

Jordan Huber
 ENGR 115
 2-4:50
 20-Oct-16

Input Parameters

Column1	Column2
Measured outdoor CO2 (ppm)	470
Assumed CO2 (ppm)	400
Correction Factor (ppm)	70
Volume of Room (feet^3)	1287
Room Capacity	2
Analysis	

Minutes	Time (min)	Hobo CO2 (ppm)	Actual CO2 (ppm)
1	10/20/2016 14:44	905.4	835.4
2	10/20/2016 14:45	683.2	613.2
3	10/20/2016 14:46	432.8	362.8
4	10/20/2016 14:47	1201.5	1131.5
5	10/20/2016 14:48	544	474
6	10/20/2016 14:49	454.8	384.8
7	10/20/2016 14:50	484.1	414.1
8	10/20/2016 14:51	469.5	399.5
9	10/20/2016 14:52	460.3	390.3
10	10/20/2016 14:53	456	386
11	10/20/2016 14:54	623.3	553.3
12	10/20/2016 14:55	735	665
13	10/20/2016 14:56	730.2	660.2
14	10/20/2016 14:57	733.8	663.8
15	10/20/2016 14:58	810.7	740.7
16	10/20/2016 14:59	904.2	834.2
17	10/20/2016 15:00	1015.9	945.9
18	10/20/2016 15:01	1028.1	958.1
19	10/20/2016 15:02	1020.1	950.1
20	10/20/2016 15:03	1015.3	945.3
21	10/20/2016 15:04	1011	941
22	10/20/2016 15:05	1020.1	950.1
23	10/20/2016 15:06	1052.5	982.5
24	10/20/2016 15:07	1238.7	1168.7
25	10/20/2016 15:08	1249.7	1179.7
26	10/20/2016 15:09	1266.8	1196.8
27	10/20/2016 15:10	1283.9	1213.9
28	10/20/2016 15:11	1302.2	1232.2
29	10/20/2016 15:12	1330.9	1260.9
30	10/20/2016 15:13	1377.3	1307.3
31	10/20/2016 15:14	1401.1	1331.1
32	10/20/2016 15:15	1445.7	1375.7
33	10/20/2016 15:16	1469.5	1399.5
34	10/20/2016 15:17	1507.3	1437.3

35	10/20/2016 15:18	1548.8	1478.8
36	10/20/2016 15:19	1570.8	1500.8
37	10/20/2016 15:20	1612.3	1542.3
38	10/20/2016 15:21	1730.8	1660.8
39	10/20/2016 15:22	1765	1695
40	10/20/2016 15:23	1768	1698
41	10/20/2016 15:24	1791.2	1721.2
42	10/20/2016 15:25	1837	1767
43	10/20/2016 15:26	1852.9	1782.9
44	10/20/2016 15:27	1871.2	1801.2
45	10/20/2016 15:28	1896.8	1826.8
46	10/20/2016 15:29	1906.6	1836.6
47	10/20/2016 15:30	1908.4	1838.4
48	10/20/2016 15:31	1914.5	1844.5
49	10/20/2016 15:32	1923.7	1853.7
50	10/20/2016 15:33	1926.7	1856.7
51	10/20/2016 15:34	1928.6	1858.6
52	10/20/2016 15:35	1932.8	1862.8
53	10/20/2016 15:36	1935.3	1865.3
54	10/20/2016 15:37	1935.3	1865.3
55	10/20/2016 15:38	1935.3	1865.3
56	10/20/2016 15:39	1930.4	1860.4
57	10/20/2016 15:40	1926.1	1856.1
58	10/20/2016 15:41	1920.6	1850.6
59	10/20/2016 15:42	1922.5	1852.5
60	10/20/2016 15:43	1924.3	1854.3
61	10/20/2016 15:44	1923.7	1853.7
62	10/20/2016 15:45	1916.4	1846.4
63	10/20/2016 15:46	1909	1839
64	10/20/2016 15:47	1902.3	1832.3
65	10/20/2016 15:48	1898	1828
66	10/20/2016 15:49	1894.4	1824.4
67	10/20/2016 15:50	1890.1	1820.1
68	10/20/2016 15:51	1886.4	1816.4
69	10/20/2016 15:52	1880.3	1810.3
70	10/20/2016 15:53	1874.8	1804.8
71	10/20/2016 15:54	1867.5	1797.5
72	10/20/2016 15:55	1860.8	1790.8
73	10/20/2016 15:56	1852.3	1782.3
74	10/20/2016 15:57	1848.6	1778.6
75	10/20/2016 15:58	1840.7	1770.7
76	10/20/2016 15:59	1838.8	1768.8
77	10/20/2016 16:00	1838.8	1768.8
78	10/20/2016 16:01	1833.9	1763.9
79	10/20/2016 16:02	1832.7	1762.7
80	10/20/2016 16:03	1822.3	1752.3
81	10/20/2016 16:04	1825.4	1755.4
82	10/20/2016 16:05	1224.1	1154.1
83	10/20/2016 16:06	838.2	768.2

