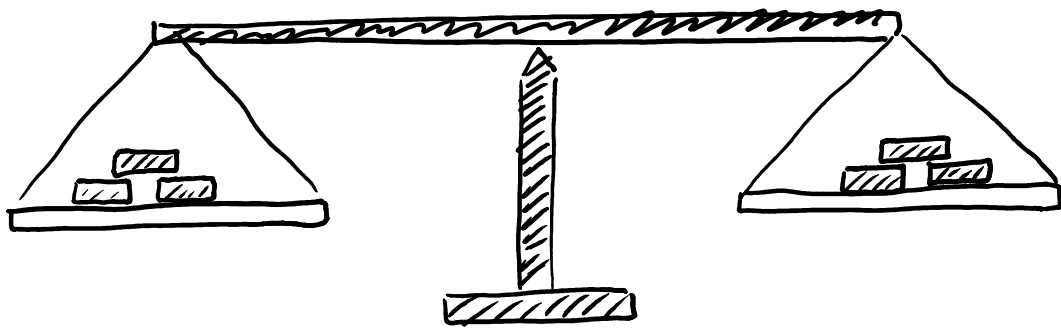


# Finding the fake coin



A BALANCE allows you to determine which of two things is heavier or whether they weigh the same.

Your job today is to figure out how to use a balance to find fake coins among real ones if the fake coins weigh a different amount than the real ones.

- ① Say there are 3 coins and we know one is heavier than the others. Can you always figure out which one it is using only one weighing?

② What if there are 9 coins? How many weighings do you need?

③ What about 25 coins? Can you figure out the least number of weighings for any number of coins?

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④ Now let's say we don't know whether the fake coin is heavier or lighter. Can you find a fake coin among 3 coins in one weighing?

⑤ What if there are 6 coins?

⑥ (HARD!) How can you use only 3 weighings to figure out which of 12 coins is fake if it can be lighter or heavier?