

Erik Nichols
ENGR 115
Friday 11am
April 1st 2016

Input parameters:

Measured Coutdoor	420
Assumed Coutdoor	400
Correction Factor	20

Analysis:

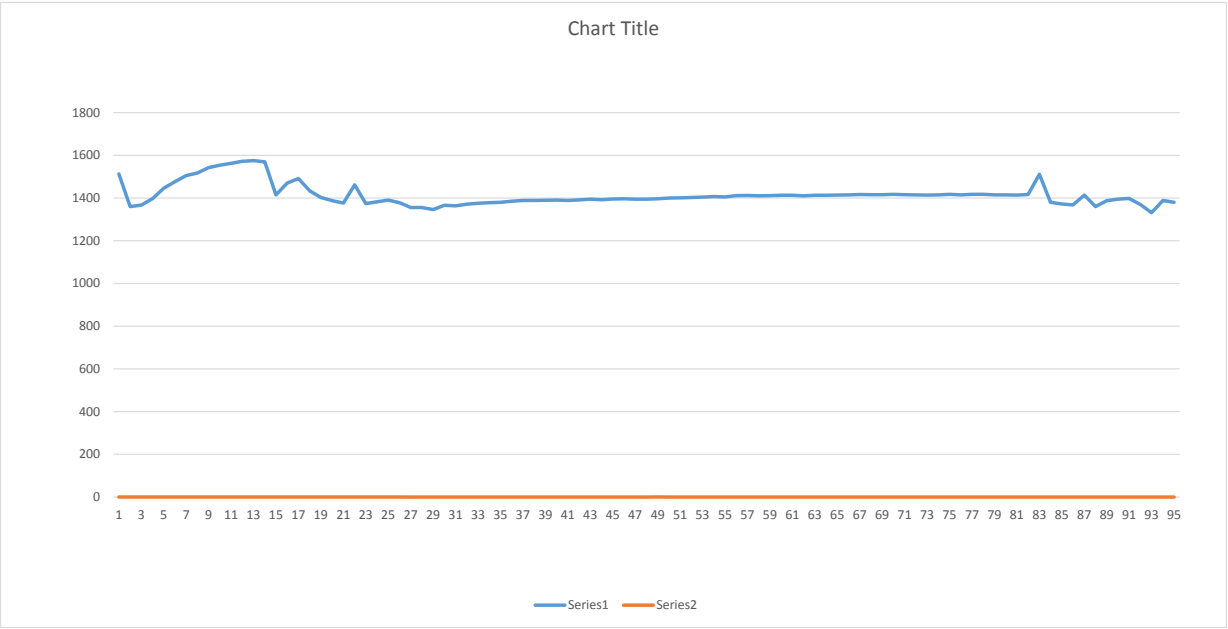
Measurment	Hobo CO2 Concentration	Actual CO2 Concentration (ppm)	Date and Time
1	1533	1513	11:48:05 AM
2	1379.7	1359.7	11:49:05 AM
3	1387.1	1367.1	11:50:05 AM
4	1417.6	1397.6	11:51:05 AM
5	1466.4	1446.4	11:52:05 AM
6	1496.9	1476.9	11:53:05 AM
7	1525	1505	11:54:05 AM
8	1537.9	1517.9	11:55:05 AM
9	1562.3	1542.3	11:56:05 AM
10	1573.9	1553.9	11:57:05 AM
11	1582.4	1562.4	11:58:05 AM
12	1592.2	1572.2	11:59:05 AM
13	1595.2	1575.2	12:00:05 PM
14	1589.7	1569.7	12:01:05 PM
15	1435.3	1415.3	12:02:05 PM
16	1490.2	1470.2	12:03:05 PM
17	1511.6	1491.6	12:04:05 PM
18	1454.2	1434.2	12:05:05 PM
19	1423.1	1403.1	12:06:05 PM
20	1407.8	1387.8	12:07:05 PM
21	1396.8	1376.8	12:08:05 PM
22	1481.7	1461.7	12:09:05 PM
23	1393.8	1373.8	12:10:05 PM
24	1402.9	1382.9	12:11:05 PM
25	1410.9	1390.9	12:12:05 PM
26	1398	1378	12:13:05 PM
27	1375.5	1355.5	12:14:05 PM
28	1375.5	1355.5	12:15:05 PM
29	1366.3	1346.3	12:16:05 PM
30	1386.4	1366.4	12:17:05 PM
31	1383.4	1363.4	12:18:05 PM
32	1391.3	1371.3	12:19:05 PM
33	1395.6	1375.6	12:20:05 PM
34	1398.7	1378.7	12:21:05 PM
35	1399.9	1379.9	12:22:05 PM
36	1405.4	1385.4	12:23:05 PM
37	1408.4	1388.4	12:24:05 PM
38	1409	1389	12:25:05 PM
39	1409.6	1389.6	12:26:05 PM
40	1410.9	1390.9	12:27:05 PM
41	1408.4	1388.4	12:28:05 PM
42	1411.5	1391.5	12:29:05 PM
43	1414.5	1394.5	12:30:05 PM

