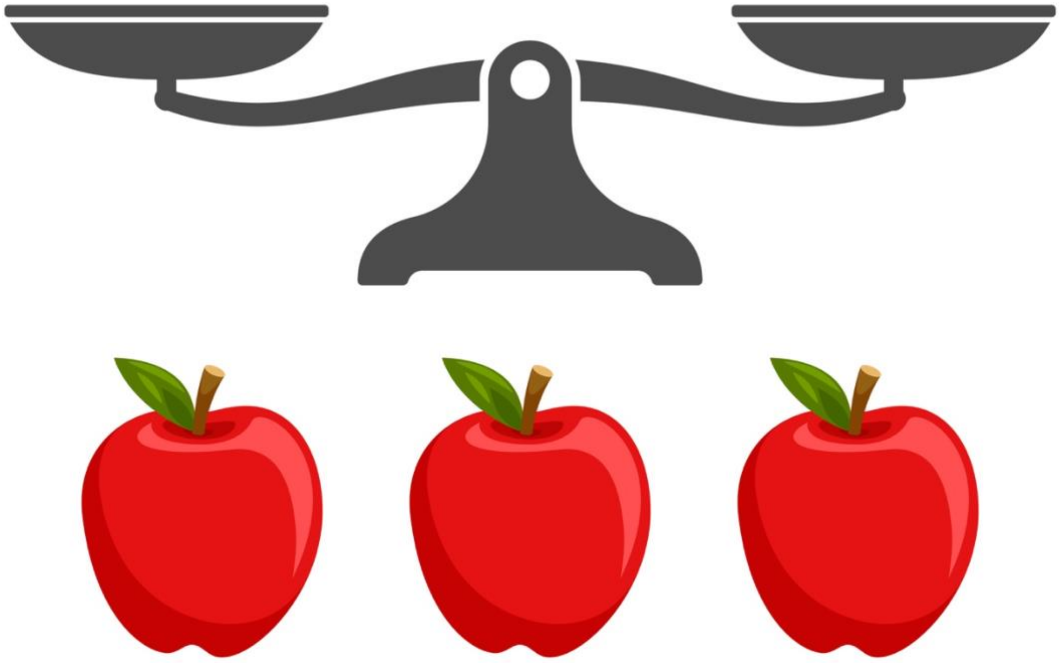
On Balance

Level A

Debbie works at an apple orchard. She knows that every so often there is a bad or rotten apple in the baskets of apples she picks. She knows that bad apples weigh less than good ones. There are a lot of apples in her basket, so she wants to spend as little time as possible checking apples. She thinks she knows a fast way to check.

She has three apples, and one is bad. How can she weigh apples using the scale just one time and still find out which one is bad?



Using the scale to weigh just one time, can you figure out a way to know for sure which apple is bad? Explain.

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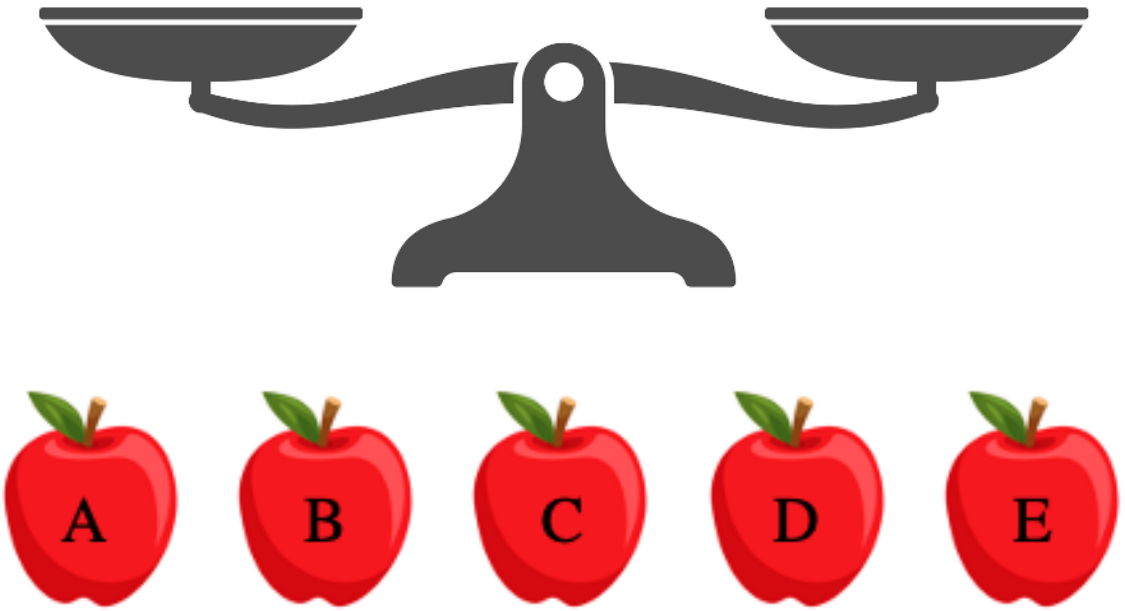
On Balance

Level B

Debbie works at an apple orchard. She knows that every so often there is a bad or rotten apple in the baskets of apples she picks. She wants to spend as little time as possible checking apples. She thinks she knows a fast way to check.

