

Plot Title: Library 312		
#	Date Time, GMT-07:00	CO2, ppm (LGR S/N: 9789942, SEN S/N: 9789942)
1	4/1/2016 11:41	654.5
2	4/1/2016 11:42	682.5
3	4/1/2016 11:43	636.1
4	4/1/2016 11:44	406
5	4/1/2016 11:45	402.9
6	4/1/2016 11:46	409.6
7	4/1/2016 11:47	382.2
8	4/1/2016 11:48	385.8
9	4/1/2016 11:49	378.5
10	4/1/2016 11:50	386.4
11	4/1/2016 11:51	449.9
12	4/1/2016 11:52	544.6
13	4/1/2016 11:53	562.3
14	4/1/2016 11:54	550.7
15	4/1/2016 11:55	557.4
16	4/1/2016 11:56	573.3
17	4/1/2016 11:57	617.8
18	4/1/2016 11:58	623.3
19	4/1/2016 11:59	640.4
20	4/1/2016 12:00	641
21	4/1/2016 12:01	642.9
22	4/1/2016 12:02	659.3
23	4/1/2016 12:03	670.9
24	4/1/2016 12:04	683.8
25	4/1/2016 12:05	700.9
26	4/1/2016 12:06	710.6
27	4/1/2016 12:07	679.5
28	4/1/2016 12:08	704.5
29	4/1/2016 12:09	703.3
30	4/1/2016 12:10	711.2
31	4/1/2016 12:11	734.4
32	4/1/2016 12:12	744.2
33	4/1/2016 12:13	733.8
34	4/1/2016 12:14	728.3
35	4/1/2016 12:15	766.8

36	4/1/2016 12:16	768
37	4/1/2016 12:17	774.7
38	4/1/2016 12:18	735.7
39	4/1/2016 12:19	736.9
40	4/1/2016 12:20	772.9
41	4/1/2016 12:21	735.7
42	4/1/2016 12:22	727.7
43	4/1/2016 12:23	747.3
44	4/1/2016 12:24	721.6
45	4/1/2016 12:25	703.3
46	4/1/2016 12:26	701.5
47	4/1/2016 12:27	706.3
48	4/1/2016 12:28	701.5
49	4/1/2016 12:29	694.7
50	4/1/2016 12:30	658.7
51	4/1/2016 12:31	667.9
52	4/1/2016 12:32	660
53	4/1/2016 12:33	641
54	4/1/2016 12:34	632.5
55	4/1/2016 12:35	619.7
56	4/1/2016 12:36	623.3
57	4/1/2016 12:37	638.6
58	4/1/2016 12:38	628.8
59	4/1/2016 12:39	605.6
60	4/1/2016 12:40	606.8
61	4/1/2016 12:41	580
62	4/1/2016 12:42	586.1
63	4/1/2016 12:43	586.1
64	4/1/2016 12:44	576.9
65	4/1/2016 12:45	580
66	4/1/2016 12:46	576.3