44	1412.1
45	1415.8
46	1416.4
47	1414.5
48	1415.1
49	1417
50	1420
51	1420.6
52	1423.1
53	1424.3
54	1426.7
55	1425.5
56	1431.6
57	1432.2
58	1430.4
59	1431.6
60	1432.8
61	1433.5
62	1430.4
63	1432.8
64	1433.5
65	1434.1
66	1434.7
67	1436.5
68	1435.9
69	1435.9
70	1437.1
71	1435.9
72	1435.3
73	1434.1
74	1434.7
75	1437.1
76	1434.7
77	1437.7
78	1437.7
79	1435.3
80	1435.3
81	1434.1
82	1436.5
83	1531.1
84	1400.5
85	1392.6
86	1387.7
87	1434.1
88	1379.7

1392.1	12:31:05 PM
1395.8	12:32:05 PM
1396.4	12:33:05 PM
1394.5	12:34:05 PM
1395.1	12:35:05 PM
1397	12:36:05 PM
1400	12:37:05 PM
1400.6	12:38:05 PM
1403.1	12:39:05 PM
1404.3	12:40:05 PM
1406.7	12:41:05 PM
1405.5	12:42:05 PM
1411.6	12:43:05 PM
1412.2	12:44:05 PM
1410.4	12:45:05 PM
1411.6	12:46:05 PM
1412.8	12:47:05 PM
1413.5	12:48:05 PM
1410.4	12:49:05 PM
1412.8	12:50:05 PM
1413.5	12:51:05 PM
1414.1	12:52:05 PM
1414.7	12:53:05 PM
1416.5	12:54:05 PM
1415.9	12:55:05 PM
1415.9	12:56:05 PM
1417.1	12:57:05 PM
1415.9	12:58:05 PM
1415.3	12:59:05 PM
1414.1	1:00:05 PM
1414.7	1:01:05 PM
1417.1	1:02:05 PM
1414.7	1:03:05 PM
1417.7	1:04:05 PM
1417.7	1:05:05 PM
1415.3	1:06:05 PM
1415.3	1:07:05 PM
1414.1	1:08:05 PM
1416.5	1:09:05 PM
1511.1	1:10:05 PM
1380.5	1:11:05 PM
1372.6	1:12:05 PM
1367.7	1:13:05 PM
1414.1	1:14:05 PM
1359.7	1:15:05 PM

89	1407.8
90	1414.5
91	1418.2
92	1389.5
93	1351.6
94	1409
95	1399.9

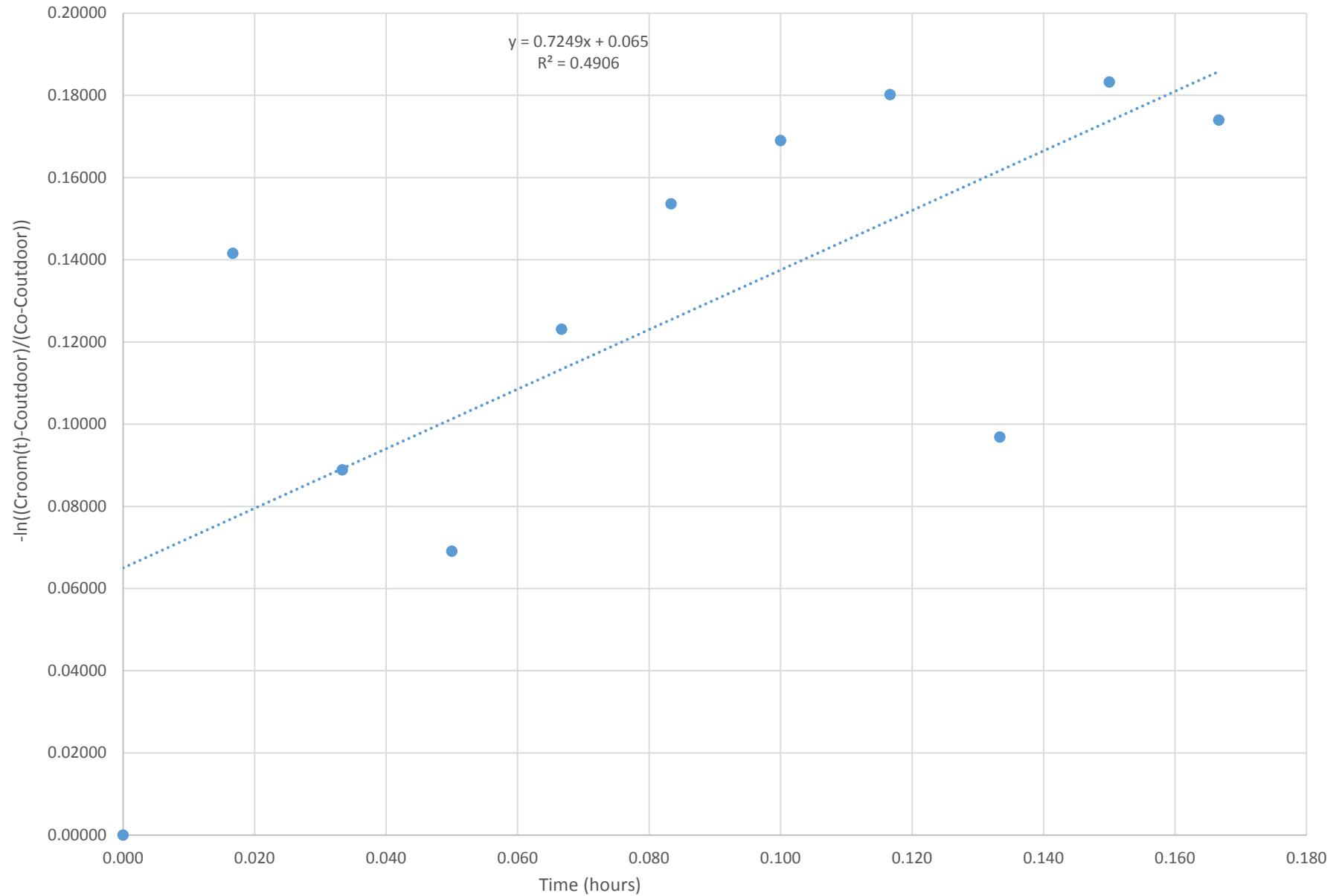
1387.8	1:16:05 PM
1394.5	1:17:05 PM
1398.2	1:18:05 PM
1369.5	1:19:05 PM
1331.6	1:20:05 PM
1389	1:21:05 PM
1379.9	1:22:05 PM



