

Plot Title:
Library
312

#						
	1	Date Time, GMT-07:00	CO2, ppm (LGR S/N: 9789942, SEN S/N: 9789942)	Host Connecte d (LGR S/N: 9789942)	Stopped (LGR S/N: 9789942)	End Of File (LGR S/N: 9789942)
	2	4/1/2016 11:41	654.5			
	3	4/1/2016 11:42	682.5			
	4	4/1/2016 11:43	636.1			
	5	4/1/2016 11:44	406			
	6	4/1/2016 11:45	402.9			
	7	4/1/2016 11:46	409.6			
	8	4/1/2016 11:47	382.2			
	9	4/1/2016 11:48	385.8			
	10	4/1/2016 11:49	378.5			
	11	4/1/2016 11:50	386.4			
	12	4/1/2016 11:51	449.9			
	13	4/1/2016 11:52	544.6			
	14	4/1/2016 11:53	562.3			
	15	4/1/2016 11:54	550.7			
	16	4/1/2016 11:55	557.4			
	17	4/1/2016 11:56	573.3			
	18	4/1/2016 11:57	617.8			
	19	4/1/2016 11:58	623.3			
	20	4/1/2016 11:59	640.4			
	21	4/1/2016 12:00	641			
	22	4/1/2016 12:01	642.9			
	23	4/1/2016 12:02	659.3			
	24	4/1/2016 12:03	670.9			
	25	4/1/2016 12:04	683.8			
	26	4/1/2016 12:05	700.9			
	27	4/1/2016 12:06	710.6			
	28	4/1/2016 12:07	679.5			
	29	4/1/2016 12:08	704.5			
	30	4/1/2016 12:09	703.3			
	31	4/1/2016 12:10	711.2			
	32	4/1/2016 12:11	734.4			
	33	4/1/2016 12:12	744.2			
	34	4/1/2016 12:13	733.8			
	35	4/1/2016 12:14	728.3			
	36	4/1/2016 12:15	766.8			
	37	4/1/2016 12:16	768			

38	4/1/2016 12:17	774.7			
39	4/1/2016 12:18	735.7			
40	4/1/2016 12:19	736.9			
41	4/1/2016 12:20	772.9			
42	4/1/2016 12:21	735.7			
43	4/1/2016 12:22	727.7			
44	4/1/2016 12:23	747.3			
45	4/1/2016 12:24	721.6			
46	4/1/2016 12:25	703.3			
47	4/1/2016 12:26	701.5			
48	4/1/2016 12:27	706.3			
49	4/1/2016 12:28	701.5			
50	4/1/2016 12:29	694.7			
51	4/1/2016 12:30	658.7			
52	4/1/2016 12:31	667.9			
53	4/1/2016 12:32	660			
54	4/1/2016 12:33	641			
55	4/1/2016 12:34	632.5			
56	4/1/2016 12:35	619.7			
57	4/1/2016 12:36	623.3			
58	4/1/2016 12:37	638.6			
59	4/1/2016 12:38	628.8			
60	4/1/2016 12:39	605.6			
61	4/1/2016 12:40	606.8			
62	4/1/2016 12:41	580			
63	4/1/2016 12:42	586.1			
64	4/1/2016 12:43	586.1			
65	4/1/2016 12:44	576.9			
66	4/1/2016 12:45	580			
67	4/1/2016 12:46	576.3			
68	4/1/2016 12:47	569.6			
69	4/1/2016 12:48	568.4			
70	4/1/2016 12:49	553.7			
71	4/1/2016 12:50	562.3			
72	4/1/2016 12:51	555.6			
73	4/1/2016 12:52	561.7			
74	4/1/2016 12:53	551.3			
75	4/1/2016 12:54	541.5			
76	4/1/2016 12:55	553.7			
77	4/1/2016 12:56	553.1			
78	4/1/2016 12:57	543.3			
79	4/1/2016 12:58	529.3			
80	4/1/2016 12:59	584.2			
81	4/1/2016 13:00	559.8			

82	4/1/2016 13:01	428			
83	4/1/2016 13:02	404.8			
84	4/1/2016 13:03	434.1			
85	4/1/2016 13:04	366.9			
86	4/1/2016 13:05	389.5			
87	4/1/2016 13:05		Logged		
	4/1/2016 13:06			Logged	Logged

