

➤ Notes for parents. Activity next page.

The purpose of this task is to help your child:

- 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.



Te tūponotanga takirua Hei Mahi | Chances of a pair

Tau
Kura 5

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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 nonmatching. 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.



Hei Mahi | Te tūponotanga takirua

Chances of a pair

**Tau
Kura 5**

He taura kōrero Māori

E rua ēnei tōkena takirua, ka whakaurua ki te toroa. He ōrite te rahi me te kakano o ia takirua, engari he rerekē ngā tae.	There are two pairs of socks we've put in the drawer. The size and texture of each pair are the same, but the colour is different.
Mēnā ka tangohia ētahi tōkena e rua, kāore he tiroiro ki aua tōkena, e hia te tūponotanga ka riro he takirua tōkena?	If we take out two socks without looking, what are the chances of getting a matching pair?
He nui te tūponotanga, he iti rānei? Kei te takiwā rānei o te haurua te tūponotanga ka riro he takirua tōkena.	Is there a large or small probability of getting a pair? Or is it about half?
Me whakamātau te tangohanga tōkena. Kia 20 ngā tangohanga, ka tuhi ai mēnā he takirua ka puta, he rerekē rānei ngā tōkena ka tangohia atu.	Lets do a trial of taking out the socks. Lets do 20 trials and write down whether we get a pair or whether the socks are different.
Ki tō whakaaro e hia ngā takirua tōkena ka puta i roto i aua tangohanga tōkena 20? E hia tō matapae?	What is your thoughts for the number of pairs we get out of the 20 sock drawouts we make? How many do you predict?
Ko tētahi tikanga matua o te whakamātau, kaua e tiroiro ki ngā tōkena e tangohia ana i te toroa. He mahi matapōkere te tangohanga tōkena.	One thing about the trial is that there should be no looking at the socks that are being drawn out. It is a random selection of the socks.
Titiro ki te tūtohi o te whakamātau. He rite ngā hua ki tāu i matapae ai?	Have a look at the table of the trial results. Are the results similar to what you predicted?



Hei Mahi | Te tūponotanga takirua

Chances of a pair

Tau
Kura 5

E rua ngā takirua tōkena e noho takitahi ana ki roto i te toroa.

He pēnei pea te āhua:



Ka toro atu tō ringa ki te tango i ētahi tōkena e rua. Kāore he tiroiro ki ngā tōkena e tangohia ana. He tangohanga matapōkere.

Pēhea nei te maha o ngā wā ka tangohia he takirua? I ngā wā katoa? Kore rawa? I ētahi wā ruarua noa iho? He haurua o ngā wā?

He takirua tēnei tangohanga. Koia tētahi o ngā putanga e taea ana.



He aha tētahi atu putanga o te tango tōkena?

