

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 of the room tested is .097/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?

$3/.097 = 30.927$ hours

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.

$(.097 \times 378/5)(1/60) = .1222$ The average is 15. The room was very small with no windows so there is poor ventilation.

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.

Given the model of 15 only one person should be in that room at a time. Adding on to it they should not be there for a long time.

change rate

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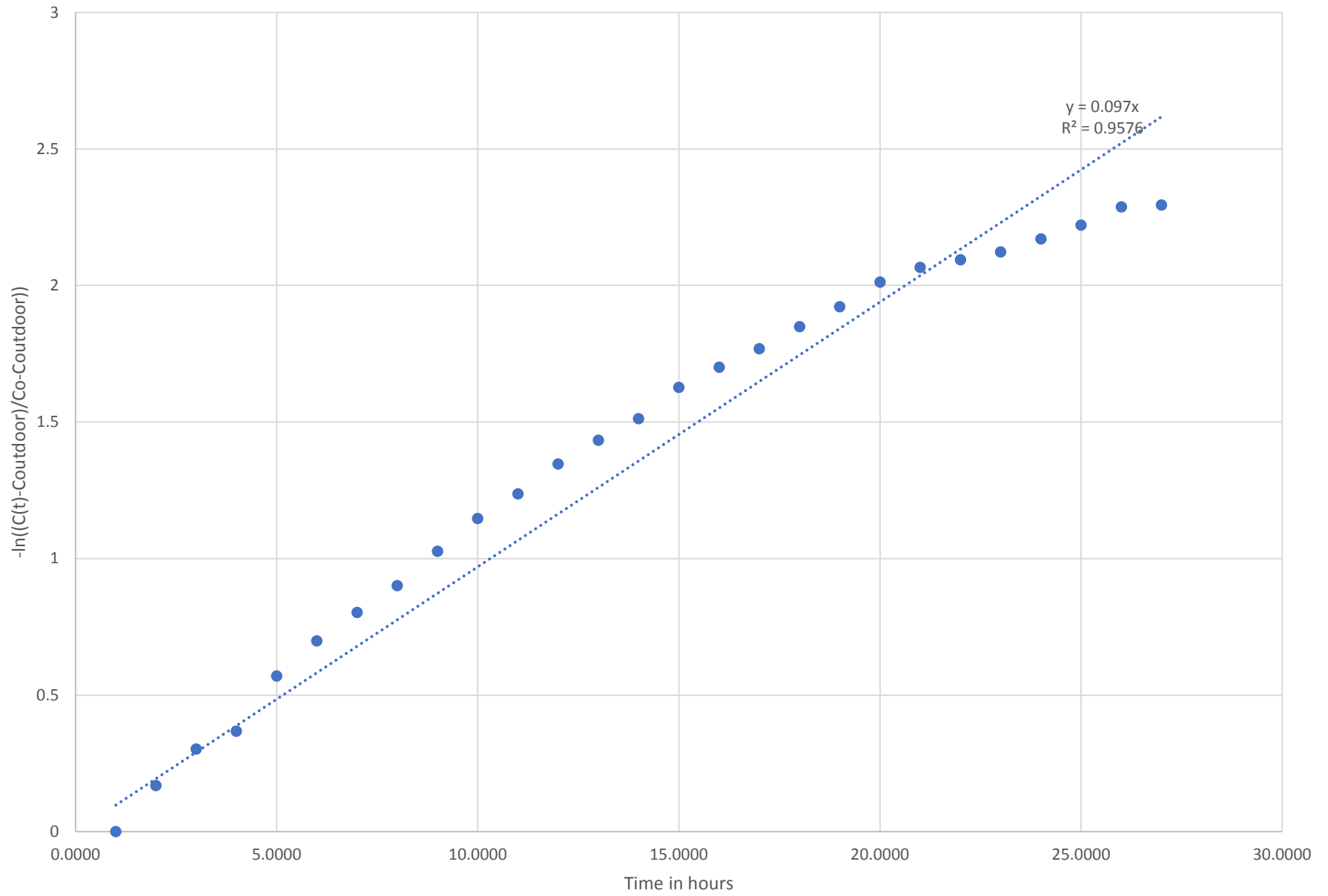
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Air Exchange Rate



Input Parameters:

Measured Coutside(ppm)	470
Assumed Coutside(ppm)	400
Correction Factor (ppm)	-70
Room volume (ft3)	378
Room capacity (people)	5

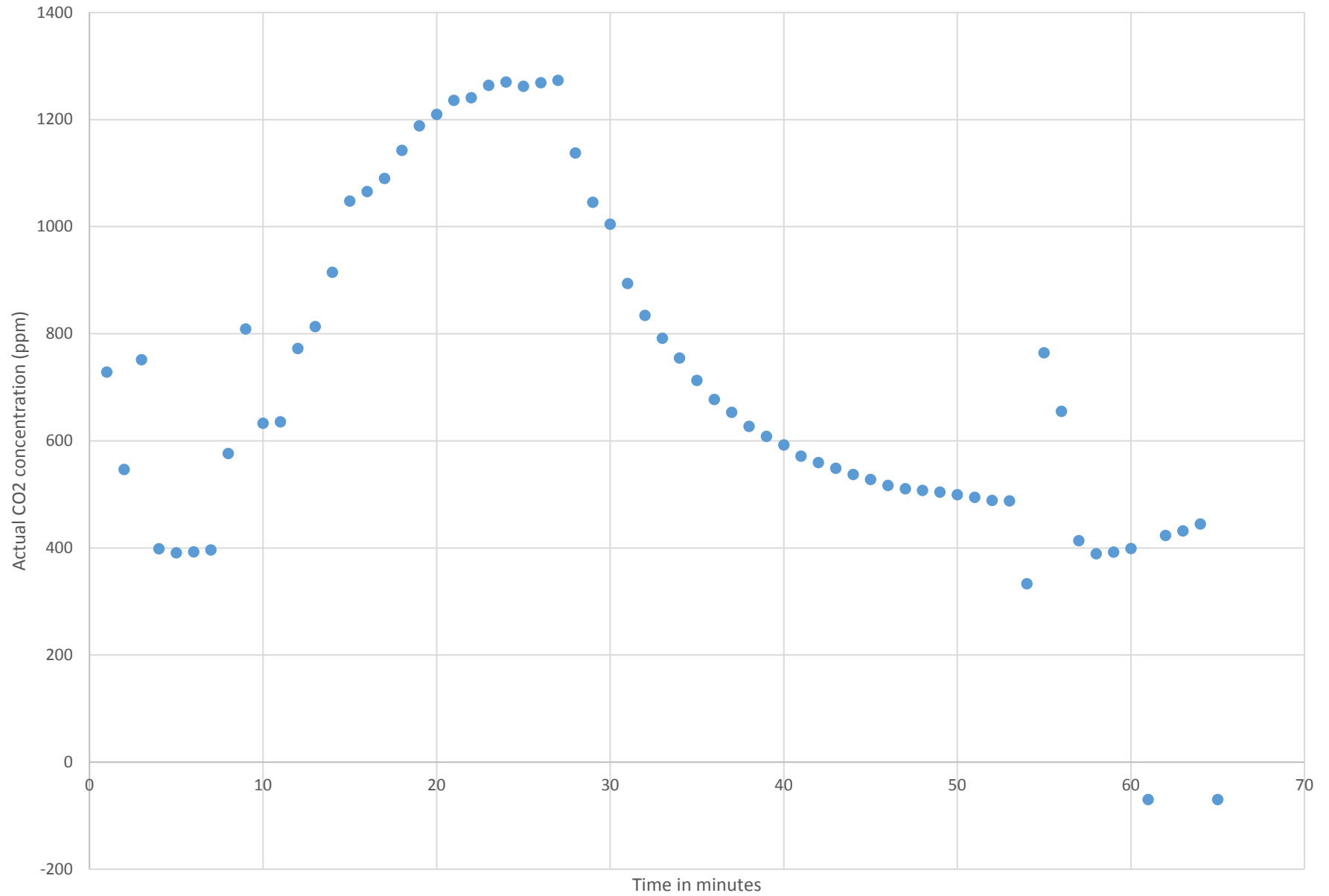
Calculations:

Air Exchange Rate[1/hr]	0.097
Time to remove non-reactive chemical	30.927
Venilation rate [ft3/min/person]	0.12222