Input parameters:	
Measured Coutdoor	420
Assumed Coutdoor	400
Correction Factor	20
Room Volume (ft3)	1538.7
Room Capacity (people)	2
Calculations:	
Air Exchange Rate (1/hr)	0.725
Time to remove non-reactive chemical (hr)	4.139
Ventilation Rate (ft3/min/person)	9.295

Measurment	Hobo CO2 Concentration	Actual CO2 Concentration (ppm)	Date and Time	Experiment Time (hr)	-LN((Croom(t)-Coutdoor)/(Co-Coutdoor))
0	1589.7	1569.7	12:01:05 PM	0.000	0.00000
1	1435.3	1415.3	12:02:05 PM	0.017	0.14156
2	1490.2	1470.2	12:03:05 PM	0.033	0.08890
3	1511.6	1491.6	12:04:05 PM	0.050	0.06910
4	1454.2	1434.2	12:05:05 PM	0.067	0.12312
5	1423.1	1403.1	12:06:05 PM	0.083	0.15365
6	1407.8	1387.8	12:07:05 PM	0.100	0.16902
7	1396.8	1376.8	12:08:05 PM	0.117	0.18022
8	1481.7	1461.7	12:09:05 PM	0.133	0.09688
9	1393.8	1373.8	12:10:05 PM	0.150	0.18330
10	1402.9	1382.9	12:11:05 PM	0.167	0.17400

Determining Air Exchange Rate for Dorm Room



Lab Questions

1. What is the air exchange rate (λ) of the room you tested? Be sure to include the units for the air exchange rate in your answer.	The air exchange rate in the room we tested was 0.725/hr.
2. In general it takes $3/\lambda$ hours to remove a non-reactive chemical from indoor air. Based on this time, what recommendations would you make to the occupants of the room?	Some recommendations I would make for the occupants of the room is to make sure they have proper ventilation to increase air flow and decrease the amount of CO ₂ built up. If there are more people in the room there will be more CO ₂ , so I would recommend not to overpack the small room with the windows shut.
3. Compare your ventilation rate for a typical number of occupants to the ASHRAE recommended 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? Justify your answer.	My ventilation rate was 3.78 ft ³ /min/person, and the ASHRAE recommended ventilation rate is 15ft ³ /min/person. This means our ventilation rate was way low for the room we were in. Since our ventilation rate is way low, the occupants would be not supplying enough air. If we were over the ventilation rate we would be wasting energy, and not adding to the room.
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.	I would recommend having 2 people in this room. When there are two people in the room the ventilation rate would be 9.3ft ³ /min/person, and that would be the closest to the ASHRAE recommendation. If there was one person in the room it would reach the recommendation, but two people in the room is still safe. This room doesn't have good ventilation so keeping windows open, and increasing ventilation would be recommended as well.