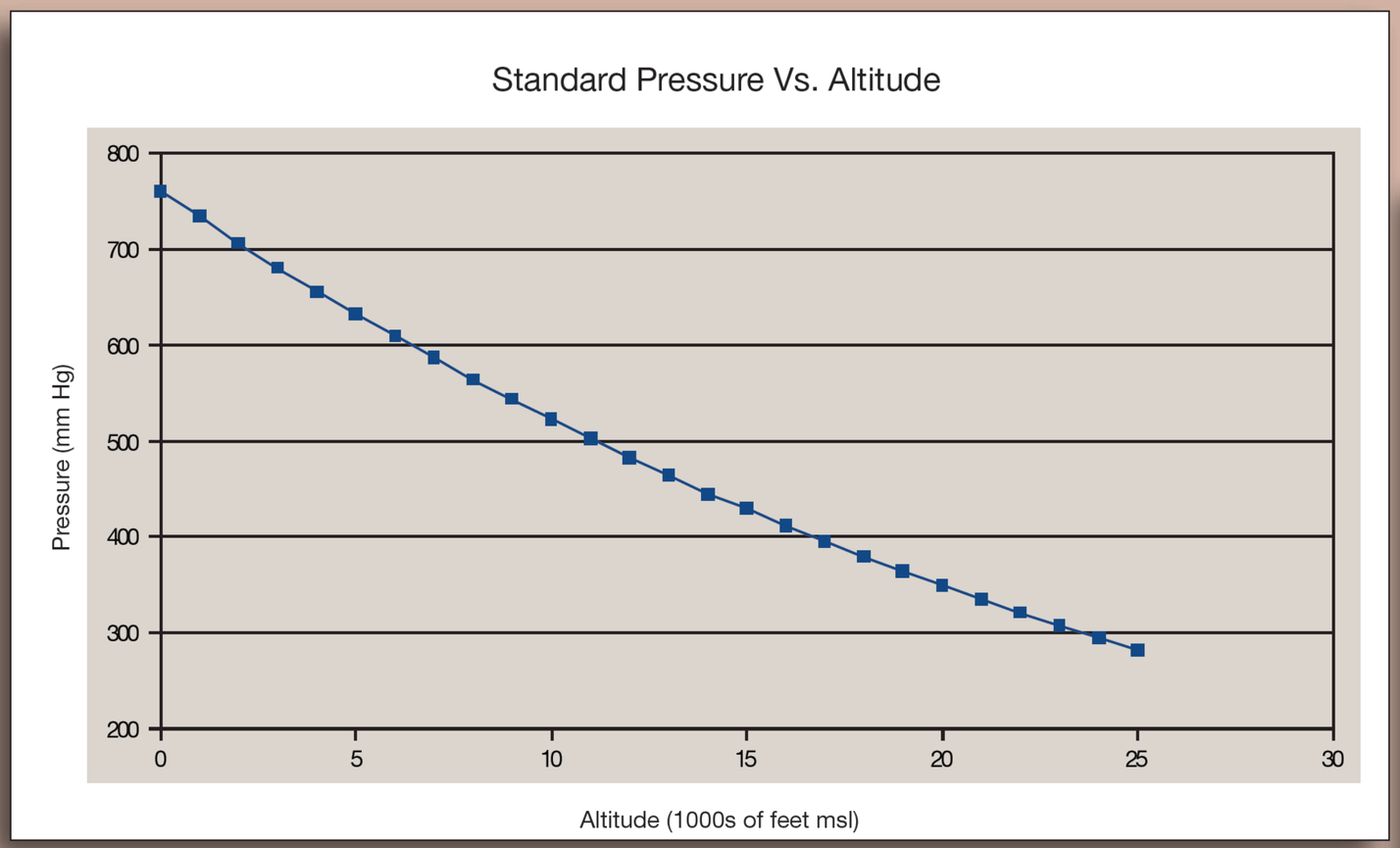
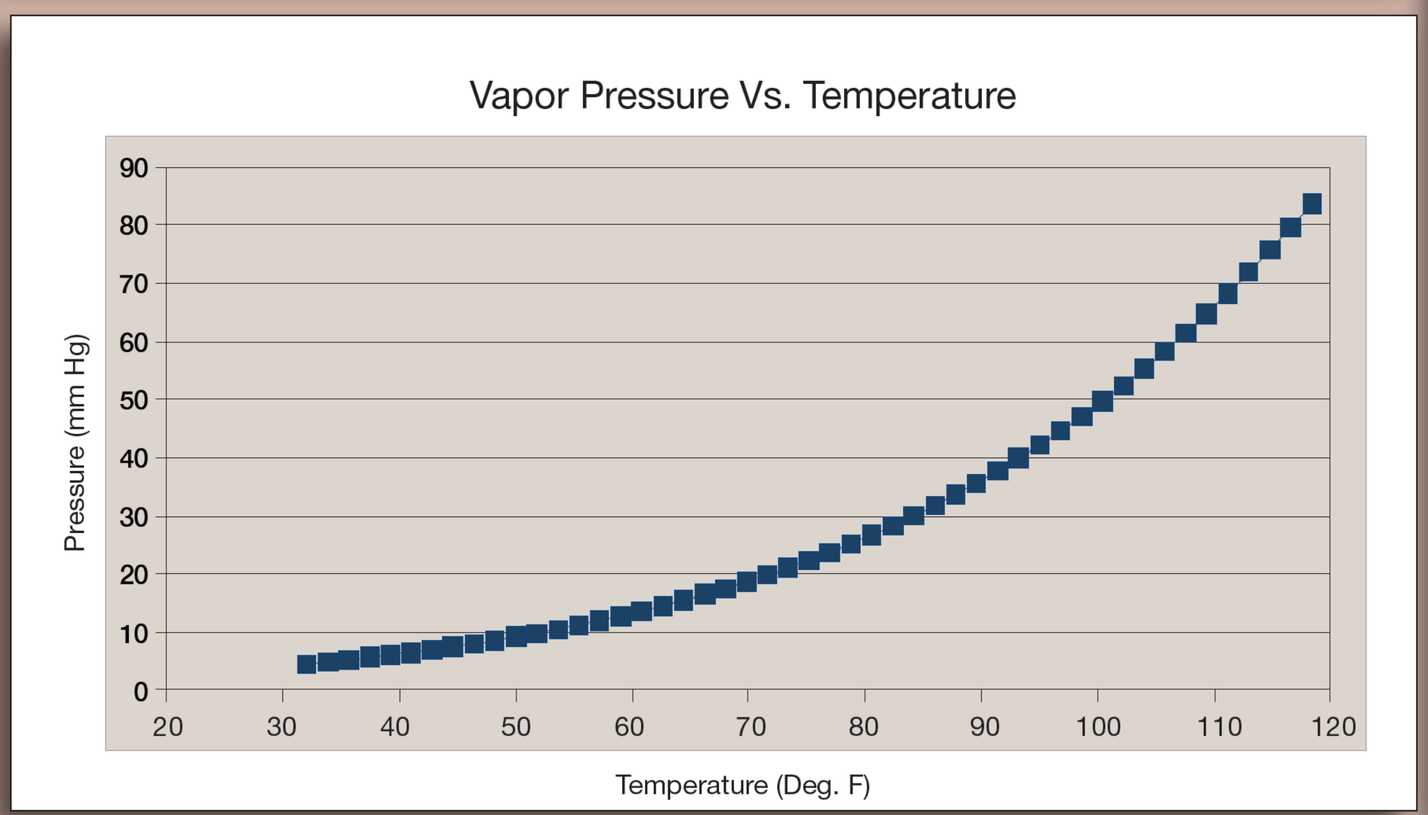
Pressure, Temperature And Vapor Relationships

