Communicating about Number Problems

Communication Checklist:

☑ Did you identify the given _____ ?

☑ Did you show how to _____ your problem step by step?

☑ Did you explain each _____?

☑ Did you explain why each calculation is _____?

Sheree's Problem

Each year, Canadians send 140 thousand tonnes of electronic waste to landfill sites. About how many kilograms of electronic waste are sent to landfills each month? Write your answer in scientific notation.

Sheree's Solution and Explanation   **Jordan's Questions**

The mass of electronic waste each year is 140 000 t. This mass is equal to 140 000 000 kg. ← How did you calculate 140 000 000 kg?

I divided 140 000 000 kg by 12. ← Why did you divide by 12?

140 000 000 kg ÷ 12
≐ 11 666 667 kg ← How did you make this estimate?

This mass is about 11.7 million kg, or 1.17×10^7 kg, each month. ← How did you change 11.7 million to scientific notation?

An Improved Solution to Sheree's Problem using the Communication Checklist

The mass of electronic waste each year is 140 000 t. Because each tonne equals 1000 kg, I can multiply 140 000 ×1000 to get 1 400 000 kg. I used mental math to multiply by 1000 by multiplying the place value of each digit by 1000. So the place value of the front digit 1 is 100 000 ×1000 = 100 million.

Since one year has 12 months, I used my calculator to divide 140 000 000 by 12 to get a monthly mass of about 11 666 667 kg. The answer is reasonable because 140 million is close to 144 million and 144 million divided by 12 is 12 million. I know the mass is about 11.7 million kg because 11 666 667 kg can be written as 11.666 667 million or about 11.7 million.

To express 11.7 million in scientific notation, I could write 11.7 million as 11.7×10^6. But the decimal factor must be less than 10 so I wrote 11.7×10^6 as 1.17×10^7. I know this answer is reasonable because 1.17×10^7 is the same as 1.17 ×10 000 000, which is just over 10 million and close to 11.7 million.