

Effect of Building Materials on Internal Housing Temperature

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Abstract

This experiment intends to model how construction of a home with different building materials affect the internal temperature over time. For this particular experiment, multiple boxes were constructed to simulate the walls of a home. In this case a cubic wooden frame was constructed with an outer surface volume of around 7.6 ft^3 . The inner dimension of all the boxes' were taken, with volume measured to be 7.3 ft^3 , taking account the volume of the wooden slabs.

We used cardboard as insulation to fill in the gap of the frames which created the wall, with masking tape used to hold everything together. We were also assigned to analyze and model three boxes. Box 3 which has a black top, Box 4 which has a black top and thermal mass, and Box 5 which has a black top and insulation. To conduct the experiment, three temperature probes were mounted inside of the box; one attached to the ceiling, one hanging in the middle, and box 4 having a temperature probe on the bottom due to the thermal mass. We started the experiment with having the temperature probes recording for 1 hours, while taking a data point every 12 seconds. The second portion of the recording process is recording with the temperature probes for 48 hours. We then later took the surface temperature of all sides of each individual box. These sets of data were used to create mathematical predictions of internal housing temperature for an entire year, as well as mathematical models of energy and power to be used for approximating the cost of keeping a similarly-constructed, average sized home cool.

PROCEDURE

The data collection was done using the Lab Pro kit with temperature probes which was preset to the appropriate data collection setting. This allowed the temperature probes to be left inside of the boxes without a computer to collect data. The first day of data collection around 1PM, we started recording data on May 2nd for 1 hour, collecting data every 12 seconds. This allowed for the monitoring of any changing conditions, such a cloud or shadow that were casted on the box. This also allowed the data to be recorded in a higher resolution then compared to the 48 hour data set. For the 48 hour data recording, we collected 8 data point every hour. We also proceeded to take the initial surface temperature of the boxes,

wait for an hour then record the surface temperature again. I was assigned box 3, 4 and 5, which I later imported all of the recorded data into a Microsoft Excel format (.csv), and Matlab was used to create all the graphs and mathematical models of the recorded data.

Probe placement box3:

Probe1(channel 1): Top of the box

Probe 2(channel 3): Middle of the box

Probe placement box4:

Probe1(channel 1): Middle of the box

Probe2(channel2): Top of the box or ceiling

Probe3(channel3): Bottom of the box

Probe placement box3:

Probe1(channel1): Middle of the box

Probe2(channel 3): Top of the box

Below is the outside temperature of May 2nd starting from 1:15 AM to 11:53 PM. Data was taken from timeanddate.com/weather/usa/west-covina/historic

Temperature		Temperature	
Time	(Fahrenheit)	Time	re (°C)2
1:15AM	57	12:53 PM	62
1:53 AM	56	1:53 PM	64
3:06 AM	55	2:53 PM	61
3:19 AM	55	3:53 PM	61
3:53 AM	54	6:53 PM	61
4:43 AM	54	7:53 PM	59
5:22 AM	54	8:53 PM	59
5:53 AM	54	9:53 PM	58
6:06 AM	54	10:53 PM	57
6:53 AM	54	11:53 PM	55
7:53 AM	56		
8:53 AM	58		
9:53 AM	60		
10:53 AM	61		
11:53 AM	59		

Temperature Data

Bellow is the high-resolution measurements for the 1-hour time period for box 3:

Note that I included only the time interval of .05 hours. Please see Appendix for full data sets for box 3,4 and 5

Time(hour)	Probe1 Middle of the box Temperature(C)	Probe 2 Top of the box Temperature(C)
.05	50.76	37.39
.1	51.60	37.97
.15	56.76	38.52
.2	58.06	39.05
.25	56.53	39.32
.3	56.5	39.5
.35	57.27	39.65
.4	56.33	39.82
.45	55.8	39.95
.5	57.68	40
.55	59.03	40.28
.6	58.75	40.56
.65	59.92	40.76
.7	61.25	41.12
.75	60.44	41.48
.8	59.64	41.79
.85	59.89	41.97
.9	60.55	42.13
.95	60.11	42.39
1	59.5	42.47

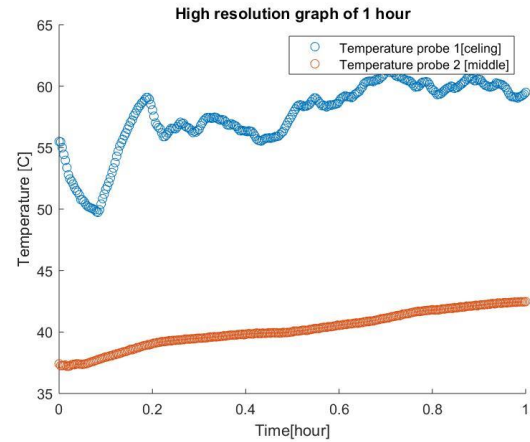
Bellow is a low resolution graph of 45 hour time period for box 3:

Note that I included only the time interval of 3 hours. Please see Appendix for full data sets for box 3,4 and 5. Also we only collected enough data for 46.4 hours instead of the intended goal of 48 hour for box 3.

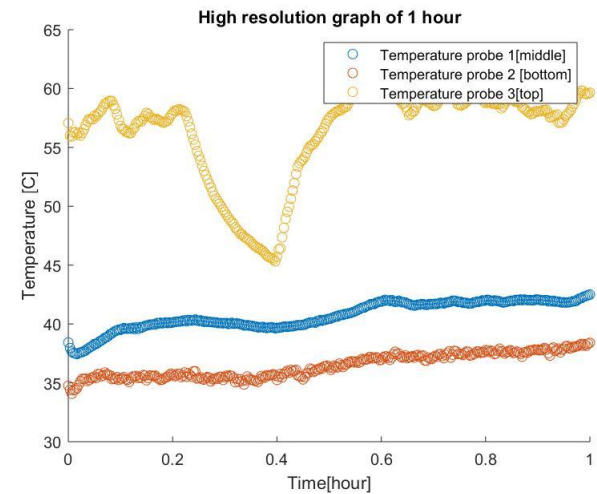
Time(hour)	Probe 1 Middle of the box Temperature(C)	Probe 2 Top of the box Temperature(C)
0	53.93	36.41
3	49.05	42.65
6	21.71	24.51
9	14.2	15.82
12	10.12	11.56
15	8.81	9.76
18	24.65	18.5
21	52.45	37.36
24	56.13	44.83
27	49.97	42.55
30	22.75	27.02