84	10/20/2016 16:07	689.9	619.9
85	10/20/2016 16:08	569	499
86	10/20/2016 16:09	464	394
87	10/20/2016 16:10	493.3	423.3
88	10/20/2016 16:11	471.3	401.3
89	10/20/2016 16:12	551.9	481.9
90	10/20/2016 16:13	482.3	412.3
91	10/20/2016 16:14	476.2	406.2
92	10/20/2016 16:15	481.1	411.1
93	10/20/2016 16:16	614.2	544.2
94	10/20/2016 16:16		-70
95	10/20/2016 16:17	607.4	537.4

Logged

Plot Title: Dakotah's Dorm Room Sunset Hall

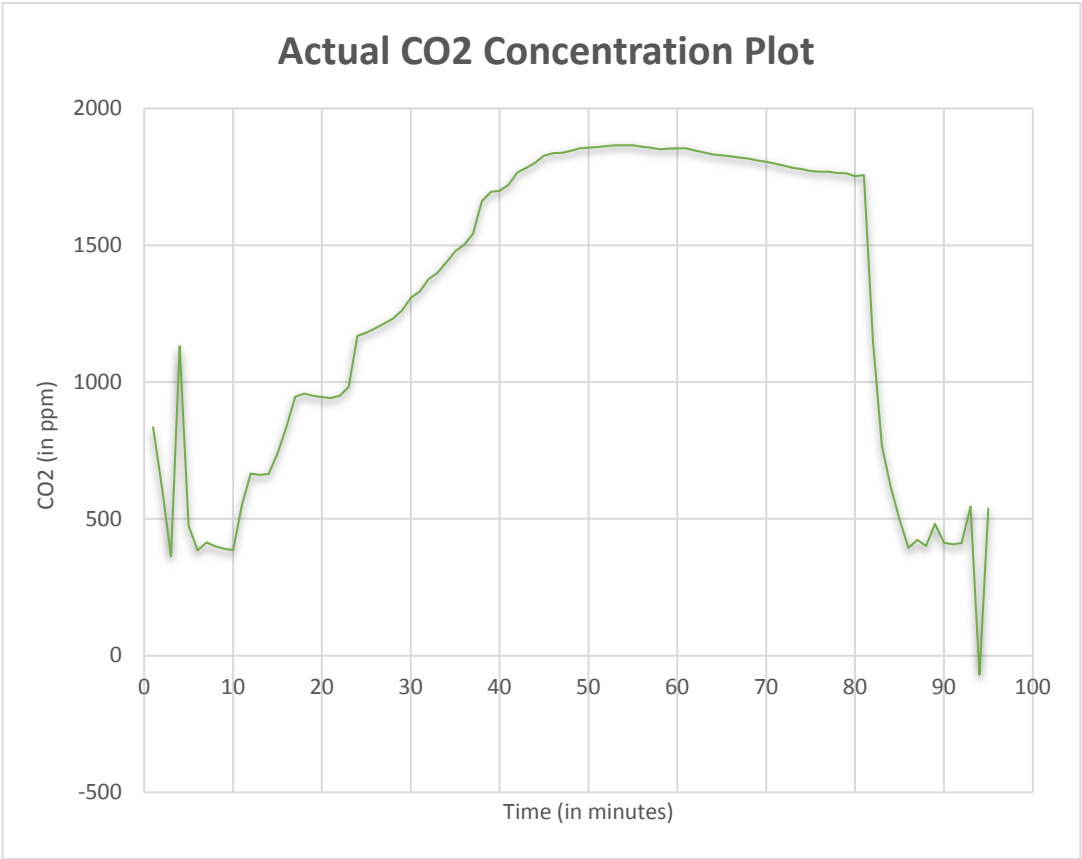
Date Time, CO2, ppm (Host Conn€ End Of File (LGR S/N: 1279119)