Measurement	Date and Time	Hobo CO2 concentration
	0 10/21/2016 15:09	1343.1
	1 10/21/2016 15:10	1207.6
	2 10/21/2016 15:11	1115.4
	3 10/21/2016 15:12	1074.5
	4 10/21/2016 15:13	964
	5 10/21/2016 15:14	904.2
	6 10/21/2016 15:15	861.4
	7 10/21/2016 15:16	824.8
	8 10/21/2016 15:17	782.7
	9 10/21/2016 15:18	747.3
	10 10/21/2016 15:19	723.4
	11 10/21/2016 15:20	697.2
	12 10/21/2016 15:21	678.3
	13 10/21/2016 15:22	662.4
	14 10/21/2016 15:23	641.6
	15 10/21/2016 15:24	629.4
	16 10/21/2016 15:25	619
	17 10/21/2016 15:26	607.4
	18 10/21/2016 15:27	597.7
	19 10/21/2016 15:28	586.7
	20 10/21/2016 15:29	580.6
	21 10/21/2016 15:30	577.5
	22 10/21/2016 15:31	574.5
	23 10/21/2016 15:32	569.6
	24 10/21/2016 15:33	564.7
	25 10/21/2016 15:34	558.6
	26 10/21/2016 15:35	558
	27 10/21/2016 15:36	403.1840456

Actual CO2 concentration	Experimental time (hrs)	-LN((Croom(t)-Coutdoor)/(Co-Coutdoor))
1273.1	0.0000	0
1137.6	0.0167	0.168648425
1045.4	0.0333	0.302179817
1004.5	0.0500	0.367648427
894	0.0667	0.56951458
834.2	0.0833	0.698544839
791.4	0.1000	0.802320042
754.8	0.1167	0.900495846
712.7	0.1333	1.026805832
677.3	0.1500	1.146950144
653.4	0.1667	1.237080829
627.2	0.1833	1.34621941
608.3	0.2000	1.433070749
592.4	0.2167	1.512473559
571.6	0.2333	1.62688391
559.4	0.2500	1.70063333
549	0.2667	1.768103791
537.4	0.2833	1.849153717
527.7	0.3000	1.922366334
516.7	0.3167	2.012443558
510.6	0.3333	2.066130008
507.5	0.3500	2.094559249
504.5	0.3667	2.122863025
499.6	0.3833	2.170887932
494.7	0.4000	2.221336097
488.6	0.4167	2.287918239
488	0.4333	2.294713282
333.1840456	0.4500	#NUM!

Concentration plot



Juli Sioson-Ebitner
ENGR 115

21-Oct-16

Input Parameters:

Measured Coutside(ppm)	470
Assumed Coutside(ppm)	400
Correction Factor	-70

Analysis:

Measured	Date and Time	Hobo CO2 concentration
	1 10/21/2016 14:43	798.5
	2 10/21/2016 14:44	616.6
	3 10/21/2016 14:45	821.7
	4 10/21/2016 14:46	468.3
	5 10/21/2016 14:47	460.9
	6 10/21/2016 14:48	462.8
	7 10/21/2016 14:49	466.4
	8 10/21/2016 14:50	646.5
	9 10/21/2016 14:51	879.1
	10 10/21/2016 14:52	702.7
	11 10/21/2016 14:53	705.7
	12 10/21/2016 14:54	842.5
	13 10/21/2016 14:55	883.4
	14 10/21/2016 14:56	984.7
	15 10/21/2016 14:57	1117.8
	16 10/21/2016 14:58	1135.5
	17 10/21/2016 14:59	1160
	18 10/21/2016 15:00	1212.5
	19 10/21/2016 15:01	1258.2
	20 10/21/2016 15:02	1279.6
	21 10/21/2016 15:03	1305.9
	22 10/21/2016 15:04	1310.7
	23 10/21/2016 15:05	1333.9
	24 10/21/2016 15:06	1340
	25 10/21/2016 15:07	1332.1
	26 10/21/2016 15:08	1338.8
	27 10/21/2016 15:09	1343.1
	28 10/21/2016 15:10	1207.6
	29 10/21/2016 15:11	1115.4
	30 10/21/2016 15:12	1074.5
	31 10/21/2016 15:13	964
	32 10/21/2016 15:14	904.2
	33 10/21/2016 15:15	861.4
	34 10/21/2016 15:16	824.8