33	14.95	17.881
36	11.92	13.77
39	10.35	11.89
42	18.52	15.75
45	50.64	31.48

High resolution graph for box 3:

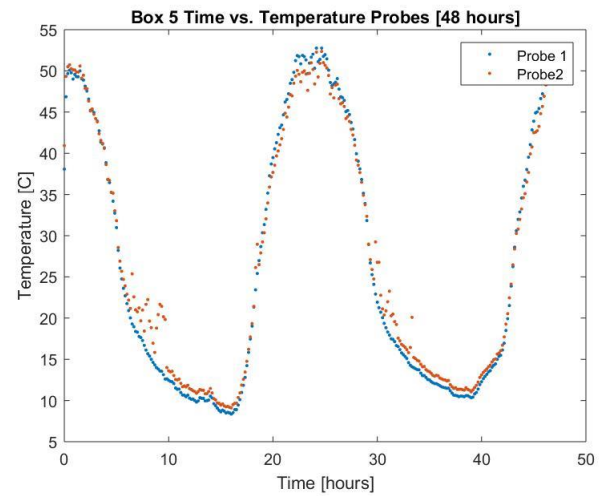
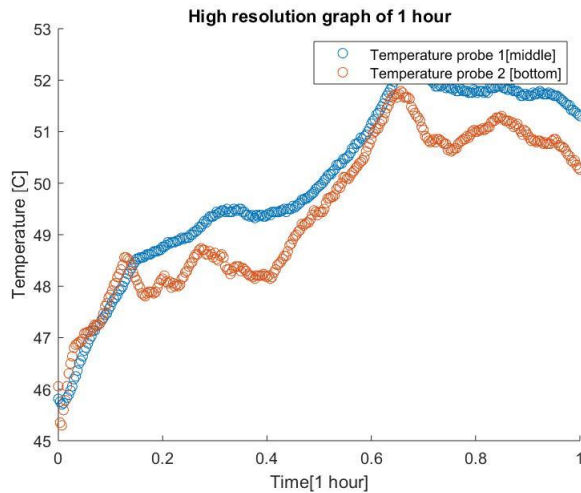


High resolution graph of box 4:

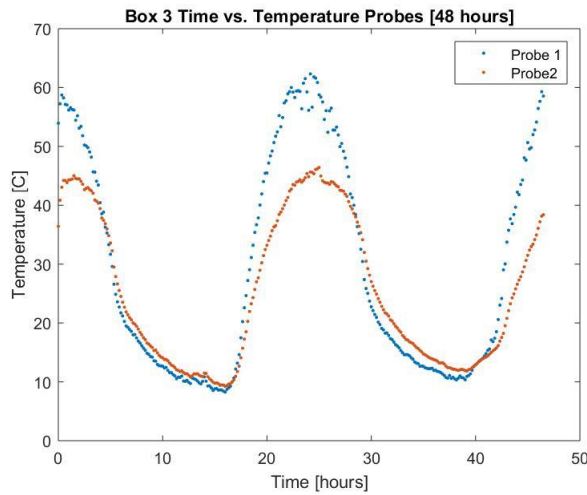


Please note that the legend for temperature probe 2 and 3 are mixed up. The yellow data set is Temperature probe 3, or bottom temperature.

High resolution graph of box 5:



Low resolution graph of box 3:

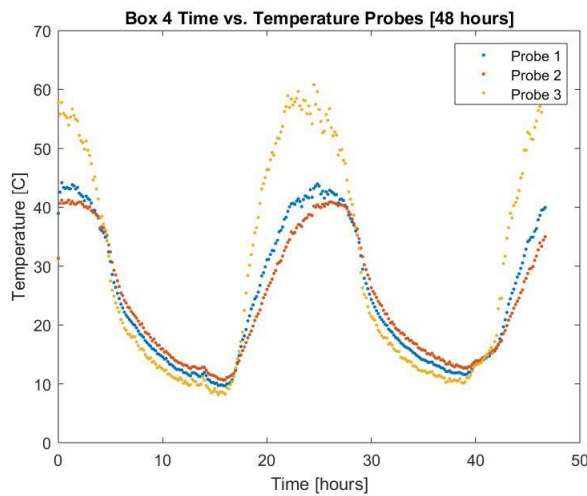


The high-resolution and low-resolution data sets were taken on may 9, with a data collection time interval of 12 seconds. The day was mostly sunny and should have no obstructions blocking the sunlight, with the exception of maybe one or two clouds. The data shows that the ground temperature is higher than of the middle and ceiling of the box. This can be because we placed the boxes on a large roof with a lot of surface area which allows the surface area of the roof to absorb more heat from the sun then distributing it back to the bottom of the boxes. Also, the ceiling of all the boxes have higher temperature than the middle of the box, this is due to the fact that box 3,4 and 5 all have black top. We know that black surfaces absorb more light than any other colors, resulting in more heat absorbed. Also, an interesting trend starts to appear when we collect data for the 48-hour time period. The temperature starts to mimic a sin graph, this is because it's hotter during the day and cooler at night.

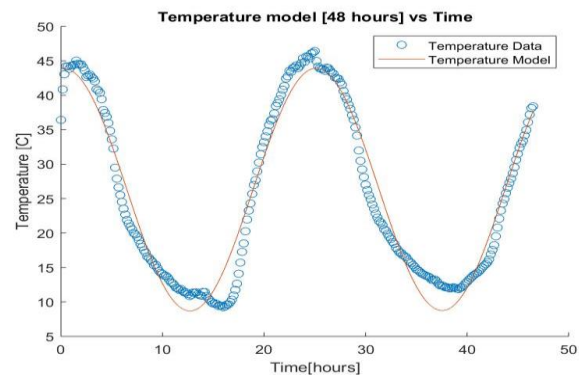
Temperature Model

I used the cftool command in Matlab to do all the expropriation and mathematical modeling for our 48-hour temperature data. This tool makes it easy to analyze data sets and create a function that matches their curve. Fourier analysis (Reference link 4) was deemed the best method to model temperature, since it mimics a sin wave function. I only used the middle temperature probe, because it would mimic the temperature in a house hold the closest in comparison to the other probes.