Maria Miller
ENGR 115 [11 AM]
1-April-2016

Input Parameters

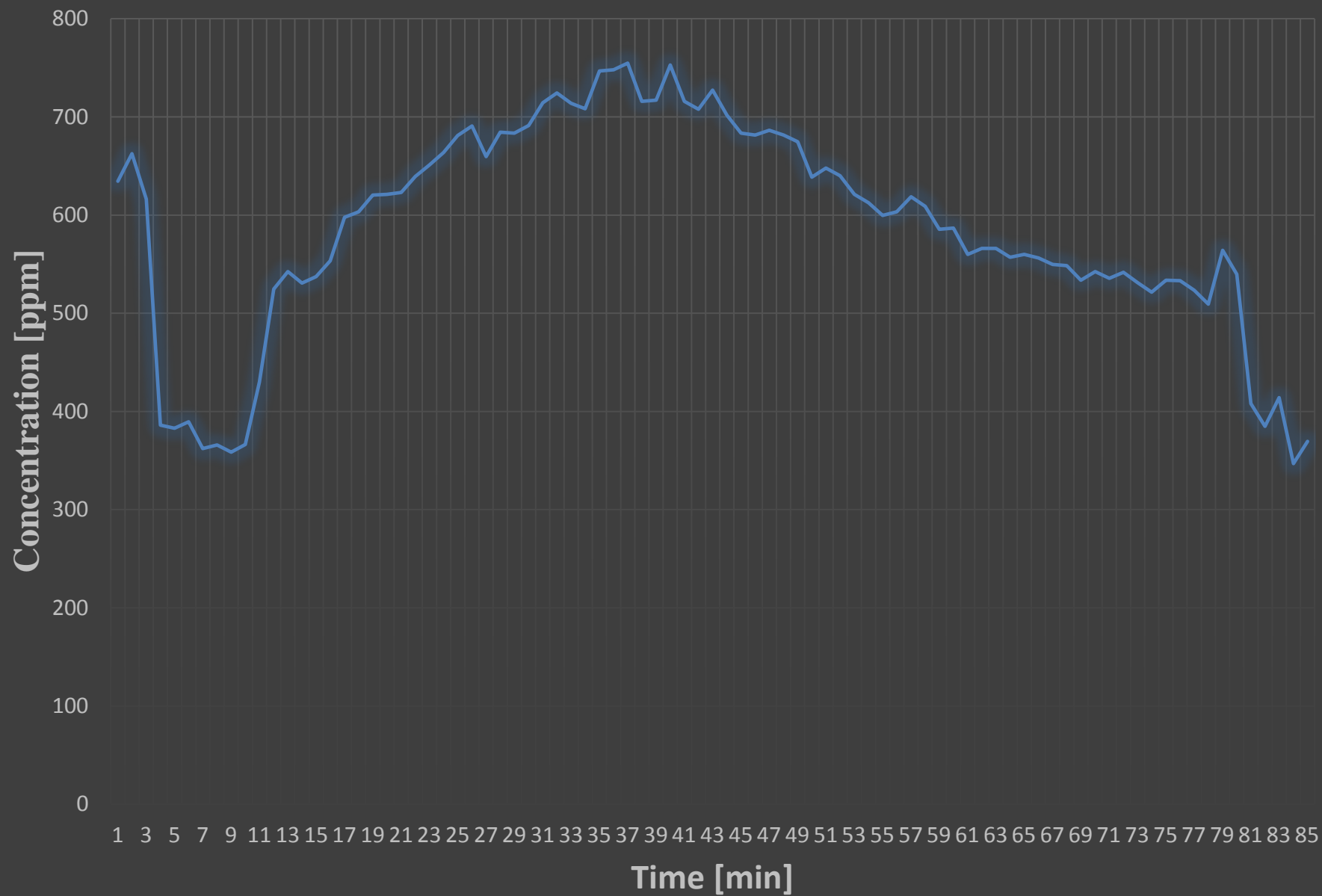
Measured Coutdoor [ppm]	420
Assumed Coutdoor [ppm]	400
Correction Factor [ppm]	-20

