

Answers to Adventure Book Challenge Questions:

Important Facts: (Use these facts to help you solve the questions.)

- 1 Ton = 2,000 lbs
- Population of Minnesota = 5,080,000
- Population of Blue Earth County = 57,500
- Every Year each Minnesotan produces over 1 ton of Garbage!
- 32 Aluminum Cans weigh one pound.
- By recycling ONE aluminum can, you can save enough electric energy to watch 3 hours of television
- 8.5 pounds of poisonous gas is released into the air for every ton of garbage burned in a burn barrel or burn pit.

Junky Questions:

1. How many tons of garbage are produced in Blue Earth County every year?
 - a. Population of Blue Earth County = 57,500
 - b. Each year each person produces 1 ton of garbage.
 - c. $57,500 \text{ people} \times 1 \text{ ton} = 57,500 \text{ tons!}$
2. How many tons of garbage are produced in Minnesota every year?
 - a. Population of Minnesota = 5,080,000
 - b. Each year each person produces 1 ton of garbage.
 - c. $5,080,000 \text{ people} \times 1 \text{ ton} = 5,080,000 \text{ tons!}$

Tricky Challenges:

1. If you recycle 20 lbs of aluminum cans, how many cans did you collect?
 - a. 32 aluminum cans weigh one pound.
 - b. You collected 20 pounds.
 - c. $20 \text{ pounds} \times 32 \text{ cans} = 640 \text{ cans that you collected!}$
2. If the scrap yard gives you \$0.50 for every pound of aluminum you collected, how much money did you make?
 - a. You collected 20 pounds.
 - b. Each pound is worth \$0.50.
 - c. $\$0.50 \times 20 \text{ pounds} = \$10.00.$
3. How many hours of Television can you watch if you recycle 20 lbs of aluminum cans.
 - a. 32 aluminum cans weigh one pound.
 - b. You collected 20 pounds.
 - c. $20 \text{ pounds} \times 32 \text{ cans} = 640 \text{ cans that you collected}$
 - d. Recycling ONE aluminum can saves enough electric energy to watch TV for 3 hours.
 - e. $640 \text{ cans} \times 3 \text{ hours} = 1,920 \text{ hours!}$
4. If you watched TV for 2 hours a day, how many months would it take to use that much energy?
 - a. $1,920 \div 2 \text{ hours} = 960 \text{ days.}$
 - b. There are 30 days in a month.
 - c. $960 \div 30 = 32 \text{ months! (yes, that's more than } 2 \frac{1}{2} \text{ years!)}$

Try This One:

1. If a family of 4 burned all the garbage they produce in a year, how many pounds of poisonous gas is released each year near their home?
 - a. Each person produces a Ton of garbage per year.
 - b. Each Ton of garbage produces 8.5 lbs of poison gas.
 - c. There are 4 people in the family.
 - d. $4 \text{ people} \times 1 \text{ ton} \times 8.5 \text{ lbs} = 34 \text{ lbs of poison gas released near their home.}$

2. If half the garbage produced in Blue Earth County were burned in a barrel or a pit, how many Tons of poison gas would be released into Blue Earth County's air?
 - a. There are 57,500 tons of garbage produced in Blue Earth County each year.
 - b. Half of that amount would be $57,500 \div 2 = 28,750$ Tons
 - c. Each ton produces 8.5 lbs of gas.
 - d. $28,750 \text{ tons} \times 8.5 \text{ lbs gas} = 244,375 \text{ lbs of poison gas.}$
 - e. 1 Ton = 2,000 lbs.
 - f. $244,375 \div 2,000 = 122.18$ Tons of poison gas release in the air of Blue Earth County.

(Remember that burning garbage in a burn barrel or in a pit is much more harmful than burning it in an industrial incinerator. A full-sized industrial garbage incinerator may burn the garbage for many thousand homes, and produces less poison gas than a single burn barrel. In addition, most industrial incinerators also produce electricity, which save the pollution caused by burning coal to produce the same electricity. Burning garbage in a burn barrel or burn pit is harmful to the environment, but burning garbage as a fuel to produce electricity actually benefits the environment by replacing coal!)

Super Challenge Questions:

(Important Information: When garbage is packed into a landfill, about 1,500 lbs of garbage can be packed into 1 cubic yard of landfill space.)

1. If all the garbage produced each year in Minnesota were packed into a landfill, how many cubic yards of landfill space would it take?
 - a. 5,080,000 tons of garbage produced in Minnesota every year.
 - b. 1 ton = 2,000 lbs.
 - c. $5,080,000 \text{ tons} \times 2,000 \text{ lbs} = 10,160,000,000 \text{ lbs of garbage each year.}$
 - d. 1 cubic yard of landfill space will hold 1,500 lbs of garbage.
 - e. $10,160,000,000 \div 1,500 = 6,773,333$ cubic yards of landfill space.

2. If all the garbage produced in Minnesota in one year were crunched into a football field, how many football fields would it fill 3 feet deep? (figure a football field is 100 yards long and 50 yards wide)
 - a. A football field is 50 yard wide by 100 yards long.
The area of that field is $50 \times 100 = 5,000$ square yards.
 - b. 3 feet = 1 yard so a football field filled 3 feet deep is filled one yard deep. The total volume of the football field would then be 5,000 square yards \times 1 yard deep, or 5,000 cubic yards.
 - c. Using the information from the last problem, all the garbage in Minnesota in one year would take up 6,773,333 cubic yards. If there are 5,000 cubic yards in a football field: $6,773,333 \div 5,000 = 1,354.67$ football fields filled to 3 feet deep.

3. If a garbage truck can carry 10 tons of garbage, and can drive 5 miles on a gallon of diesel fuel, how many gallons of diesel fuel would it take to haul all of Minnesota's garbage 10 miles to a landfill?
 - a. Minnesota generates 5,080,000 tons of garbage a year. The truck can haul 10 tons. It would take $5,080,000 \div 10 = 508,000$ trips to haul the garbage.
 - b. Each trip is 10 miles long. So the truck travels $508,000 \text{ trips} \times 10 \text{ miles} = 5,080,000$ miles loaded with garbage. But.... The truck has to go back again, so it actually travels twice that far...: $5,080,000 \times 2 = 10,160,000$ miles.
 - c. The truck can travel 5 miles for every gallon of diesel fuel it consumes. It travels the $10,160,000 \text{ miles} \div 5 \text{ miles per gallon} = 2,032,000$ gallons of fuel.
 - d. What happens if the truck has to drive farther to get to the landfill?
 - e. How much fuel is saved each year if we make 10% less garbage?????