35	10/21/2016 15:17	782.7
36	10/21/2016 15:18	747.3
37	10/21/2016 15:19	723.4
38	10/21/2016 15:20	697.2
39	10/21/2016 15:21	678.3
40	10/21/2016 15:22	662.4
41	10/21/2016 15:23	641.6
42	10/21/2016 15:24	629.4
43	10/21/2016 15:25	619
44	10/21/2016 15:26	607.4
45	10/21/2016 15:27	597.7
46	10/21/2016 15:28	586.7
47	10/21/2016 15:29	580.6
48	10/21/2016 15:30	577.5
49	10/21/2016 15:31	574.5
50	10/21/2016 15:32	569.6
51	10/21/2016 15:33	564.7
52	10/21/2016 15:34	558.6
53	10/21/2016 15:35	558
54	10/21/2016 15:36	403.1840456
55	10/21/2016 15:37	834.6
56	10/21/2016 15:38	725.3
57	10/21/2016 15:39	483.5
58	10/21/2016 15:40	459.1
59	10/21/2016 15:41	462.1
60	10/21/2016 15:42	468.9
61	10/21/2016 15:43	
62	10/21/2016 15:43	493.3
63	10/21/2016 15:44	501.8
64	10/21/2016 15:45	514.7
65	10/21/2016 15:46	

Actual CO2 Concentration [ppm]
728.5
546.6
751.7
398.3
390.9
392.8
396.4
576.5
809.1
632.7
635.7
772.5
813.4
914.7
1047.8
1065.5
1090
1142.5
1188.2
1209.6
1235.9
1240.7
1263.9
1270
1262.1
1268.8
1273.1
1137.6
1045.4
1004.5
894
834.2
791.4
754.8

	712.7
	677.3
	653.4
	627.2
	608.3
	592.4
	571.6
	559.4
	549
	537.4
	527.7
	516.7
	510.6
	507.5
	504.5
	499.6
	494.7
	488.6
	488
333.1840456	
	764.6
	655.3
	413.5
	389.1
	392.1
	398.9
	-70
	423.3
	431.8
	444.7
	-70

Plot Title: Music Room

Date Time, GMT-07:00 CO2, ppm (Host Connε Stopped (L End Of File (LGR S/N: 940890)

1	10/21/2016 14:43	798.5
2	10/21/2016 14:44	616.6
3	10/21/2016 14:45	821.7
4	10/21/2016 14:46	468.3
5	10/21/2016 14:47	460.9
6	10/21/2016 14:48	462.8
7	10/21/2016 14:49	466.4
8	10/21/2016 14:50	646.5
9	10/21/2016 14:51	879.1
10	10/21/2016 14:52	702.7
11	10/21/2016 14:53	705.7
12	10/21/2016 14:54	842.5
13	10/21/2016 14:55	883.4
14	10/21/2016 14:56	984.7
15	10/21/2016 14:57	1117.8
16	10/21/2016 14:58	1135.5
17	10/21/2016 14:59	1160
18	10/21/2016 15:00	1212.5
19	10/21/2016 15:01	1258.2
20	10/21/2016 15:02	1279.6
21	10/21/2016 15:03	1305.9
22	10/21/2016 15:04	1310.7
23	10/21/2016 15:05	1333.9
24	10/21/2016 15:06	1340
25	10/21/2016 15:07	1332.1
26	10/21/2016 15:08	1338.8
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46	10/21/2016 15:28	586.7		
47	10/21/2016 15:29	580.6		
48	10/21/2016 15:30	577.5		
49	10/21/2016 15:31	574.5		
50	10/21/2016 15:32	569.6		
51	10/21/2016 15:33	564.7		
52	10/21/2016 15:34	558.6		
53	10/21/2016 15:35	558		
54	10/21/2016 15:36	557.4		
55	10/21/2016 15:37	834.6		
56	10/21/2016 15:38	725.3		
57	10/21/2016 15:39	483.5		
58	10/21/2016 15:40	459.1		
59	10/21/2016 15:41	462.1		
60	10/21/2016 15:42	468.9		
61	10/21/2016 15:43		Logged	
62	10/21/2016 15:43	493.3		
63	10/21/2016 15:44	501.8		
64	10/21/2016 15:45	514.7		
65	10/21/2016 15:46		Logged	Logged