Analysis

Measurement	Date And Time	Hobo CO2 Concentration	Actual CO2 Concentration [ppm]
1	4/1/2016 11:41	654.5	634.5
2	4/1/2016 11:42	682.5	662.5
3	4/1/2016 11:43	636.1	616.1
4	4/1/2016 11:44	406	386
5	4/1/2016 11:45	402.9	382.9
6	4/1/2016 11:46	409.6	389.6
7	4/1/2016 11:47	382.2	362.2
8	4/1/2016 11:48	385.8	365.8
9	4/1/2016 11:49	378.5	358.5
10	4/1/2016 11:50	386.4	366.4
11	4/1/2016 11:51	449.9	429.9
12	4/1/2016 11:52	544.6	524.6
13	4/1/2016 11:53	562.3	542.3
14	4/1/2016 11:54	550.7	530.7
15	4/1/2016 11:55	557.4	537.4
16	4/1/2016 11:56	573.3	553.3
17	4/1/2016 11:57	617.8	597.8
18	4/1/2016 11:58	623.3	603.3
19	4/1/2016 11:59	640.4	620.4
20	4/1/2016 12:00	641	621
21	4/1/2016 12:01	642.9	622.9
22	4/1/2016 12:02	659.3	639.3
23	4/1/2016 12:03	670.9	650.9
24	4/1/2016 12:04	683.8	663.8
25	4/1/2016 12:05	700.9	680.9
26	4/1/2016 12:06	710.6	690.6
27	4/1/2016 12:07	679.5	659.5
28	4/1/2016 12:08	704.5	684.5
29	4/1/2016 12:09	703.3	683.3
30	4/1/2016 12:10	711.2	691.2
31	4/1/2016 12:11	734.4	714.4
32	4/1/2016 12:12	744.2	724.2
33	4/1/2016 12:13	733.8	713.8
34	4/1/2016 12:14	728.3	708.3
35	4/1/2016 12:15	766.8	746.8
36	4/1/2016 12:16	768	748
37	4/1/2016 12:17	774.7	754.7
38	4/1/2016 12:18	735.7	715.7
39	4/1/2016 12:19	736.9	716.9
40	4/1/2016 12:20	772.9	752.9

41	4/1/2016 12:21	735.7	715.7
42	4/1/2016 12:22	727.7	707.7
43	4/1/2016 12:23	747.3	727.3
44	4/1/2016 12:24	721.6	701.6
45	4/1/2016 12:25	703.3	683.3
46	4/1/2016 12:26	701.5	681.5
47	4/1/2016 12:27	706.3	686.3
48	4/1/2016 12:28	701.5	681.5
49	4/1/2016 12:29	694.7	674.7
50	4/1/2016 12:30	658.7	638.7
51	4/1/2016 12:31	667.9	647.9
52	4/1/2016 12:32	660	640
53	4/1/2016 12:33	641	621
54	4/1/2016 12:34	632.5	612.5
55	4/1/2016 12:35	619.7	599.7
56	4/1/2016 12:36	623.3	603.3
57	4/1/2016 12:37	638.6	618.6
58	4/1/2016 12:38	628.8	608.8
59	4/1/2016 12:39	605.6	585.6
60	4/1/2016 12:40	606.8	586.8
61	4/1/2016 12:41	580	560
62	4/1/2016 12:42	586.1	566.1
63	4/1/2016 12:43	586.1	566.1
64	4/1/2016 12:44	576.9	556.9
65	4/1/2016 12:45	580	560
66	4/1/2016 12:46	576.3	556.3
67	4/1/2016 12:47	569.6	549.6
68	4/1/2016 12:48	568.4	548.4
69	4/1/2016 12:49	553.7	533.7
70	4/1/2016 12:50	562.3	542.3
71	4/1/2016 12:51	555.6	535.6
72	4/1/2016 12:52	561.7	541.7
73	4/1/2016 12:53	551.3	531.3
74	4/1/2016 12:54	541.5	521.5
75	4/1/2016 12:55	553.7	533.7
76	4/1/2016 12:56	553.1	533.1
77	4/1/2016 12:57	543.3	523.3
78	4/1/2016 12:58	529.3	509.3
79	4/1/2016 12:59	584.2	564.2
80	4/1/2016 13:00	559.8	539.8
81	4/1/2016 13:01	428	408
82	4/1/2016 13:02	404.8	384.8
83	4/1/2016 13:03	434.1	414.1
84	4/1/2016 13:04	366.9	346.9
85	4/1/2016 13:05	389.5	369.5

