This is a balance scale. It is used to compare weights.

I can place an object that I want to weigh on one side, and balance it with these weights on the other side.

Before today’s lesson, I weighed some things.

This elefinch weighs 90 grams. How many of these 10-gram weights will it take to balance him?

We just skip-count by 10’s up to 90...

...10, 20, 30, 40, 50, 60, 70, 80, 90.

That makes *nine* 10-gram weights.

Good!
Now, you can’t always get the scale to balance if all you have are 10-gram weights.

What is the problem with only using 10-gram weights?

You can only balance objects with weights that end in 0: 10, 20, 30...

...you can’t balance something that weighs 55 grams if all you have are 10-gram weights.

That’s right!
This octapug weighs exactly 55 grams. We cannot balance him with 10-gram weights. Which of these sacks of weights can I use to balance him?
You can use the 5-gram weights.

Good. How many of the 5-gram weights will balance this 55-gram critter?

5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55...

...that’s eleven fives.

Instead of using eleven 5-gram weights, you could use five of these 11-gram weights!

Aha! Right you are! Which is easier?

It’s easier to use the bigger weights, because you don’t need as many.

Agreed! The fewer weights the better.

We can’t balance everything with 10-gram weights, or even 5-gram weights.

And it’s not practical to use 1-gram weights to measure heavy items. So, weights come in many sizes.

For example, you could balance this 37-gram pandakeet using only 5 and 6-gram weights. How many of each should you use?
You can count by fives to 35.

It takes seven 5’s to get to 35...

...but we need exactly 37 grams.

If we replace a 5 with a 6, then we get one extra gram.

Right, so if we replace two of the 5’s with two 6’s, we get 2 extra grams. That makes 37 grams!

We could use five 5’s and two 6’s to balance the pandakeet.

Brilliant! Using only 5 and 6-gram weights also has its problems.

What if you need to measure something that weighs 4 grams?

Or 14 grams?

That’s right. We can’t balance some of the smaller weights, like 4, 7, 13, or 14 grams.

However, there is only one weight larger than 14 grams that you can’t balance using just 5’s and 6’s! Can you find it?

Try it!