The Geopacks Junior Weather Watcher's Study Pack

MFP422a

Contents of your Weather Watcher's Study Pack:

1. Mini-Met Instrument Screen
2. Dial Maximum-Minimum Thermometer
3. Combined Dial Hygrometer/Thermometer
4. Mini Barometer
5. Plastic Direct Rain Gauge
6. Anemometer

Siting your Instrument Screen

The screen is designed to be attached to a wall using screws and the screw holes provided. Spare some time considering potential sites bearing in mind the following requirements:

- shade from direct sunlight
- shelter from driving rain
- protection from vandals

In order to minimise heat conduction from the wall on which the screen is to be mounted, consider placing a tile of wood or slate between the screen and the wall. Ideally, the screen should be placed on a wall approximately 1.1 metres above ground level.

Your **Maximum-Minimum Thermometer** - for measuring temperatures

This should be positioned inside the Mini-Met Screen to one side, leaving space for the hygrometer.

Your **Hygrometer** - for measuring humidity

This instrument should be placed alongside the Maximum-Minimum Thermometer.

Your **Barometer** - for measuring atmospheric pressure

This may be placed in the screen or inside the main building as you wish. If kept indoors, the barometer should be protected from direct sunlight and should not be positioned near any heat source.

Your **Rain Gauge** - for measuring rainfall

This should be placed on soft, open, level ground where direct rain can be collected. Avoid placing the gauge in the shelter of buildings and hedges.

Your **Anemometer –** for measuring wind speed

Discuss how long each reading should take, since some gusts are fairly irregular. Take readings in various positions, as the strength & direction vary according to the surroundings.

Reading the instruments

The Maximum-Minimum Thermometer

The **DIAL MAXIMUM-MINIMUM THERMOMETER** has three needles. The BLACK needle indicates the current temperature. The RED needle indicates the MAXIMUM temperature recorded by the instrument since it was re-set. The BLUE needle indicates the MINIMUM temperature recorded. As the temperature rises, the black needle pushes the red needle along and as the temperature falls, the black needle pushes the blue needle.

To RE-SET the instrument, turn the central knob until the RED and Blue needles converge and cover the BLACK needle

The Hygrometer

The **DIAL HYGROMETER** is a simple instrument on which a needle indicates percentage humidity (Relative Humidity or RH). It requires no re-setting and the value can simply be read off the dial when required. From time to time it should be checked against a more sophisticated instrument. If necessary, the reading can be corrected by adjusting the needle from the back of the instrument.

The Barometer

This **ANEROID BAROMETER** indicates atmospheric pressure. At the heart of the instrument is a small diaphragm in which there is a vacuum. When atmospheric pressure is high, the diaphragm is compressed a little; when pressure is low, the diaphragm expands a little. These motions are connected to a needle, which moves around a dial indicting pressure.

The unit of pressure is the BAR. Average pressure at sea level is 1 BAR. The BARometer is calibrated in millibars (MB); 1 MB = 1 thousandth of a Bar. At sea level, pressure rarely exceeds a high of 1050 and a low of 950 mbs.

Your Barometer has two needles; one indicates actual pressure and its movement is controlled by changes in the internal diaphragm. The other can be moved by turning a knob in the centre of the dial. This needle can be positioned over the indicator needle and used to indicate whether pressure is changing positively (towards higher pressure) or negatively (towards lower pressure). The Pressure TENDENCY (up or down) can often be used as an aid to forecasting. More details are provided with the instrument.

The Rain Gauge

This is a very simple, cone shaped container designed to catch and measure rainfall. The side of the cone is graduated in millimetres. The level of any rain in the cone can be read against the graduated scale. Take care to hold the gauge level when making a reading. To be accurate as possible, you should read the level from the top of the meniscus (the higher part of the upwardly curved water surface). If your gauge contains snow or hail, wait until it melts before making your reading.

The Anemometer

The unique design features of this Anemometer give direct wind speed readings without the need to count revolutions. It can be hand held or permanently fixed. As the wind blows harder, the arms move further out lifting the reading bar. The measurement can then be read in either m/sec or Beaufort scale from the shaft.

Recording your Observations

Use the monthly charts supplied with these notes.

Try to make your observations at a similar time each day. If your instruments are at a school or workplace, try to arrange access at weekends and holiday periods. Remember, to get the best from your observations, you need a continuous daily record from day one - quite a responsibility really. If more than one person is making the observations**, make sure everyone involved can read the instruments and record in a uniform way**.

You can record directly on to the record charts supplied for each month of the year. Alternatively (and preferable), make your immediate records in a notebook and transfer these to the record sheet. This is especially advantageous when recording relative humidity from a Mason Wet and Dry Bulb hygrometer as the relative humidity has to be calculated from the chart supplied with the instrument. A typical set of readings would look like those shown in the table below:

	Maximum	Minimum	Humidity	Pressure	Rainfall
DAY	Temp °C	Temp °C	%	millibars	mm
1st	11	6	87	999	0
2nd	12	5	85	1010	0
3rd	14	6	78	1115	0
4th	15	9	77	1116	0
5th	12	9	89	1002	15
6th	12	9	90	998	12
7th	13	7	70	990	10
8th	14	6	68	988	0

On the record sheet there is space for the observer to make brief notes on the general characteristics of the Weather. Some typical examples are shown in the following extract for the first 6 days of a specimen month:

Day	Weather Notes for the Month of March 2001	Name of Observer:
1st	Overcast; light breeze from south West	Mark
2nd	Bright; scattered cloud; light SW wind	Mark
3rd	Bright, dry and calm	Joan
4th	As before	Sam
5th	Cloudy with drizzle; SW wind	Joan
6th	Cloudy, rain showers, fresh SW wind	Matthew