Concentration Plot



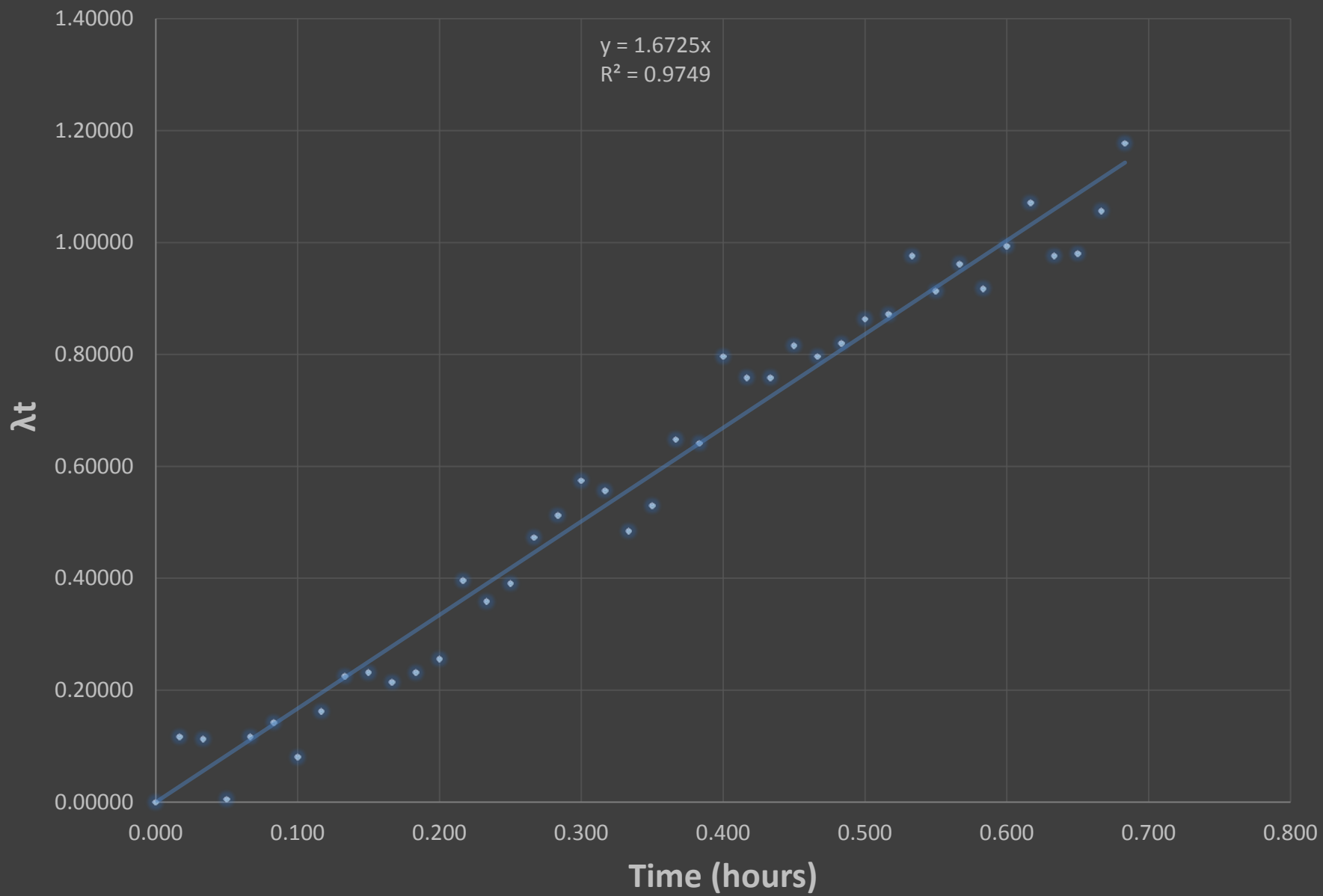
Maria Miller
ENGR 115 [11 AM]
1-April-2016

Input Parameters	
Measured Coutdoor [ppm]	420
Assumed Coutdoor [ppm]	400
Correction Factor [ppm]	-20
Room Volume [ft3]	2194.5
Room Capacity [People]	7

Calculations	
Air Exchange Rate [1/hr]	1.6808
Time To Remove Non-Reactive Chemical [hr]	1.78486435
Ventilation Rate [ft3/min/person]	8.78218