Jessica Horton
 ENGR 115
 4/1/2016

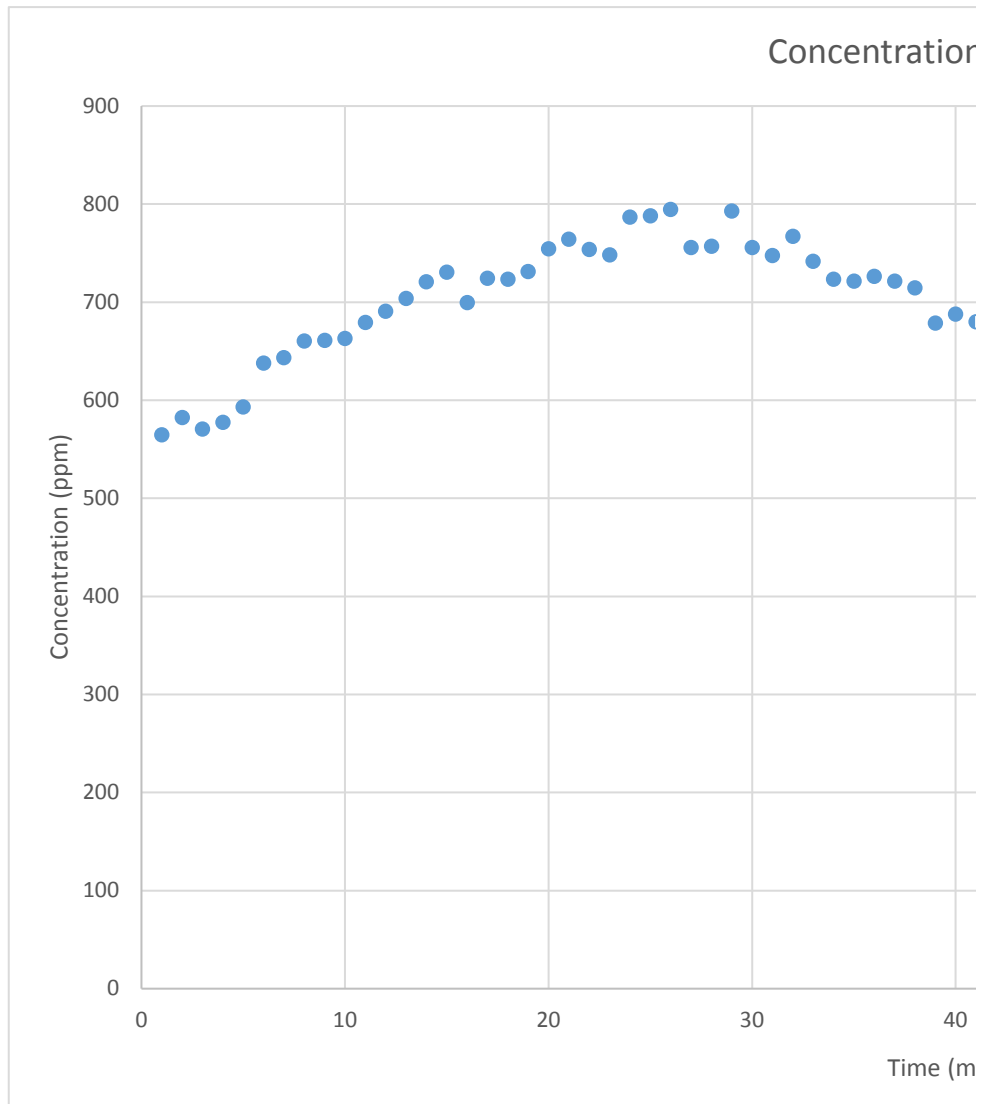
Input Parameters:

C-outdoor (ppm) 380
 Assumed C-outdoor (ppm) 400
 correction (ppm) 20

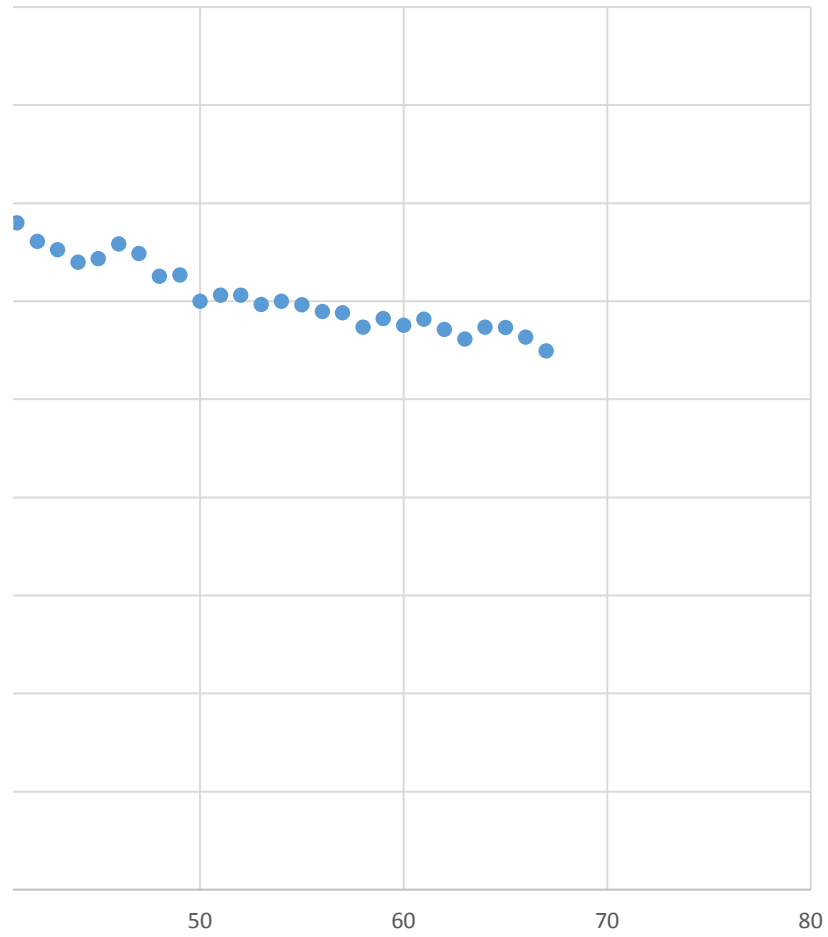
Analysis

Measurement	Date and Time	Hobo CO2 concentration (ppm)	Actual CO2 Concentration (ppm)
1	4/1/2016 11:52	544.6	564.6 Time Start
2	4/1/2016 11:53	562.3	582.3
3	4/1/2016 11:54	550.7	570.7
4	4/1/2016 11:55	557.4	577.4
5	4/1/2016 11:56	573.3	593.3
6	4/1/2016 11:57	617.8	637.8
7	4/1/2016 11:58	623.3	643.3
8	4/1/2016 11:59	640.4	660.4
9	4/1/2016 12:00	641	661
10	4/1/2016 12:01	642.9	662.9
11	4/1/2016 12:02	659.3	679.3
12	4/1/2016 12:03	670.9	690.9
13	4/1/2016 12:04	683.8	703.8
14	4/1/2016 12:05	700.9	720.9
15	4/1/2016 12:06	710.6	730.6
16	4/1/2016 12:07	679.5	699.5
18	4/1/2016 12:08	704.5	724.5
19	4/1/2016 12:09	703.3	723.3
20	4/1/2016 12:10	711.2	731.2
21	4/1/2016 12:11	734.4	754.4
22	4/1/2016 12:12	744.2	764.2
23	4/1/2016 12:13	733.8	753.8
24	4/1/2016 12:14	728.3	748.3
25	4/1/2016 12:15	766.8	786.8 Time source ends
26	4/1/2016 12:16	768	788
27	4/1/2016 12:17	774.7	794.7
28	4/1/2016 12:18	735.7	755.7
29	4/1/2016 12:19	736.9	756.9
30	4/1/2016 12:20	772.9	792.9
31	4/1/2016 12:21	735.7	755.7
32	4/1/2016 12:22	727.7	747.7

33	4/1/2016 12:23	747.3	767.3
34	4/1/2016 12:24	721.6	741.6
35	4/1/2016 12:25	703.3	723.3
36	4/1/2016 12:26	701.5	721.5
37	4/1/2016 12:27	706.3	726.3
38	4/1/2016 12:28	701.5	721.5
39	4/1/2016 12:29	694.7	714.7
40	4/1/2016 12:30	658.7	678.7
41	4/1/2016 12:31	667.9	687.9
42	4/1/2016 12:32	660	680
43	4/1/2016 12:33	641	661
45	4/1/2016 12:34	632.5	652.5
46	4/1/2016 12:35	619.7	639.7
47	4/1/2016 12:36	623.3	643.3
48	4/1/2016 12:37	638.6	658.6
49	4/1/2016 12:38	628.8	648.8
50	4/1/2016 12:39	605.6	625.6
51	4/1/2016 12:40	606.8	626.8
52	4/1/2016 12:41	580	600
53	4/1/2016 12:42	586.1	606.1
54	4/1/2016 12:43	586.1	606.1
55	4/1/2016 12:44	576.9	596.9
56	4/1/2016 12:45	580	600
57	4/1/2016 12:46	576.3	596.3
58	4/1/2016 12:47	569.6	589.6
59	4/1/2016 12:48	568.4	588.4
60	4/1/2016 12:49	553.7	573.7
61	4/1/2016 12:50	562.3	582.3
62	4/1/2016 12:51	555.6	575.6
63	4/1/2016 12:52	561.7	581.7
64	4/1/2016 12:53	551.3	571.3
65	4/1/2016 12:54	541.5	561.5
66	4/1/2016 12:55	553.7	573.7
67	4/1/2016 12:56	553.1	573.1
68	4/1/2016 12:57	543.3	563.3
69	4/1/2016 12:58	529.3	549.3 Time end



Plot



minutes)

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ENGR 115
4/8/2016

Input Parameters:	
C-outdoor (ppm)	380
Assumed C-outdoor (ppm)	400
correction (ppm)	20
Room Volume (ft ³)	2195
Room Capacity (people)	6

Calculations:	
Air exchange Rate (1/hr)	1.574
Time to Remove Non-Reactive Chemical (hr)	1.906
Venatalation Rate (ft ³ /min/person)	9.593