At the end of each month the record sheet can be completed by calculating totals and averages where appropriate in the spaces provided, as in this example from the bottom of the Record Sheet:

29th	12	6	87	997	12
30th	13	5	80	970	10
31st	15	7	72	980	0
Mean	14	7	75	995	5
Total					155

Means are calculated for all the data
Only rainfall is totalled

The monthly rainfall total as well as the mean daily rainfall, maximum and minimum temperatures and relative humidity figures can be transferred to the Monthly Summary Log. Here is an example:

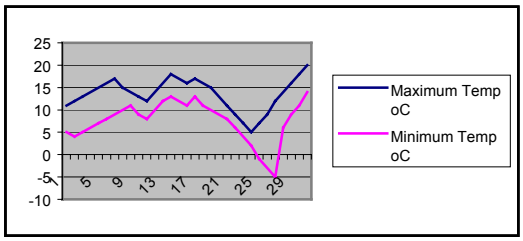
	Mean	Mean	Mean	Mean	Mean	Total
	Maximum	Minimum	Humidity	Pressure	Rainfall	Rainfall
Month	Temp °C	Temp °C	%	millibars	mm	mm
Jan	8	3	78	1013	5	155
Feb	9	2	82	999	6	148
Mar	10	4	80	1005	8	249
Apr	13	7	77	1009	3	90
May	15	10	67	1020	3	93

As time goes by you will accumulate data from your instruments, which can be used for comparisons - day by day, week by week, month by month and year by year.

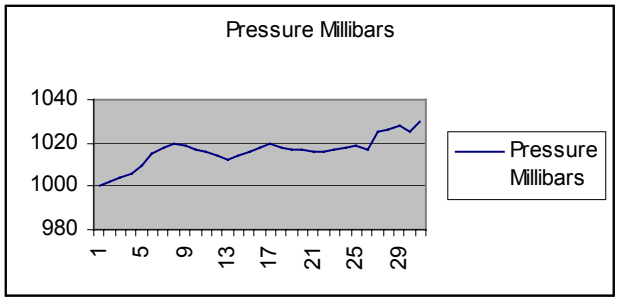
You will also be able to construct graphs like those shown on the following page. Good luck!

If you want to bring an element of I.T. to your weather students then Geopacks' *Mini Met* software is an ideal tool. This software was written specifically with the weather study pack in mind. It lets you build up your own electronic weather database by inputting eight weather variables every day. Take advantage of a whole host of different statistical and graphing techniques to help analyse and present your data. See page 24 of the Geopacks catalogue for more details.

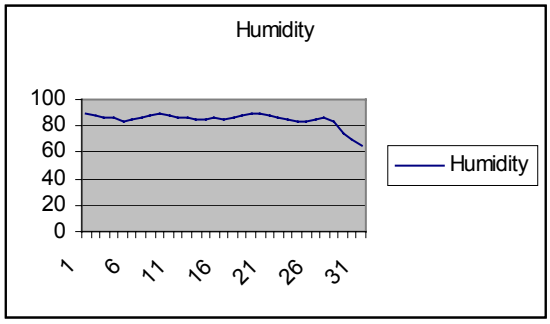
This chart shows maximum and minimum temperatures



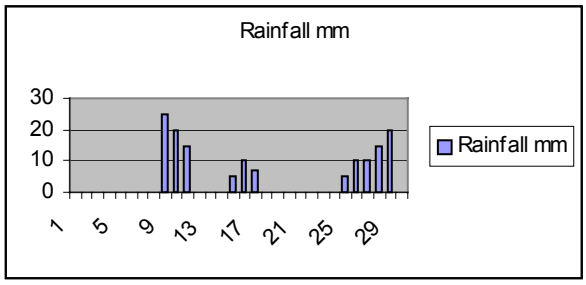
This one shows atmospheric pressure recorded by the Barometer



Relative Humidity data was collected from the Mason' Hygrometer



And the Rain gauge enabled us to do this



There are many styles of graphs (and you should try to make yours bigger than these). Normally, rainfall is shown by columns and pressure by lines – but you can be creative.

Daily/Monthly Record Sheet

	Mean	Mean	Mean	Mean	Mean	Total	Mean	Mean	
	Maximum	Minimum	Humidity	Pressure	Rainfall	Rainfall	Wind Speed	Wind	
Month	Temp oC	Temp oC	%	Millibars	MM	MM	M/Sec	Direction	Monthly Weather Summary for the Year 20_ _ _
Jan									
Feb									
Mar									
Apr									
May									
Jun									
Jul									
Aug									
Sep									
Oct									
Nov									
Dec									
Year									

	Mean	Mean	Mean	Mean	Mean	Total	Mean	Mean	
	Maximum	Minimum	Humidity	Pressure	Rainfall	Rainfall	Wind Speed	Wind	
Month	Temp oC	Temp oC	%	Millibars	MM	MM	M/Sec	Direction	Monthly Weather Summary for the Year 20_ _ _
Jan									
Feb									
Mar									
Apr									
May									
Jun									
Jul									
Aug									
Sep									
Oct									
Nov									
Dec									
Year									

Daily/Monthly Record Sheet

Day	Maximum Temp oC	Minimum Temp oC	Humidity %	Pressure Millibars	Rainfall MM	Wind Speed M/Sec	Wind Direction	Weather Notes for the Month of:	Name of Observer
1st									
2nd									
3rd									
4th									
5th									
6th									
7th									
8th									
9th									
10th									
11th									
12th									
13th									
14th									
15th									
16th									
17th									
18th									
19th									
20th									
21st									
22nd									
23rd									
24th									
25th									
26th									
27th									
28th									
29th									
30th									
31st									
Mean									
Total									