Low resolution graph of box 4:

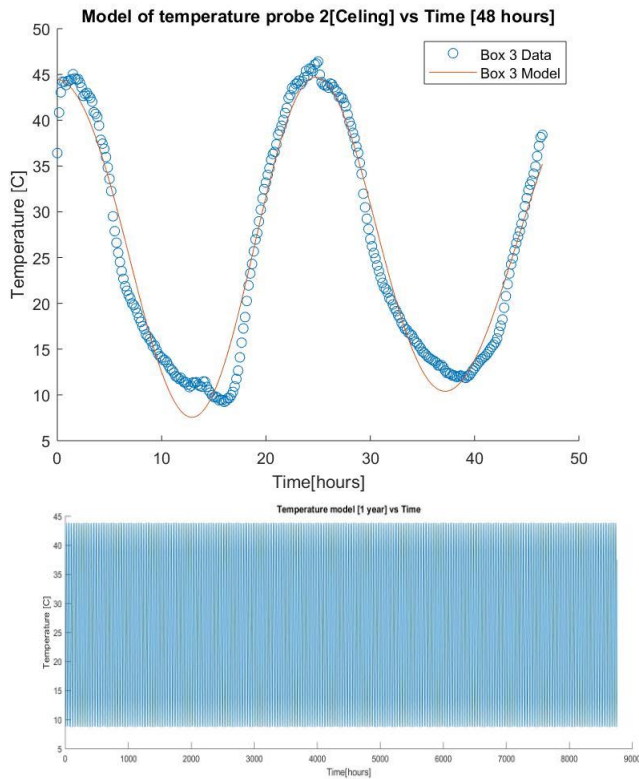


Box 3 Model 48 hour probe 1:



Low resolution graph of box 5:

Box 3 Model 48 hour probe 2:

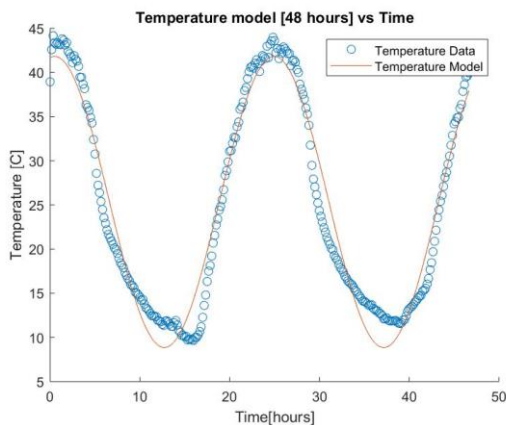


The equation for box 3 model:

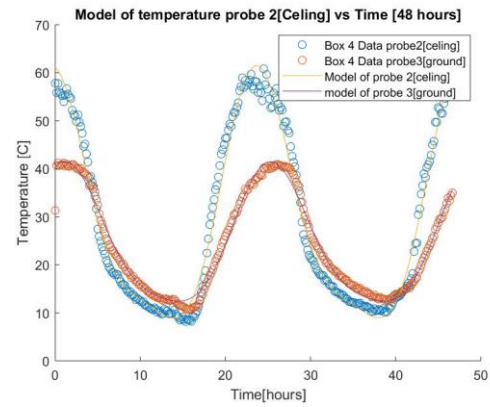
Probe1: $26.31 + 17.55\cos(.253x) + 1.272\sin(.253x)$
 Probe2: $26.9 + 1.585\cos(.1215x) - .307\sin(.1215x) - 1.356\cos(.1215x)$

Using the mean function on the year model box 3 has an average temperature of: 26.3 C

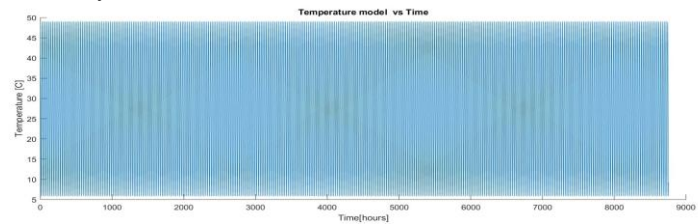
Box 4 model 48 hour probe 1:



Box 4 48 hour Model probe 2 and probe 3:



Box 4 model 1 year:

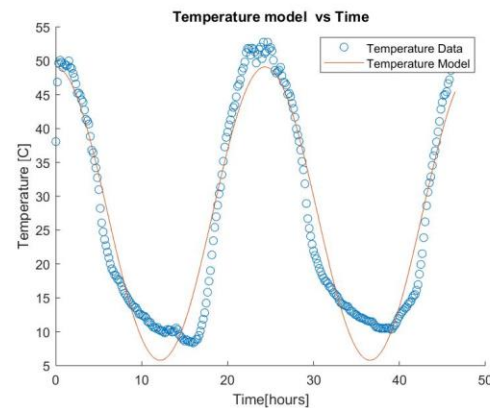


The equation for box 4 model:

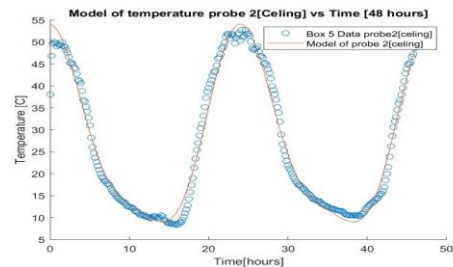
Probe 1: $25.34 + 16.35\cos(.257x) + 2.13\sin(.257x)$
 Probe 2: $29.93 + 25.41\cos(.2608x) - .593\cos(.2608x)$
 Probe3: $24.6 + 13.44\cos(.2604x) + 5.142\sin(.2604x)$

Using the mean function on the year model box 4 has an average temperature of: 25.34 C

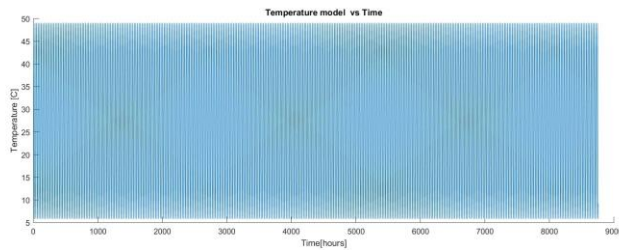
Box 5 Model 48 hour probe 1:



Box 5 Model 48 hour probe 2:



Box 5 Model 1 year:



The equation for box 5:

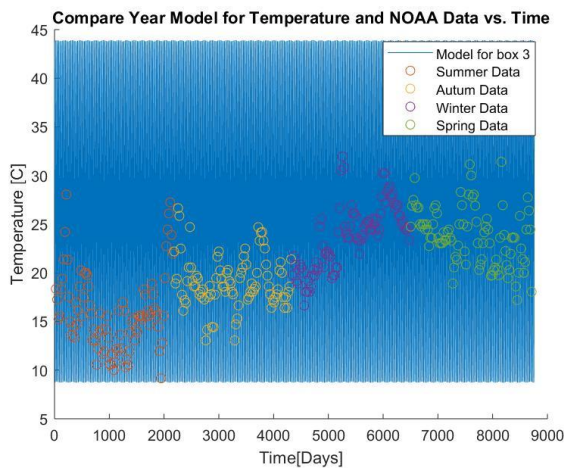
Probe 1: $27.44 + 21.66\cos(.2572x) - .3978\sin(.2572x)$

Probe 2: $27.32 + 21.78\cos(.2607x) + 1.375\sin(.2607x)$

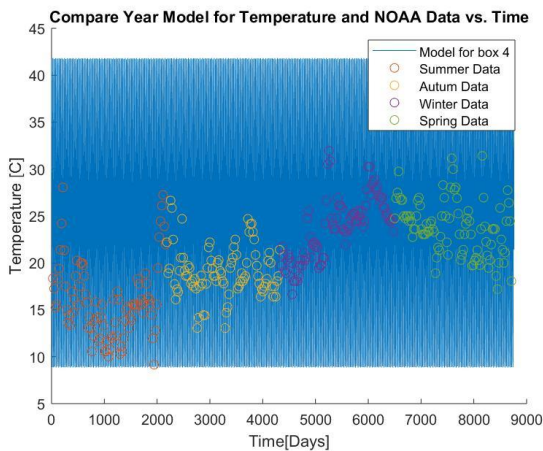
Using the mean function on the year model box 5 has an average temperature of:
27.43 C

NOAA Data compared to model
Please see appendix for NOAA Data

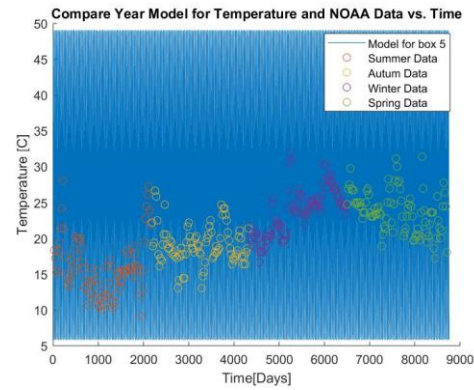
Box3:



Box 4:



Box 5:



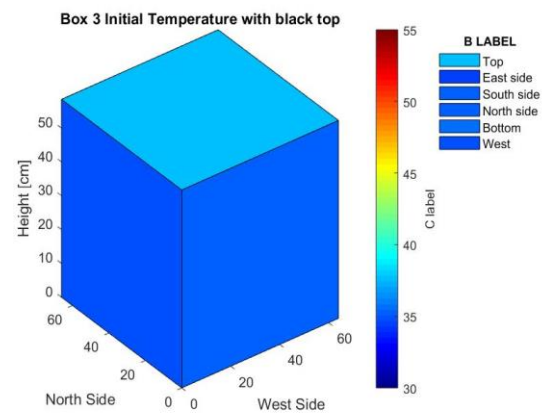
The temperature probes used in this experiment are not equipped with anything to deal with moisture in the air, or any uncertainty resulting in lower temperature and higher temperature readings than those from the weather station. Whoem likely has equipment to handle variances such as moisture. That is why I think the yearly model for the boxes have extreme high and lows.

Surface Temperature

A temperature probe was used to touch each side of the boxes and recorded the temperature of each surface. A three-dimensional model was created using Matlab which shows the temperature in various colors, blue being the coldest red being the hottest.

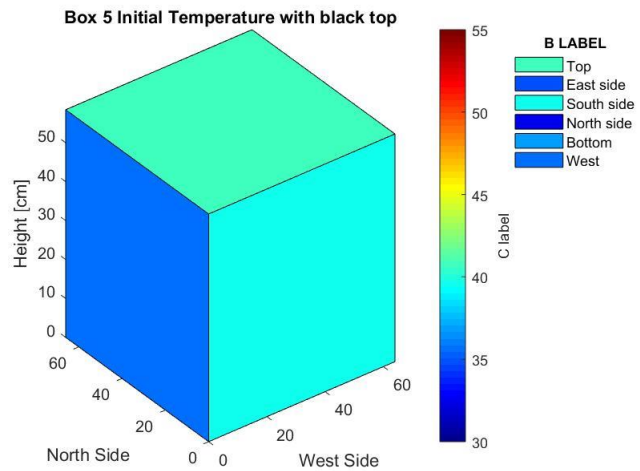
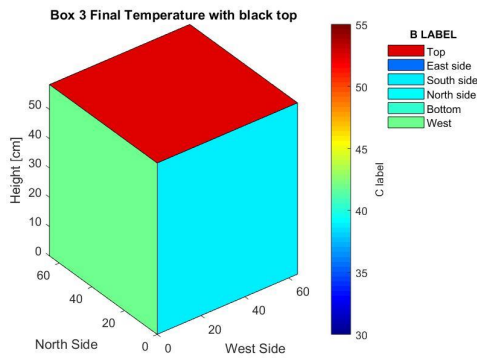
Box3 initial:

Temperature[C]: North:35.1 South:35.3 West:34.9
East:34.3 Top:37.7 Bottom:35.8



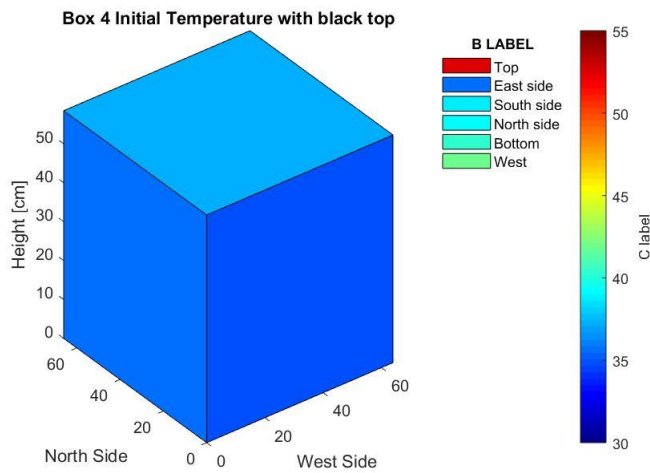
Box 3 final:

Temperature [C]: North:39.3 South:38.8 West:42
East:35.8 Top:52.4 Bottom:40.2



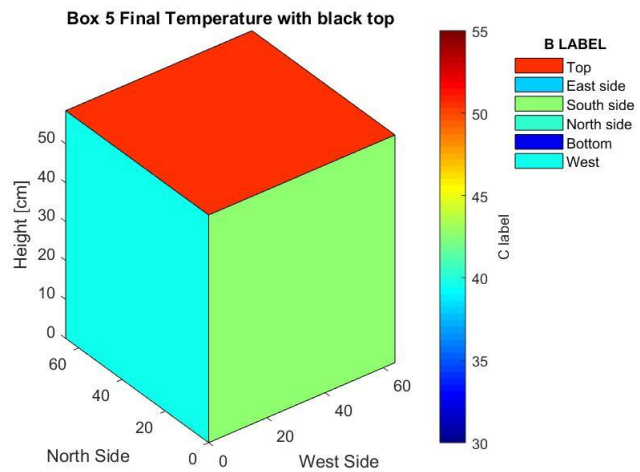
BOX 4 INITIAL:

Temperature [C]: 37.4 Top 35.8 West 34.8 South 34.9 bottom
34.1 North 33.8 East



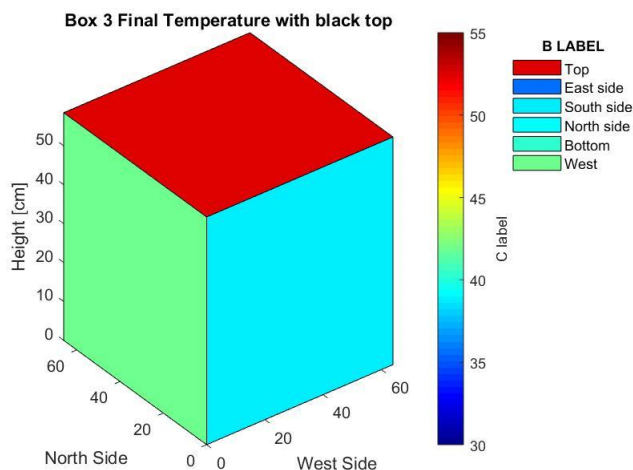
Box 5 final:

Temperature[C]: 40.2 North 42.5 South 38 East 50.4 Top 32.7
Bottom



Box 4 Final:

Temperature [C]: 34.7North 38.9South 40.6 West 34.1 East
39.4 Top 37.3 Bottom



ENERGY FLOW MODEL

By relating the ideal gas law and the diatomic ideal gas law (Reference link 2) for the kinetic energy of particles, a formula can be derived which models the energy flow into the box as a function of time. Because, the box was insulated we can assume when time is zero, the initial temperature T can be used to find the numbers of moles in the box. I used "sum of sin" method to create my mathematical model, as I thought it is a better fit.

From this equation we have Energy Flow vs Time:

$$T_{\text{box1}} = 309.56 \text{ K}$$

$$T_{\text{box2}} = 312.1 \text{ K}$$

$$T_{\text{box3}} = 314.07 \text{ K}$$

$$P = 1 \text{ atm} = 1.01 \times 10^5 \text{ pascal}$$

$$V = .205 \text{ m}^3$$

$$R = 8.31 \frac{\text{J}}{\text{mol} \cdot \text{K}}$$

$$n1 = 8.048 \text{ mol}$$

Box 5 Initial:

Temperature[C]: 40.7 Top 32.6 North 35.6 West 34.9 East
36.7 Bottom 39.7 South

$$n_2 = 7.983 \text{ mol}$$

$$n_3 = 7.933 \text{ mol}$$

Ideal Gas Law:

$$PV = nRT$$

$$\Rightarrow n = \frac{PV}{RT} = \frac{(1.01 \times 10^5 \text{ Pa})(.205 \text{ m}^3)}{(8.31 \frac{\text{J}}{\text{mol} \cdot \text{K}})(309.56 \text{ K})}$$

The energy Inside the box can be expressed with the diatomic Ideal gas law as the following:

Energy:

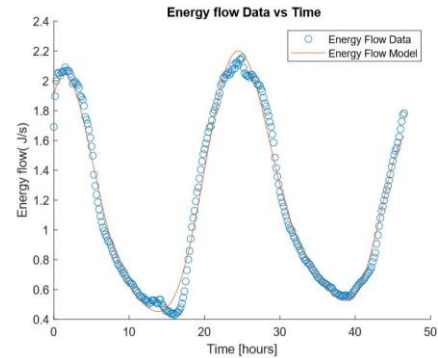
$$Q = \frac{5}{2} nRT$$

$$\Rightarrow Q(t) = \frac{5}{2} (8.048 \text{ mol})(8.31 \frac{\text{J}}{\text{mol} \cdot \text{K}} * k)T$$

$$Q(t) = (167.19 \frac{\text{J}}{\text{K}})T$$

From this equation we have Energy Flow vs Time:

Box3 model 24 hour:



Using the sum function to find total energy per year for box 3: -22518 J

The energy Inside the box can be expressed with the diatomic Ideal gas law as the following:

Energy:

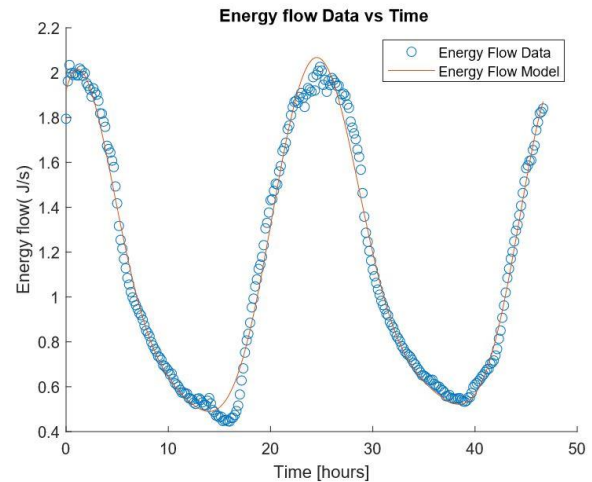
$$Q = \frac{5}{2} nRT$$

$$Q(t) = \frac{5}{2} (8.048 \text{ mol})(8.31 \text{ J/mol} \cdot \text{K})T$$

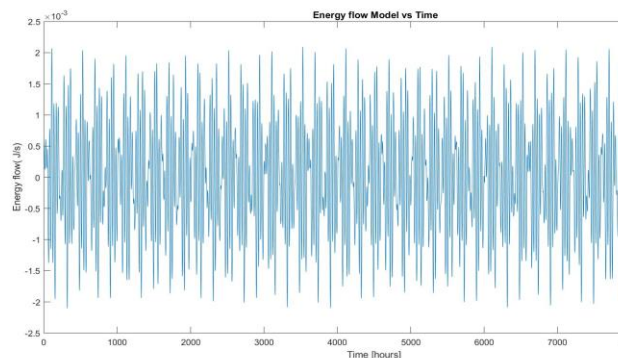
$$Q(t) = (167.19 \text{ J/K})T$$

From this equation we have Energy Flow vs Time:

Box4 model 24 hour:



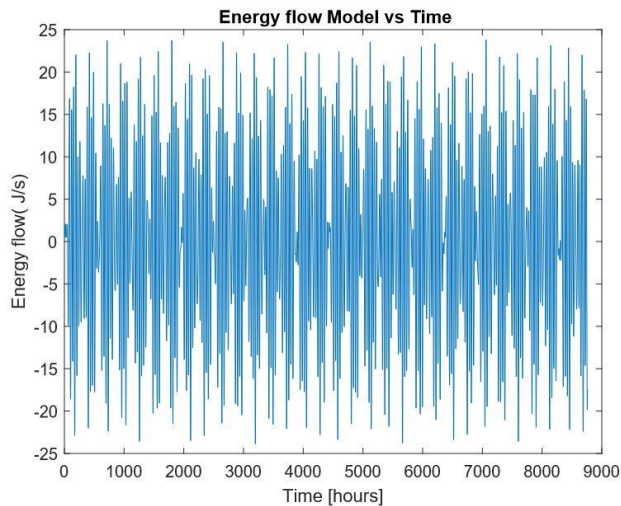
Box 3 model year:



Equation for box 3 energy is:

$$1.228 * \sin(.000627 * t + 1.416) + 17.6 * \sin(.253 * t + 1.498)$$

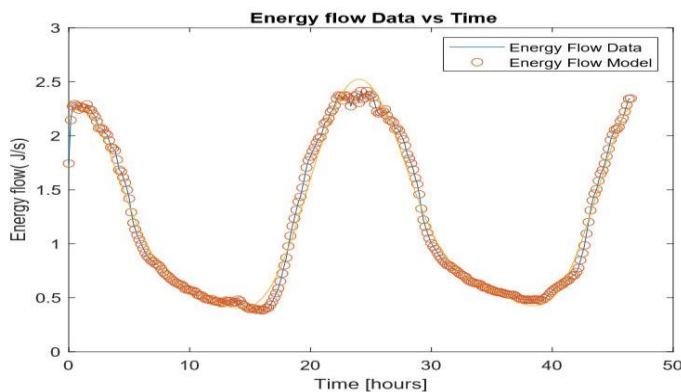
Box 4 model 1 year:



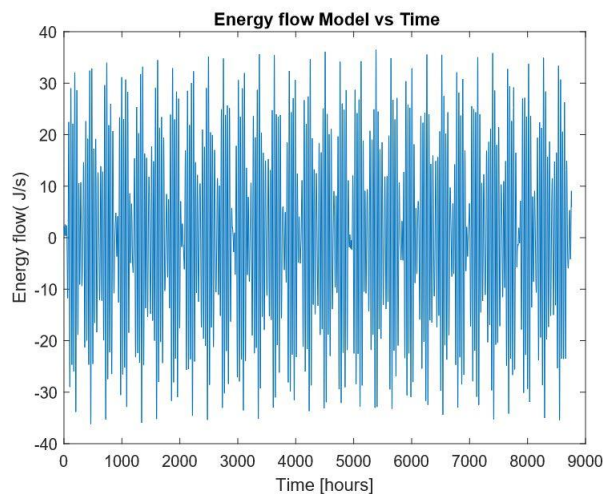
Equation for box 4 energy:
 $4.55\sin(.1098x-1.144) + 8.37\sin(.1911x+3.119)$

Using the sum function to find total energy per year for box 4:
 -74140 J

Box5 model 24 hour:



Box 5 model 1 year:



Equation for box 5 energy:
 $6.793\sin(.1219x-1.396) + 12.48\sin(.1934x+3.148)$

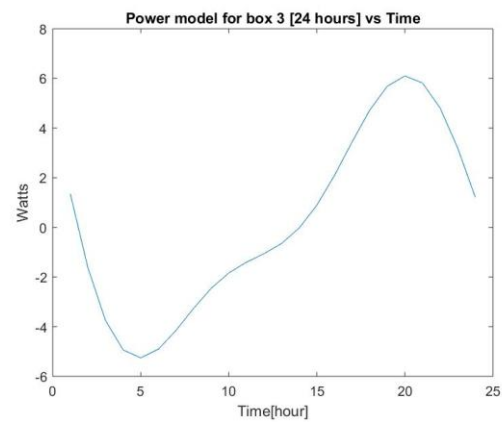
Using the sum function to find total energy per year for box 5:
 74957 J

If a box were to have negative joules that indicates energy is being transferred out of the box and into the air. Box 3 and 4 has energy loss. The reason that this is the case is because the box has no insulation, and the box heats up a bit during the day, and loses the energy when it's night, especially with no insulation. It also makes sense that box 4 has a lower energy flow thought the year then box 3. Since, box 4 has a thermal mass and absorb a lot of energy that is being transferred into the box, this results in an overall lower energy inside box 4. For the case of box 5, it makes sense that it has a positive energy flow, sense the insulated material traps the heat inside, even at night where the temperature is cooler.

