Experiments and probability

- Exploring outcomes that are equally likely or not equally likely
- Investigating the results of a large number of trials
- Estimating a probability from a number of trials

Keywords

You should know

explanation 1

1 a In an experiment, a coin is spun repeatedly and the results recorded.

Write how many heads and how many tails you would expect after

   i 10 trials   **ii** 20 trials   **iii** 50 trials

b Copy this tally table.

Heads	Tails

10 trials   ————— Hs   ————— Ts

20 trials   ————— Hs   ————— Ts

50 trials   ————— Hs   ————— Ts

c Carry out the experiment described in part **a**. Tally your results in your table and work out the number of heads and tails after

   i 10 trials   **ii** 20 trials   **iii** 50 trials

d Work out the percentage of heads and tails after 10, 20 and 50 trials.
Record your results in a copy of this table.

Number of trials	Percentage of heads	Percentage of tails
10		
20		
50		

e Describe how the results for 50 trials are different to the results for 10 trials.

Compare your percentage results with others in the class.

f What do you think happens to the percentages of heads and tails as you increase the number of trials?

explanation 2

2 a Stick a small piece of Blu-tack to the side of your coin showing tails.

Do you think that the two possible outcomes, heads and tails, are still equally likely?
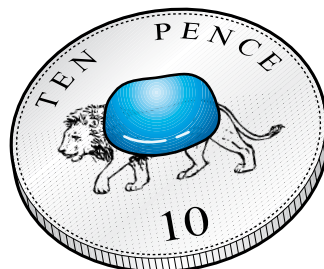
Explain your answer.

b Copy this tally table.

Heads	Tails

10 trials ———— Hs ———— Ts

20 trials ———— Hs ———— Ts

50 trials ———— Hs ———— Ts

c Spin your coin (with the Blu-tack still on) 50 times. Tally your results in your table and work out the number of heads and tails after

i 10 trials **ii** 20 trials **iii** 50 trials

d Work out the percentage of heads and tails after 10, 20 and 50 trials and record your results in a copy of this table.

Number of trials	Percentage of heads	Percentage of tails
10		
20		
50		

e Which set of results will give the best estimate of the probabilities of the coin showing heads and tails? Why is this?

f Use your results to estimate the probability of your coin landing on

i heads **ii** tails

g What do you think will happen to the probabilities if you increase the amount of Blu-tack on the tails side of the coin?

h What do you think will happen to the probabilities if you add the same amount of Blu-tack to both sides of the coin?

3 When a drawing pin is dropped it can either land 'point up' or 'point down'.
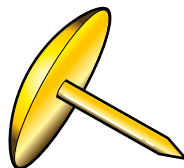
Point up   Point down

a Copy the tally table shown below.

Point down	Point up

10 trials _____ Ups _____ Downs

20 trials _____ Ups _____ Downs

50 trials _____ Ups _____ Downs

b Drop your pin 50 times onto a table. Tally your results in your table and work out the number of 'point ups' and 'point downs' after

  i 10 trials   **ii** 20 trials   **iii** 50 trials

c Which set of results will give the best estimate for the probabilities of the pin landing 'point down' and 'point up'? Why is this?

d Use your results to estimate the probabilities of a drawing pin landing 'point down' and 'point up'. Give your probabilities as percentages.

e Compare your results with others in the class. Do they agree?

f **i** Add your results for 50 trials together with the results from three other people to give the number of 'point ups' and 'point downs' for 200 trials.

  ii Use your results for 200 trials to estimate the probabilities of a drawing pin landing 'point down' and 'point up'. Give your probabilities as percentages.

g Do you think that the outcomes 'point down' and 'point up' are equally likely? Explain your answer.