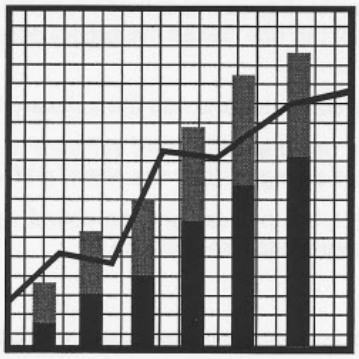
EASYSENSE

Age 7 - 9

Sensors: Light

Logging mode: EasyLog

What happens when I am not here?



Learning experiences covered.

- Science activities and methods.
- Collecting data remotely.
- Quantity.
- Graphing (Line).
- Describing and comparing.
- Time as a variable.
- The controlled experiment.

You will need.

- A study area that will show a change in temperature over time – the classroom over night is a good example, but you may have other inspiration.
- A data datalogger with an external temperature sensor.
- A PC with the software to show what the datalogger recorded.

Suggested method.

Your children need to be familiar with the datalogger and what a datalogger does. A recap of its capabilities would be a good idea.

Connect the datalogger to a PC so results can be shown to the class on a whiteboard or large screen. Use Easylog to show what happens when you hold onto the temperature sensor for a period of time.

Give the children a few moments to talk about what the graph line is showing. Ask individuals to come and show important areas of the graph e.g. the axes, time, where temperature is going up, going down etc

Pose the question, what happens to the temperature in the study area over the chosen time period? Ask them to talk to each others in learning groups or partners and draw a picture to show what they think will happen to temperature for the rest of the day and overnight. Pin the diagrams on a display board. There are activities you can use to help with this, a simple one is to have a child hold the pen, use a long paper and pull it along. Have one edge of the paper labelled HOT and the other edge COLD, Ask the pen holder to move the pen to the hot side, cold side, hold steady as the paper is slowly pulled along under the pen. Then examine the graph.

1. Use an external temperature sensor if available, it gives a clearer indication of what is being recorded. There is an internal temperature sensor that can be used as an alternative when collecting the overnight data.

2. Ask the children talk about and decide a place to put the datalogger and how long to record for. They will need to consider where does the sun come into the class, where are radiators, what the lesson structure is the next day etc.
3. Next day, remind the class about the activity.
4. Ask them to reclaim their graphs and add to them some predictions e.g. what happens when the class is empty? what changes overnight? (e.g. sun goes in, heating turns off etc).
5. Get some ideas of time for events. For example time when the class became empty. The time when the school closed for the end of the day. When the school opened for the day (you may be interested in the replies!).
6. Connect the datalogger to the computer and use the software to show the collected data.
7. If you are using a white board, use the whiteboard software to mark up areas of interest. Try to go for big changes and diminish small changes, they are often "artifacts".
8. You could repeat the next night, but include light and sound – ghost hunting! Looking for borrowers! Anything to encourage predictions and explanations.

Showing the data.

The data collected with the datalogger is most valid when used with observation data.

- Data from this exploration should be shown as a line graph.
- Check the understanding of the time axis by asking members of the class to point out (or mark up using whiteboard tools) key times in the school day on the time axis.
- Try to get them to say words and phrases of difference i.e. It was colder at midnight than just before we left the class to go home. (*note In secondary science when a difference is given, both parts of the difference has to be given, it is not enough to say site one is sunny).*
- Things to look for on the graph.
    - When was it coldest?
    - How do we know it was colder at.(a given time).
    - Why did it get colder or hotter.
    - Why did it get hotter before anyone arrived
    - When was midnight on the graph, and why did you decide on this?

How did the children's graphs drawn the day before match the real data? Who was closest in shape? With times?

Teaching notes.

Key Questions.

1. What does a graph show?
2. How can we trust the data collected when we are not around is correct?
3. Why and when do you use different types of chart?
4. Do you understand X and Y axis?
5. How do you decide on the scales to use?
6. How do you know where to place the data points on the graph?
7. What are the rules for drawing graphs?

By this stage, it is hoped that children will be used to seeing a datalogger in class use and using the software in a variety of lessons. A datalogger is capable of collecting information when the observer is absent, this is an area that has not been covered in many of the previous activities, nor has the idea of showing the data collected as a line graph.

A bar chart or bar graph shows data in graphical format, technically it does not create links between the data, the bar format indicates that each data is separate from other data. For much of the work so far, this is correct, and allows us to consider simple differences in value between locations or events.

A line graph format indicates the data is linked to the data either side. In this activity the link is the time that has passed, we want to see what happens to temperature as time changes. Everything else in the activity has stayed constant.

Graph drawing is an important skill for science. There is however a slight difference in the way that mathematics and science use graphs and draw graphs.For science a graph is a graphical representation of data.

There is an excellent package form the ASE that teaches scientific graphing call AKSIS and a primary publication called Science and Numeracy. Both publications use and teach the graphing standards. A search on the internet on "how to draw graphs" will also reveal information about graphing.

Plotting the data by hand can be useful exercise in its own right, the data logging software will allow a lesson to flow freely by reducing the time between data collection and discussions about what the graph tells us. A short time between collection of the data and its presentation can be very important when teaching how to decipher the content and message in a graphed data set.