Problem of the Week
Problem A and Solution
Missing Cookies

Problem

Janelle and Jean-Paul baked 70 cookies for a school bake sale. They baked five different kinds of cookies and there was an even number of each kind of cookie. When Janelle and Jean-Paul got to school, they realized that they were missing the *sugar* cookies.

Below is a pictograph of the cookies that they brought to the school.

Each  represents 4 cookies.

Cookie Type	Number of Cookies
Chocolate Chip	
Oatmeal Raisin	
Gingerbread	
Sugar	
Coconut Macaroon	

How many *sugar* cookies had they forgotten at home? Complete the pictograph and explain your answer.

Solution

We start by counting the known number of cookies represented in the pictograph. Since each full oval represents four cookies, then a half oval must represent half as many cookies, or two cookies.

- *Chocolate Chip:* There are five full ovals, which represent $5 \times 4 = 20$ cookies. There is one half oval, which represents 2 cookies. So there are a total of $20 + 2 = 22$ chocolate chip cookies.
- *Oatmeal Raisin:* There are three full ovals, which represent $3 \times 4 = 12$ oatmeal raisin cookies.
- *Gingerbread:* There are two full ovals, which represents $2 \times 4 = 8$ gingerbread cookies.

- *Coconut Macaroon:* There are four full ovals, which represent a total of $4 \times 4 = 16$ coconut macaroon cookies. There is one half oval, which represents 2 cookies. So there are a total of $16 + 2 = 18$ coconut macaroons.

From this, the known total number of cookies is $22 + 12 + 8 + 18 = 60$.

Another way we could have computed the known number of cookies is by counting up all of the full ovals, for a total of 14, and counting up all of the half ovals, for a total of 2. The total number of cookies represented by full ovals is $14 \times 4 = 56$. The total number of cookies represented by half ovals is $2 \times 2 = 4$. Thus, the total number of cookies is $56 + 4 = 60$.

Since Janelle and Jean-Paul baked a total of 70 cookies, but we can only account for 60 of them, then there are $70 - 60 = 10$ cookies missing. These must be our *sugar* cookies.

We can figure out how many extra full ovals we need in our pictograph by dividing the number of sugar cookies we need to represent by 4, and getting the quotient of that calculation. Since $10 \div 4 = 2$ with a remainder 2, then we need 2 full ovals and 1 half oval to represent this number of sugar cookies.

The completed pictograph is shown.

Cookie Type	**Number of Cookies**
Chocolate Chip	
Oatmeal Raisin	
Gingerbread	
Sugar	
Coconut Macaroon