Notes on "FAIR TESTS" & Good Scientific Habits!

What is a FAIR TEST?

Many questions lead to the designing of one or more experiments. If you are designing a scientific experiment it is very important to ask; **is this a "fair test"?**
To understand the concept of a fair test" it is best to use an example...

Imagine that your class has asked the question;"Does this washing powder really remove stains with cold water as well as it does with hot water (as is often claimed)?" For an experiment to give you meaningful information you need to design it so that **the only factor** that can account for any difference in the outcome is the water temperature. At the design phase children need to be encouraged to identify all the things ("**variables**") they need to **control** and **keep the same** each time they test the stain removing properties of the washing powder at a a given temperature. In this case each time they test the powder they need to use the **same** type of material being washed, the **same** amount of washing powder, the **same** amount of water, the **same** way of manipulating/ scrubbing the material, and the **same** type of stain. If they do this then they can claim that they have conducted a **"fair test"** and any observed change in performance of the washing powder is solely due to the change in the temperature of the water. They could then extend the experiment to test different types of stains and different brands of washing powder, but the same approach would have to be taken within each group of experiments.

What if you can't make a FAIR TEST with your experiment?

In some instances you may not be able to conduct a "fair test". This happens either because it is not practical for you to control all the variables (eg. the weather conditions on different days) OR because your question does not lend itself to an experimental plan where the idea has any real meaning. For example your class might start their investigations asking... "What is the top speed achievable by a worm?" You will have to design experimental ways of measuring a worms speed but you only want to know the **highest speed** observable so there is no need to control any variables in the sense described above. So for these experiments you can't ask the children to explain how they have developed a "fair test".

Repeat your experiments.

Good scientists add weight to their findings by repeating their own experiments or having them carried out by multiple groups. If the same outcome is observed then this adds strength to the claim that their results are reliable. This is one of sciences great qualities; all results have to be repeatable to be accepted. If (for older classes) your experiments result is a number or a measurement then repeating that experiment and calculating an average result is good practice.

Talking about errors.

We'd encourage your class to cast a critical eye over their actions. All experiments and surveys have problems or inaccuracies and it is a good thing to discuss these openly. If your repeat experiments/measurements show a lot of variation then what does that tell you about the experiment or the question you are investigating?