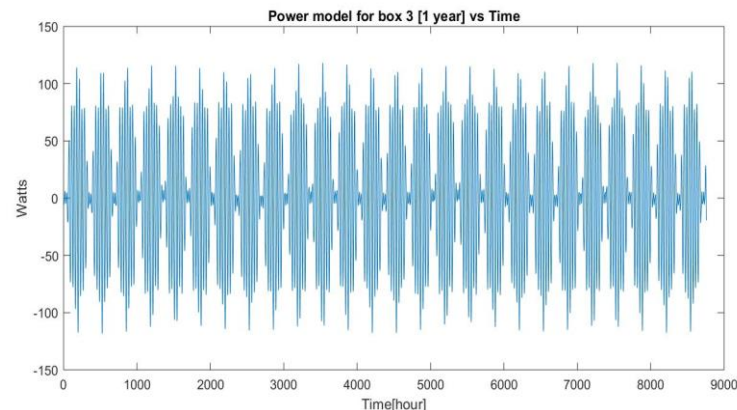
Power Model

Power is known as change in energy over time, in other words you can take the derivative of a energy function to find power. You can either take the derivative by hand or use the diff function in Matlab.

Box 3 Power 24 hour:



Box 3 Power 1 year:



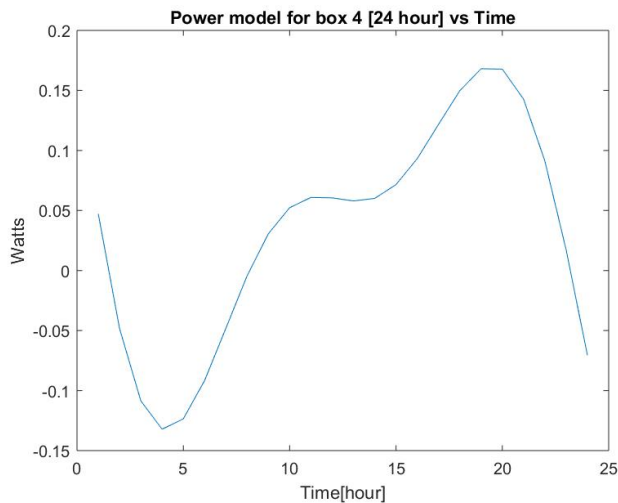
Equation for box 3 power:

$13.404\cos(.116x-1.264) + 47.93\cos(.1912x+3.148)$

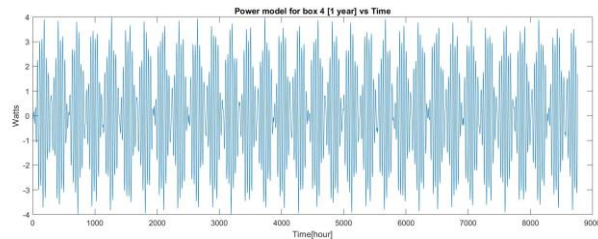
Using the sum function to find total power per year for box 3:

366850 Watt

Box 4 power 24 hour:



Box4 power 1 year:

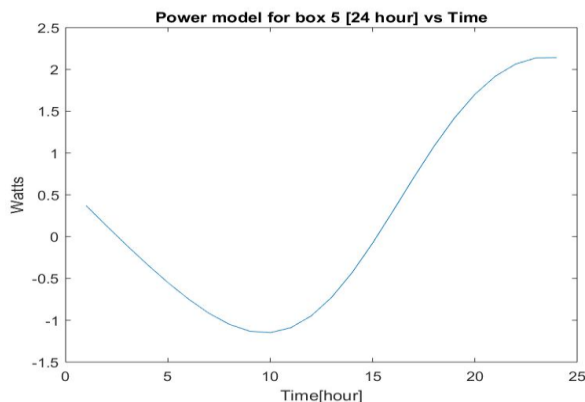


Equation for box 4 power:

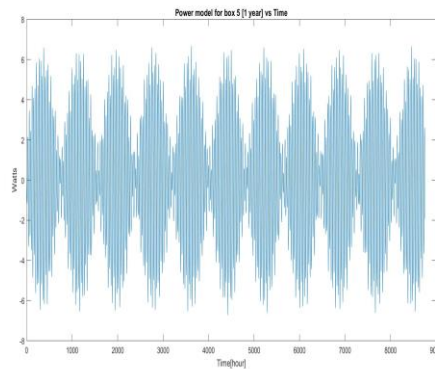
$$.4995\cos(.1098x+1.144) + 1.6\cos(.1911x+3.199) \\ + 1.852\cos(.1683*t+.546) + .081*\cos(.5046*t+1.84)$$

Using the sum function to find total power per year for box 4:
12265 Watt

Box 5 power 24 hours:



Box 5 power 1 year:



Equation for box 5 power:

$$.828\cos(.1219x-1.396)+2.413\cos(.1934x+3.148)$$

Using the sum function to find total power per year for box 5:
22140 Watt

Looking at the Power used for each box for a year; box 3 has the highest power usage which make sense it isn't insulated and has no thermal mass. Box 4 has a water thermal mass which has a specific heat 4.186 joule/gram. Since, water has a higher specific heat then air the thermal mass will absorb the heat rather than being absorbed by the air. Box 5 is insulated, meaning that the insulated material is keeping the box from heating up. That's why it has a lower power per year then box 3 does.

Conclusion

The purpose of this experiment was to model the internal temperature of cardboard boxes, in order to determine the cooling and heating cost maintain a "comfortable temperature". We then scaled the models we generated in Matlab to an average size home. I choose box 5 to mimic the average household , since it is the only box that has insulation. Also, most house don't have a thermal mass(chimney). When taking the sum of the energy for a year in the box, the results were 74957 J. This indicates that a lot of heat is trapped inside the house and will need air conditioning to keep the box at a comfortable temperature of 65 to 72 degrees. Based on the data we collected on box 5 and model for 48 hour, the box is either above or below 65-72 degrees 18 hours of the day. Meaning that it will need air conditioning or heater on 18 hours to stay comfortable. Note: I'm assuming that the AC and heater use the same amount of energy, based on the model. Running a small AC/Heater 18 hour per day is 6750 BTU (1977 W) that is about 35.59 kWh per day (Please reference link 6 & 7). According to npr.org the price of kWh is 12 cent in California; the total price per day is \$5.3 or \$1948.5 per year. According California Public Utilities Commissions the average electricity bill in California is about \$90 per day or \$1080 per year, this is also including other house hold appliance that use electricity. The reason I think that keeping the box at a comfortable temperature is because it's exposed to the hot roof most of the time, and we used masking tape to seal any holes which a good insulator isn't.

