

Evaluating data and methods

Setting the scene

Scientists evaluate data from an experiment to see if it is good enough to answer their question.

In this activity you will find out how to evaluate data from experiments.

Aims

In this activity you will be using **enquiry processes** to:

- **Analyse:** describe how to evaluate data
- **Analyse:** suggest ways to improve the data from an experiment.

Task

Here are two accounts written by students who wanted to know how far a table-tennis ball, squash ball, tennis ball, golf ball, and billiard ball travelled when hit using a tennis racket.

Read each write-up.

Experiment 1

- I bounced the table-tennis ball, the squash ball, and the tennis ball, then hit them. I threw the golf ball and the billiard ball in the air, then hit them.
- Some strings on the tennis racket broke when I hit the billiard ball but I carried on. I stood in different places after the billiard ball broke a window. I tested the tennis ball three times and the other balls once.
- The tennis ball went furthest. I decided this by looking. I think my test went well.

Experiment 2

- I tried bouncing the balls but it didn't work for all balls. So I threw each ball up and hit it hard but it broke the tennis racket.
- I used a new racket and threw each ball in the air and hit it medium hard. I practised a few times. Then I took a new set of results and tried each ball three times.
- I stood in the same place each time and measured the distances with a tape measure. I calculated the mean of the results.
- The tennis ball went furthest. I think my test went well.

Summarise the key differences between the experiments in the table below.

Experiment 1	Experiment 2

Questions

1 Describe the stages each student must do to evaluate their data.

2 State which experiment gave better results. Explain your answer.

3 Suggest three ways to improve the first experiment.

- 4 Suggest how the student could use their data to check if there is a real difference between how far each ball travelled.

Extension

- 1 From the three suggestions that you have given in Question 3 above, explain which change would improve the data most.

- 2 Explain why it is important to evaluate data carefully.