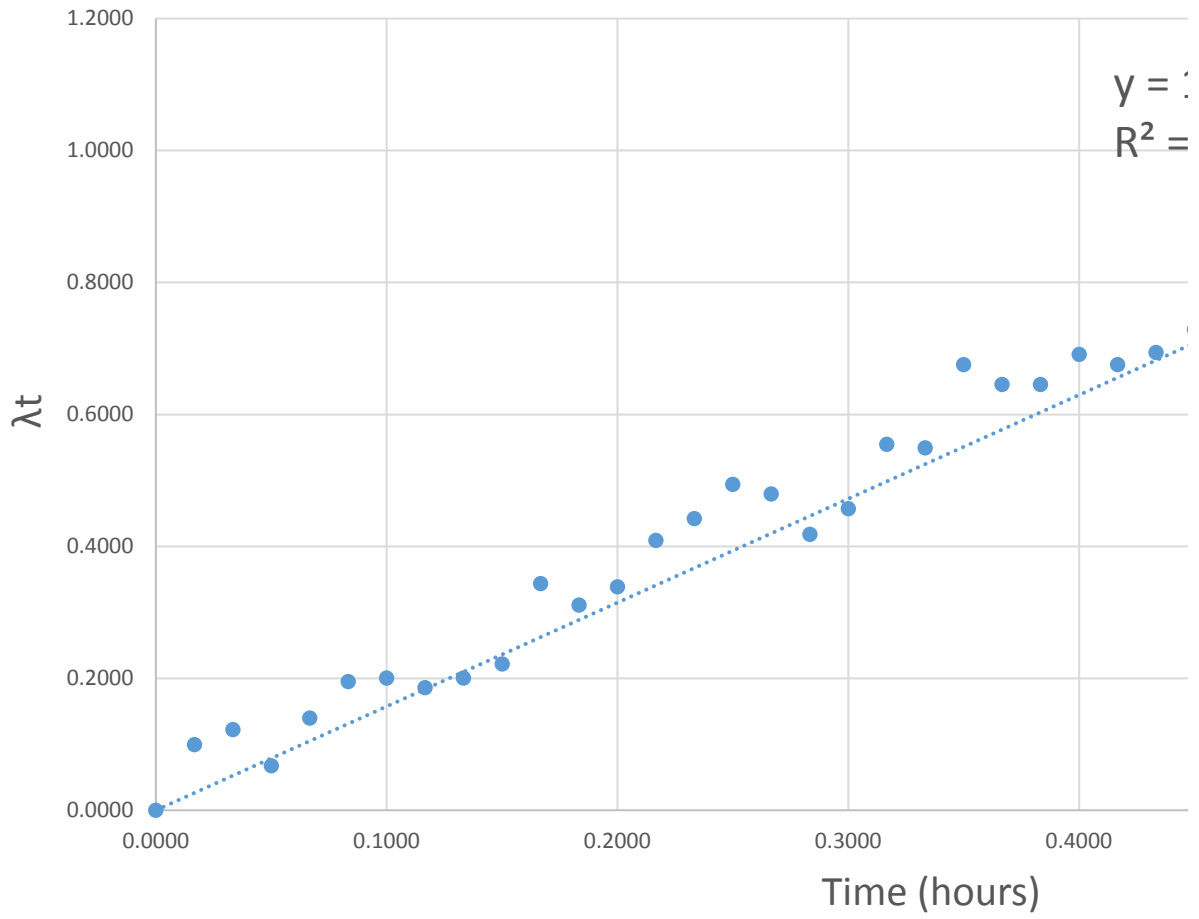
Analysis:				
Measurement	Date and Time	Hobo CO2 concentration (ppm)	Actual CO2 Concentration (ppm)	experiment time (hr)
0	4/1/2016 12:20	772.9	792.9	0.0000
1	4/1/2016 12:21	735.7	755.7	0.0167
2	4/1/2016 12:22	727.7	747.7	0.0333
3	4/1/2016 12:23	747.3	767.3	0.0500
4	4/1/2016 12:24	721.6	741.6	0.0667
5	4/1/2016 12:25	703.3	723.3	0.0833
6	4/1/2016 12:26	701.5	721.5	0.1000
7	4/1/2016 12:27	706.3	726.3	0.1167
8	4/1/2016 12:28	701.5	721.5	0.1333
9	4/1/2016 12:29	694.7	714.7	0.1500
10	4/1/2016 12:30	658.7	678.7	0.1667
11	4/1/2016 12:31	667.9	687.9	0.1833
12	4/1/2016 12:32	660.0	680.0	0.2000
13	4/1/2016 12:33	641.0	661.0	0.2167
14	4/1/2016 12:34	632.5	652.5	0.2333
15	4/1/2016 12:35	619.7	639.7	0.2500
16	4/1/2016 12:36	623.3	643.3	0.2667
17	4/1/2016 12:37	638.6	658.6	0.2833
18	4/1/2016 12:38	628.8	648.8	0.3000
19	4/1/2016 12:39	605.6	625.6	0.3167
20	4/1/2016 12:40	606.8	626.8	0.3333
21	4/1/2016 12:41	580.0	600.0	0.3500