Debbie has five apples. Four apples are good, all weighing the same. But the bad one either weighs more or weighs less than the others. List the process steps and decisions you need to make in order to determine which apple is bad, and whether it is heavier or lighter than the good ones.



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You know one of the apples is either heavier or lighter than all the others. Describe the most efficient way to weigh the apples and determine which apple is bad, and whether it is heavier or lighter than the others. Show and justify your solution.

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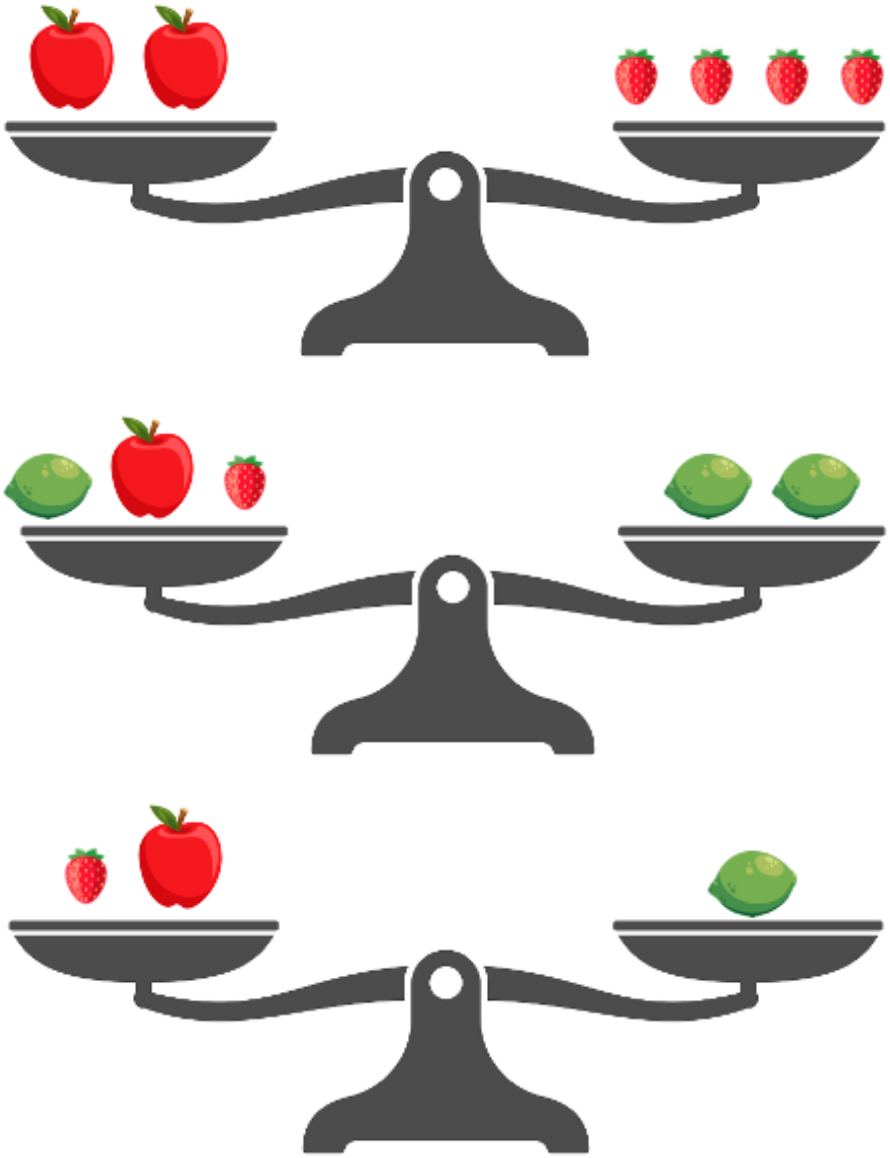
On Balance:

Level C

Each type of fruit has a unique weight that is consistent. Use the scales to determine the relationship between the different types of fruit.



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How does the weight of one strawberry compare to the weight of one lime? What is the weight of one lime in terms of strawberries?

