this car.

If Lilly is going to **keep her new car for 5 years**, how much will each car cost to buy and run over the 5 year period? Which car should Maggie advise Lilly to buy?

To help you solve this problem, look at the words in bold and think about these things.....

A. How much will the internal combustion engine car cost to buy and run for five years?

B. How much will the fuel cell car cost to buy and run for five years?

Your Final Answer...

What car is a better buy? _____

Think About It...

Which car should Maggie advise Lilly to buy? Explain your answer.

Name _____

Can This Power Plant Be Built?

Phoebe Kasen is in charge of deciding whether a new power plant can be constructed. There is a camp for asthmatic children **50 miles from the site of the planned power plant**. State regulations are that **the amount of sulphur dioxide in the air cannot be more than 12 parts per million** at the camp. If it is 12 parts per million or more, then the power plant cannot be built.

Phoebe finds that the testing equipment shows that **the amount of sulphur dioxide in the air 20 miles from the plant will be 40 parts per million**. **40 miles from the plant, the amount of sulphur dioxide will be 20 parts per million**. **At 80 miles from the plant the amount of sulphur dioxide in the air will be 10 parts per million**.

Make a graph to show the relationship between the distance from the power plant and the amount of sulphur dioxide in the air.

To help you solve this problem, look at the words in bold and study your graph.

Your Final Answer...

Can this power plant be built? _____

Think About It...

If you were Phoebe Kasen giving your report to officials from the power company and leaders of the camp for asthmatic children, what would you say? How would you present your information? Write a short speech.

Name _____

Should Dude Dog Food Company Install Energy Saving Windows?

The Dude Dog Food Company **spends \$20,000 a year** in air conditioning. They want to put in new windows that will help save money on this part of their power bill. The new windows will **cost \$8,000 in total**.

By adding these new windows, the company **will save 10% a year** on their energy bill. How long will it take the Dude Dog Food Company to recover the amount of money spent on the new windows by their energy bill savings?

To help you solve this problem, look at the words in bold and think about this.....

How much is 10% of the current power bill?

Your Final Answer...

How long will it take the Dude Dog Food Company to recover the amount of money it spent on the new windows by its energy bill savings?

Think About It....

If you were the president of the Dude Dog Food Company, would you choose to install the new windows? Explain your answer.

Name _____

What Should Matthew Orr Do?

Maggie's friend, Matthew Orr wants to start a mattress selling business. He has two options. He can rent a store and sell mattresses in the mini-mall. His other choice is to sell mattresses from a computer website and rent storage space. In both options, Matthew's customers will pay the delivery charge.

It will **cost \$1,500 a month to rent** a store and small storage space in the mini-mall. Matthew must hire many clerks, and **salaries** (the amount he has to pay each worker) **will cost him \$5,500 each month** if he opens a store. The mini-mall is a good location and Matthew will sell **\$10,000 worth of mattresses each month** from the store.

If Matthew sells mattresses from a computer website, he will not have to hire as many people. **Salaries will only cost him \$2,000 each month.** He will need to rent a warehouse and computer equipment, so that will **cost Matthew another \$2,000 each month.** He will not get as many customers on the website, so his mattress **sales will be 20% less each month** than in the store.

What advice should Maggie give her friend Matthew about how to sell mattresses?

To help you solve this problem, look at the words in bold and think about these things.....

- A. If Matthew opens a store, how many dollars worth of mattresses will he sell each year?
- B. How much profit per year will the store make after Matthew pays store rent and salaries?
- C. If Matthew sells mattresses on a computer website, how many dollars worth of mattresses will he sell each year?
- D. How much profit per year will the computer website make after Matthew pays warehouse rent and salaries?

Your Final Answer...

What will allow Matthew to make the most money?

Think About It...

Pretend you are Maggie and make a list of reasons why Matthew should open a store. Then make a list of reasons why Matthew should use a computer website. Remember to think of reasons other than just making money.