Analysis					
Measurement	Date And Time	Hobo CO2 Concentration	Actual CO2 Concentration [ppm]	Experiment Time [hr]	λt
	0 4/1/2016 12:17	774.7	754.7	0.000	0.00000
	1 4/1/2016 12:18	735.7	715.7	0.017	0.11648
	2 4/1/2016 12:19	736.9	716.9	0.033	0.11269
	3 4/1/2016 12:20	772.9	752.9	0.050	0.00509
	4 4/1/2016 12:21	735.7	715.7	0.067	0.11648
	5 4/1/2016 12:22	727.7	707.7	0.083	0.14215
	6 4/1/2016 12:23	747.3	727.3	0.100	0.08040
	7 4/1/2016 12:24	721.6	701.6	0.117	0.16217
	8 4/1/2016 12:25	703.3	683.3	0.133	0.22477
	9 4/1/2016 12:26	701.5	681.5	0.150	0.23114
	10 4/1/2016 12:27	706.3	686.3	0.167	0.21423
	11 4/1/2016 12:28	701.5	681.5	0.183	0.23114
	12 4/1/2016 12:29	694.7	674.7	0.200	0.25559
	13 4/1/2016 12:30	658.7	638.7	0.217	0.39606
	14 4/1/2016 12:31	667.9	647.9	0.233	0.35825
	15 4/1/2016 12:32	660	640	0.250	0.39063
	16 4/1/2016 12:33	641	621	0.267	0.47311
	17 4/1/2016 12:34	632.5	612.5	0.283	0.51233
	18 4/1/2016 12:35	619.7	599.7	0.300	0.57446
	19 4/1/2016 12:36	623.3	603.3	0.317	0.55659
	20 4/1/2016 12:37	638.6	618.6	0.333	0.48403
	21 4/1/2016 12:38	628.8	608.8	0.350	0.52990
	22 4/1/2016 12:39	605.6	585.6	0.367	0.64768
	23 4/1/2016 12:40	606.8	586.8	0.383	0.64123
	24 4/1/2016 12:41	580	560	0.400	0.79610
	25 4/1/2016 12:42	586.1	566.1	0.417	0.75868
	26 4/1/2016 12:43	586.1	566.1	0.433	0.75868
	27 4/1/2016 12:44	576.9	556.9	0.450	0.81566
	28 4/1/2016 12:45	580	560	0.467	0.79610
	29 4/1/2016 12:46	576.3	556.3	0.483	0.81950
	30 4/1/2016 12:47	569.6	549.6	0.500	0.86331
	31 4/1/2016 12:48	568.4	548.4	0.517	0.87136
	32 4/1/2016 12:49	553.7	533.7	0.533	0.97567
	33 4/1/2016 12:50	562.3	542.3	0.550	0.91333
	34 4/1/2016 12:51	555.6	535.6	0.567	0.96156
	35 4/1/2016 12:52	561.7	541.7	0.583	0.91756
	36 4/1/2016 12:53	551.3	531.3	0.600	0.99379
	37 4/1/2016 12:54	541.5	521.5	0.617	1.07136
	38 4/1/2016 12:55	553.7	533.7	0.633	0.97567
	39 4/1/2016 12:56	553.1	533.1	0.650	0.98017
	40 4/1/2016 12:57	543.3	523.3	0.667	1.05665
	41 4/1/2016 12:58	529.3	509.3	0.683	1.17718

Air Exchange Rate Plot



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 is 1.6808/hr.
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?	It takes about 1.78 hours for a non-reactive chemical (CO ₂) to be removed from the air in the room tested. Based on this, it would be ideal to have less people in this room to help speed up the removal of the chemical from the air.
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.	When comparing the ventilation rate recommended by ASHRAE with the ventilation rate of the room used in this lab, it is easy to see that too many people in the library room causes a ventilation rate that falls very short of the ASHRAE standard. ASHRAE's standard is 15ft ³ /min/person, while the ventilation rate calculated in this lab is 8.78ft ³ /min/person. This indicates that the occupants are "being too cheap" and are not supplying enough air into the room, causing the ventilation rate to be much lower than the recommended rate.
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.	Only four people should be in this room at one time because when there are four people, there is a ventilation rate of 15.4ft ³ /min/person, which is (though slightly over) pretty close to the ASHRAE standard.