22	4/1/2016 12:42	586.1	606.1	0.3667
23	4/1/2016 12:43	586.1	606.1	0.3833
24	4/1/2016 12:44	576.9	596.9	0.4000
25	4/1/2016 12:45	580.0	600.0	0.4167
26	4/1/2016 12:46	576.3	596.3	0.4333
27	4/1/2016 12:47	569.6	589.6	0.4500
28	4/1/2016 12:48	568.4	588.4	0.4667
29	4/1/2016 12:49	553.7	573.7	0.483
30	4/1/2016 12:50	562.3	582.3	0.500
31	4/1/2016 12:51	555.6	575.6	0.517
32	4/1/2016 12:52	561.7	581.7	0.533
33	4/1/2016 12:53	551.3	571.3	0.550
34	4/1/2016 12:54	541.5	561.5	0.567
35	4/1/2016 12:55	553.7	573.7	0.583
36	4/1/2016 12:56	553.1	573.1	0.600
37	4/1/2016 12:57	543.3	563.3	0.617
38	4/1/2016 12:58	529.3	549.3	0.633

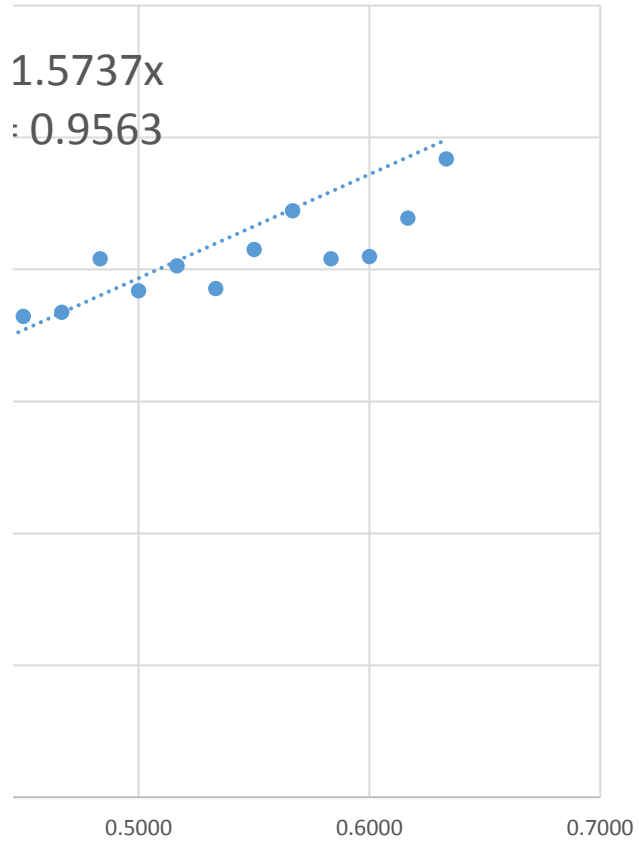
λt
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0.0995
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0.0674
0.1399
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0.3434
0.3109
0.3388
0.4090
0.4421
0.4942
0.4793
0.4183
0.4569
0.5548
0.5495
0.6752

0.6452
0.6452
0.6909
0.6752
0.6939
0.7286
0.7350
0.8162
0.7679
0.8053
0.7712
0.8301
0.8890
0.8162
0.8197
0.8780
0.9676

Determining the Air Exchange Rate for the Library



Study Room



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 of the room we tested came out to be 9.593 ft³/person.

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?

Because of the air exchange rate, the time a non-reactive chemical would take to leave the room would be very close to 2 hours. I would recommend the occupants of the room to not be inside more than needed and in order for this rate to speed up, opening up a window if possible would also help further ventilate.

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.

The occupants of the room we tested would be considered wasting the energy because of there not being enough people in the room to meet the standard 15 scfm/person. The volume of the room was too big in comparison to the four of us in the room.

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.

The maximum amount of people I would recommend in the room measured is around 12 people.