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5	#####	544
6	#####	454.8
7	#####	484.1
8	#####	469.5
9	#####	460.3
10	#####	456
11	#####	623.3
12	#####	735
13	#####	730.2
14	#####	733.8
15	#####	810.7
16	#####	904.2
17	#####	1015.9
18	#####	1028.1
19	#####	1020.1
20	#####	1015.3
21	#####	1011
22	#####	1020.1
23	#####	1052.5
24	#####	1238.7
25	#####	1249.7
26	#####	1266.8
27	#####	1283.9
28	#####	1302.2
29	#####	1330.9
30	#####	1377.3
31	#####	1401.1
32	#####	1445.7
33	#####	1469.5
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35	#####	1548.8
36	#####	1570.8
37	#####	1612.3
38	#####	1730.8
39	#####	1765
40	#####	1768
41	#####	1791.2
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46	#####	1906.6
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66	#####	1894.4
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71	#####	1867.5
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74	#####	1848.6
75	#####	1840.7
76	#####	1838.8
77	#####	1838.8
78	#####	1833.9
79	#####	1832.7
80	#####	1822.3
81	#####	1825.4
82	#####	1224.1
83	#####	838.2
84	#####	689.9
85	#####	569
86	#####	464
87	#####	493.3
88	#####	471.3
89	#####	551.9
90	#####	482.3
91	#####	476.2
92	#####	481.1

93	#####	614.2	
94	#####		Logged
95	#####	607.4	Logged

Actual CO2 Concentration Plot



Input Parameters

Column1	Column2
Measured outdoor CO2 (ppm)	470
Assumed CO2 (ppm)	400
Correction Factor (ppm)	70
Volume of Room (feet^3)	1287
Room Capacity	2

Analysis

Minutes	Time (min)	Hobo CO2 (ppm)	Actual CO2 (ppm)	Time (hour)	LN FUNCTION
0	10/20/2016 15:36	1935.3	1865.3	0.0000	0
1	10/20/2016 15:39	1930.4	1860.4	0.0167	0.003349629
2	10/20/2016 15:40	1926.1	1856.1	0.0333	0.006298371
3	10/20/2016 15:41	1920.6	1850.6	0.0500	0.010082736
4	10/20/2016 15:42	1922.5	1852.5	0.0667	0.00877379
5	10/20/2016 15:43	1924.3	1854.3	0.0833	0.007535314
6	10/20/2016 15:44	1923.7	1853.7	0.1000	0.007947969
7	10/20/2016 15:45	1916.4	1846.4	0.1167	0.012982289
8	10/20/2016 15:46	1909	1839	0.1333	0.018111572
9	10/20/2016 15:47	1902.3	1832.3	0.1500	0.022778456
10	10/20/2016 15:48	1898	1828	0.1667	0.025785136
11	10/20/2016 15:49	1894.4	1824.4	0.1833	0.028309327
12	10/20/2016 15:50	1890.1	1820.1	0.2000	0.031332708
13	10/20/2016 15:51	1886.4	1816.4	0.2167	0.033941558
14	10/20/2016 15:52	1880.3	1810.3	0.2333	0.038257552
15	10/20/2016 15:53	1874.8	1804.8	0.2500	0.042165056
16	10/20/2016 15:54	1867.5	1797.5	0.2667	0.047375074
17	10/20/2016 15:55	1860.8	1790.8	0.2833	0.052180879
18	10/20/2016 15:56	1852.3	1782.3	0.3000	0.058311221
19	10/20/2016 15:57	1848.6	1778.6	0.3167	0.060991508
20	10/20/2016 15:58	1840.7	1770.7	0.3333	0.066738441
21	10/20/2016 15:59	1838.8	1768.8	0.3500	0.068125556
22	10/20/2016 16:01	1833.9	1763.9	0.3667	0.071711757
23	10/20/2016 16:02	1832.7	1762.7	0.3833	0.072591974
24	10/20/2016 16:03	1822.3	1752.3	0.4000	0.080253153
25	10/20/2016 16:04	1825.4	1755.4	0.4167	0.077963386

