

## ➤ Notes for parents.

**The purpose of the activity is to help your child to:**

- Measure the likelihood of something happening by:
  - a) trying out the event many times
  - b) thinking about all the possible outcomes

**Here is what to do:**

Look at the activity sheet together with your child. Set up a sock drawer that has four socks, two matching pairs. Separate the socks so they are loose in the drawer. Try to use socks that look noticeably different but feel the same. Similar feel will make it hard for your child to fix the outcomes.



Ask: *“What are the chances that you get a matching pair without looking?”*

Let your child speculate by using words associated with chance, such as likely, impossible, sometimes, rarely, never, etc...

Ask: *“Why do you believe the socks will match most of the time?”*

Expect some acknowledgement of the possible outcomes of the event. Your child might try to list all the things that could occur.

Carry out an experiment by doing 20 trials of taking two socks. Ensure you replace the socks back in the drawer and scramble them before the next selection. Record the results using a tally chart, like this:

Match	No match
	

Ask: *“What do the results show? Can you explain why this happened? Is it just luck or is it really harder to get a match than not get a match?”*

While 20 trials are not enough to get reliable results, the tally sheet may provoke your child to consider all the possible outcomes. Discuss ways to find all the things that might happen.



## ➤ Notes for parents cont... Activity next page.

### Points to note:

Probability, the measure of chance, is an important part of young people's mathematical and statistical education. Life abounds with situations which involve chance, from identifying health risks, to playing board games, to choosing fast food meals.

The sock drawer problem looks very simple but it is not. First impressions might be that the chance of a match is the same as the chance of a non-match. One way to check this is to experiment. But how many trials should you do?

The simple answer is as many as you can. The more trials you do the more reliable the results are in reflecting the actual chance. So you should trust a sample of 100 selections more than a sample of only ten. You should also know that samples vary a lot, especially small ones.

1000 trials would take a very long time. The results might look something like this:

Match	Non-Match
337	663

So the fractions would be about one third matching and two thirds non-matching. That might appear strange but can it be explained?

Another way to explore the situation is to look at it theoretically. In other words, try to come up with a model of all the possible outcomes. There are various ways to do that but possibly this diagram is the most elegant.



The arrows represent all the matches that are possible. There are six possible pairings and only two of them contain matching socks.

Two out of six is an equivalent ratio to one out of three. So our experimental results and our theoretical model agree, as they should.

Be aware of common misconceptions about chance as you work with your child. Look for incorrect beliefs such as:

- It's all about luck and I am a naturally unlucky person. So the socks will not match.
- We've carried out ten tries and it is about 50-50. That's enough.
- There are two colours (not socks), tan and yellow. So you can get tan-tan, yellow-yellow and tan-yellow or yellow-tan. The last two are the same combination.



# Activity | Chances of a pair

Y5

Imagine that your sock drawer has only two pairs. But you didn't match your socks when you last did the washing. The socks are loose.

So your drawer might look like this:



It's dark in the morning so you reach into the drawer without looking and take out two socks.

How often will the socks match? Never? Always? Sometimes?

Here are two socks you might get, a matching pair of colourful socks.



What else might you get when you take out two socks?