Understanding the relationships between pressure altitude, temperature and humidity doesn't require a physics degree. It's really rather simple.

The graph below, Standard Pressure Vs. Altitude, details the natural decrease in ambient air's pressure as altitude increases. This is the classic definition of pressure altitude.





Meanwhile, the graph Vapor Pressure Vs. Temperature charts the increase in pressure with temperature. On its face, higher vapor pressure with higher temperature would result in lower density altitude, wouldn't it. Nope. That's because the additional vapor pressure in high-humidity conditions *displaces* the ambient air, making the density altitude *higher* than it would be in dry air.

The table below right details the value, in mm of Hg, you should subtract from ambient pressure before computing density altitude.

Water Vapor Pressure Vs. Temperature

100% Relative Humidity

Temp ºC	Temp ºF	Pressure (mm Hg)	Temp ºC	Temp ºF	Pressure (mm Hg)
0	32.0	4.58	25	77.0	23.76
1	33.8	4.90	26	78.8	25.20
2	35.6	5.30	27	80.6	26.70
3	37.4	5.70	28	82.4	28.30
4	39.2	6.10	29	84.2	30.00
5	41.0	6.50	30	86.0	31.80
6	42.8	7.00	31	87.8	33.70
7	44.6	7.50	32	89.6	35.70
8	46.4	8.00	33	91.4	37.70
9	48.2	8.60	34	93.2	39.90
10	50.0	9.20	35	95.0	42.20
11	51.8	9.84	36	96.8	44.60
12	53.6	10.52	37	98.6	47.07
13	55.4	11.23	38	100.4	49.70
14	57.2	11.99	39	102.2	52.40
15	59.0	12.79	40	104.0	55.30
16	60.8	13.60	41	105.8	58.30
17	62.6	14.50	42	107.6	61.50
18	64.4	15.50	43	109.4	64.80
19	66.2	16.50	44	111.2	68.30
20	68.0	17.54	45	113.0	71.90
21	69.8	18.70	46	114.8	75.70
22	71.6	19.80	47	116.6	79.60
23	73.4	21.10	48	118.4	83.70
24	75.2	22.40			