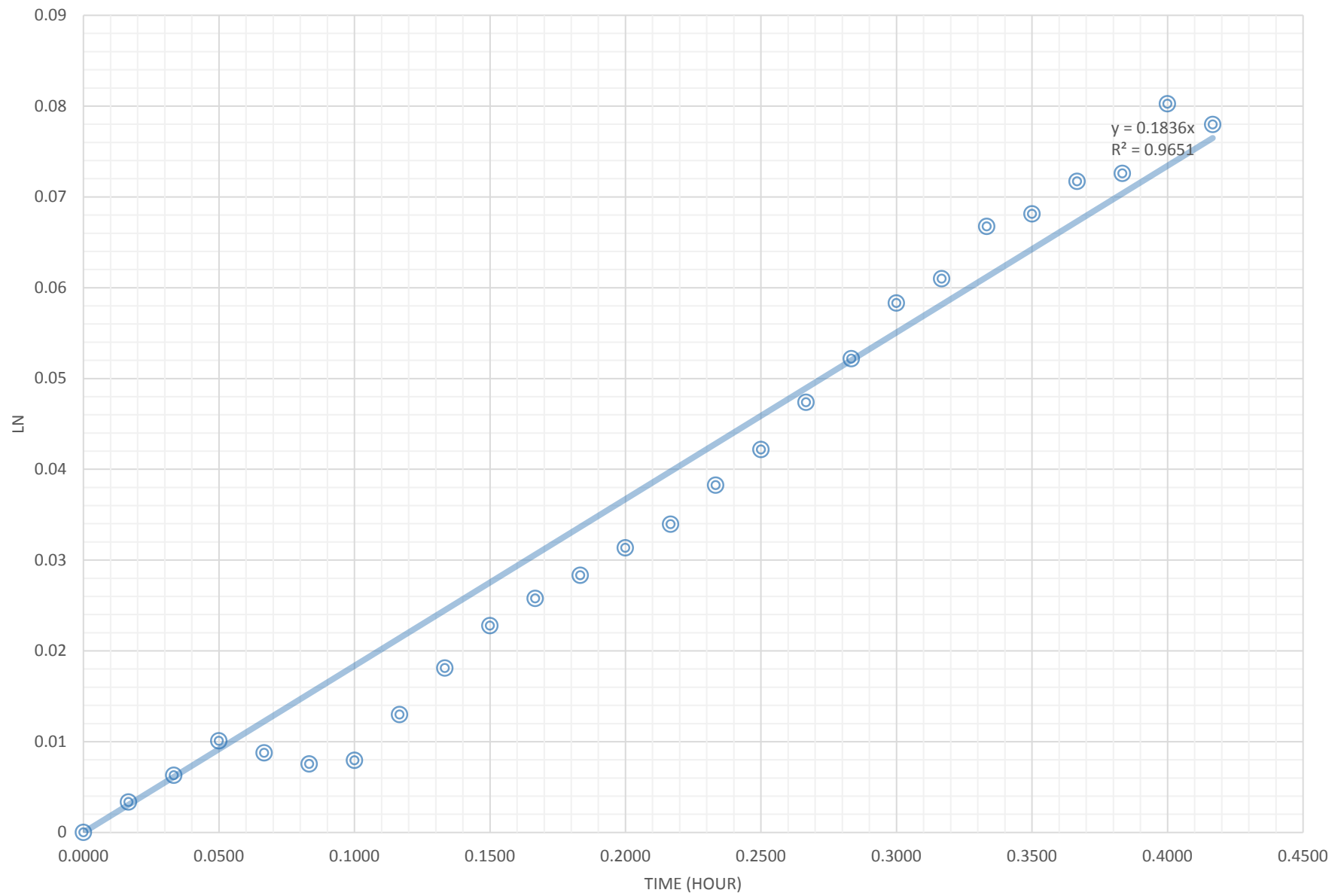
Input Parameters

Column1	Column2
Measured outdoor CO2 (ppm)	470
Assumed CO2 (ppm)	400
Correction Factor (ppm)	70
Volume of Room (feet^3)	1287
Room Capacity	2
Air Exchange Rate (per hour)	0.184

Ventilation Rate (scfm/person)

1.97

Air Exchange Rate for Dorm Room



Question 1: What is the air exchange rate of the room you tested?

I calculated an air exchange rate of .184 per hour in the dorm room.

Question 2: In general it takes $3/(\text{the air exchange rate})$ to remove a non-reactive chemical from the indoor air. Based on this time, what recommendations would you make to the occupants of the room?

When I did this calculation I got an answer of 16.3 hours, so I would recommend they keep the windows open and have a box fan to keep the air circulating as much as possible so chemicals do not stay in the air for that long.

16.3

Question 3: Compare your ventilation rate for a typical number of occupants to the ASHRAE recommend ventilation rate. Based on this comparison, are the occupants wasting energy heating and cooling the air or are the occupants being too cheap and not supplying enough air?

When I compared my rate of 1.97 scfm/person to that of the recommended 15 scfm/person, I concluded that the occupants are being too cheap and not supplying enough air because of how my number is significantly lower than that of the recommended amount.

Question 4: Given the ASHRAE standard ventilation standard, what is the maximum number of people you would recommend having in this room at one time? Use your model to determine this number.

It is difficult to accurately say how many people should be in the dorm room at any given time because the air flow is so poor that even having one person in at any given time does not mean that standards. Since it is impossible to have part of a person in a room, I would have to say that no one should be in the room at any given time.