



# Data Tracer

## Teacher briefing notes

### What's the experiment?

How does data move over the internet?

This exhibit shows the route an image search follows across the internet. Students search for an image using the gallery computers and a large map behind the exhibit traces the route their image search takes across the web.

### Learning outcome

Understand the vast size of the web as well as the speed at which information can travel such vast distances.

### Lab Tag activity

Students collect an image of their search route to take home or back to school.

### Glossary

**Packet** – One unit of data that's small enough to be routed through a computer network. A file, such as a web page, could be made up of many packets.

### What does it show us?

The internet is a collection of millions and millions of computers all linked together. When you search for something, such as an image, using the internet and click on a link your computer will send the link address a request to view the web page. The computer where the web page is stored will then send your computer enough data packets to view the web page. The packets are reassembled by your computer to make up the website you want to view.

Each web page is made of lots of packets of information and these packets are sent using the internet in the most efficient way possible. Lots of decisions are made within seconds to send you all the packets of information you need to view all the websites you want to.

The physical structure that your data travels through can also vary depending on the information you are requesting. The internet uses cables, radio waves, satellite signals and lots of other structures and waves to send information across the globe. Because the information is travelling using physical structures, the speed at which it can travel has its limits. And of course, however fast it does travel, it can't go faster than the speed of light.

### **What could we discuss?**

- In a vacuum the maximum speed that data can travel is 30 cm per nanosecond (a billionth of a second). Make your own 'nanostick' by measuring out a 30-cm-long piece of card or just use a ruler. With your 'nanostick' you can measure out how long it would take data to travel from one side of the playground to the other. Why not work out how long data would take to get from your home to school?
- Use this activity to discuss why there is sometimes a delay in retrieving data using the internet.

### **Museum web links**

[sciencemuseum.org.uk/weblab](https://www.sciencemuseum.org.uk/weblab)

The on-gallery animation which introduces the topic of data packets can be found here.