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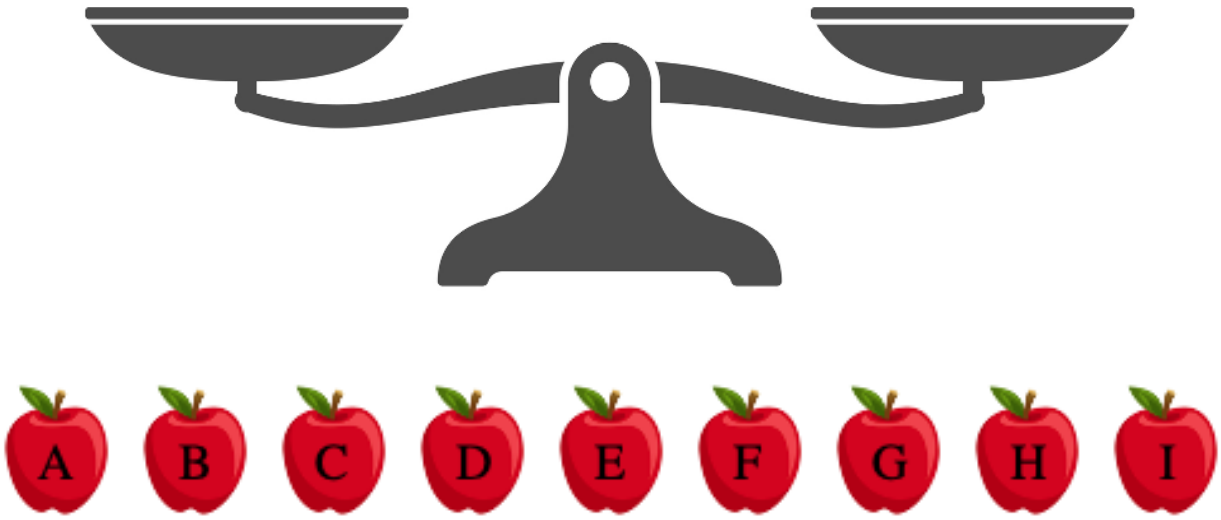
On Balance:

Level D

Suppose you were presented with nine apples (A through I). Eight apples are the same weight, and the ninth either weighs more or weighs less than the others. List the process steps and decisions you need to make in order to determine which apple is different, and whether it is heavier or lighter than the others.



You are given any number of apples between 3 and 9, and you know that one of the apples is either heavier or lighter than the others, which all weigh the same. For each set of apples, what is the least number of weighings necessary to guarantee that you find the one that is a different weight than the others and whether it's lighter or heavier?

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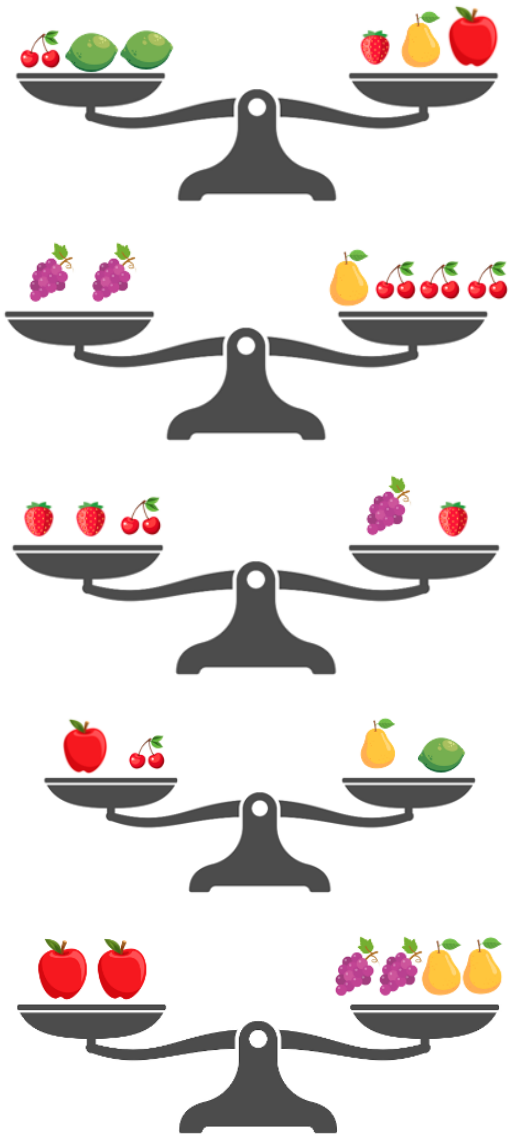
On Balance:

Level E

Each type of fruit shown below has a unique weight that is consistent. Use the five scales to determine the relationship between the different types of fruits. How do the weights of each fruit compare with each other? Which weighs the most? Which weighs the least? Suppose a strawberry weighs 3 ounces. How many of one kind of fruit is equal to another kind of fruit? How much does each kind of fruit weigh?

Explain your reasoning.



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