We assume that a larger AC/ heater is required to keep a standard home at a comfortable level. Assuming, that a 5000

Watt AC and heater is good enough to do the job then the price will increase. Say a 20,000 BTU AC and Heater produces 5860 W, assuming that both runs for 18 hours of the day. The price per day is \$15.8 or \$5775.6 per year. This is a ridiculous amount of money to be spending on AC and heater. Also, imagine the price on box 3 since it had no insulation, where the Watt is roughly 10 times more than box 5.

There are two important things to take away from this project. First, Black is the worst color for a roof, due to the properties of how black absorbs more heat. Second, insulation is very important for maintaining good energy efficiency.

References:

- 1) NOAA Data CSV File:
https://mtsac.instructure.com/courses/47475/files/1269763?module_item_id=382077
- 2) Energy and Diatomic ideal gas equation:
http://physics.bu.edu/~redner/211-sp06/class23/class24_kinetic.html
- 3) Justification of air being diatomic:
<http://hyperphysics.phy-astr.gsu.edu/hbase/Kinetic/shegas.html>
- 4) Fourier Analysis:
<https://www.quora.com/What-is-the-fourier-series-for-the-sine-wave-written-as-the-sum-of-infinite-cosine-functions>
<https://www.niwa.co.nz/education-and-training/schools/resources/climate/modelling>
- 5) Weather data may 2nd:
<https://www.timeanddate.com/weather/usa/west-covina/historic>
- 6) AC unit Cost:
<https://www.comfort-pro.com/2015/10/how-much-energy-does-an-air-conditioner-ac-use-infographic/>
http://energyusecalculator.com/electricity_centralac.htm
- 7) Price of Electricity in California
<https://www.npr.org/sections/money/2011/10/27/141766341/the-price-of-electricity-in-your-state>

Appendix:**NOAA Data:****Anhiem Station:****Tmax Tmin**

30.6	17.8
33.3	22.8
29.4	13.3
25	10
17.8	12.2
17.8	9.4
18.9	10
20	6.7
21.7	12.2
22.2	7.2
25	7.2
28.9	8.3
28.3	12.2
22.2	8.9
27.8	7.2
27.2	12.8
28.9	11.1
28.9	10.6
26.1	11.1
24.4	8.9
18.3	13.3
21.1	5
20.6	7.8
17.8	8.3
18.3	2.8
17.2	7.2
22.2	5.6
23.9	7.8
22.2	6.1
17.2	6.1
17.8	6.1
16.7	11.7
18.9	12.2
18.3	8.3
15.6	5.6
17.2	3.9
18.3	5
16.7	3.3
18.3	3.3
19.4	5
18.9	5
21.1	11.1
20.6	6.7
17.8	6.7
21.7	12.2
18.9	13.3
13.9	6.7
28.9	12.2
26.1	10.6
23.9	10.6
19.4	11.1
23.9	7.2
27.2	9.4
29.4	9.4
30.6	12.2

13.9	8.3	29.4	11.7
16.7	4.4	29.4	20
16.7	7.2	29.4	11.7
17.2	10.6	27.8	10.6
21.1	8.9	26.1	11.1
22.8	7.8	25.6	11.7
20	6.1	27.2	12.2
19.4	8.9	26.7	12.2
17.8	10	25	10.6
20.6	10.6	24.4	11.7
22.2	8.9	22.8	12.2
19.4	11.1	22.2	14.4
18.9	12.2	20.6	13.9
22.2	14.4	17.2	8.9
26.1	9.4	22.2	6.1
22.8	8.3	24.4	10.6
22.2	10	25.6	11.7
21.1	8.3	23.9	11.7
23.3	8.3	20	8.9
25.6	12.2	19.4	9.4
25	10.6	21.1	14.4
24.4	8.3	27.8	11.1
23.3	8.9	31.1	12.2
20.6	10.6	31.1	13.3
16.1	12.8	26.1	14.4
15	8.9	24.4	14.4
16.1	2.2	24.4	12.8
20.6	5	23.3	13.9
23.3	7.8	23.3	12.8
25	13.9	28.9	11.1
28.3	17.2	28.9	11.7
31.1	17.8	27.2	11.1
30	22.2	25.6	12.2
32.8	21.7	23.3	12.8
32.8	15	21.7	13.9
30	13.9	18.3	7.8
31.1	13.3	20	9.4
27.2	10.6	21.7	8.9
29.4	9.4	23.3	10
33.9	19.4	27.2	11.7
36.1	15.6	27.8	12.2
31.7	13.3	28.3	12.8
22.2	13.3	31.7	11.7
22.2	10	31.1	13.9
24.4	10	25.6	16.1
24.4	9.4	18.9	15.6
29.4	8.9	20	15

21.1	15	24.4	15
25	12.8	23.9	16.7
23.3	12.8	23.3	16.1
22.8	13.9	26.1	16.1
22.8	14.4	24.4	16.1
27.2	12.8	24.4	16.7
31.1	18.3	33.9	15.6
33.3	13.3	33.9	17.2
32.2	16.1	29.4	16.1
31.7	16.7	25.6	15.6
32.2	14.4	26.7	17.2
31.1	13.9	27.2	17.2
27.8	13.9	25.6	17.8
25	14.4	26.7	17.2
24.4	12.8	26.1	17.2
21.7	13.9	22.2	16.7
22.2	10.6	22.8	16.7
22.2	12.2	23.9	15.6
21.1	12.8	24.4	16.7
22.8	12.2	27.2	13.9
22.8	12.8	32.8	15.6
23.3	13.3	36.1	17.2
27.2	13.3	41.1	20
27.8	14.4	41.1	22.8
25.6	14.4	40.6	21.1
20	15	30.6	18.9
18.9	13.9	28.9	19.4
21.1	13.9	28.3	18.9
20.6	12.2	28.9	18.3
22.8	13.3	31.7	17.8
23.9	13.3	33.9	20
26.7	16.1	32.2	20
25.6	13.9	32.8	19.4
27.8	15.6	31.1	20.6
25	16.7	27.2	20
22.2	16.1	27.8	18.9
21.7	16.1	26.7	17.2
23.9	16.7	28.3	18.3
25	16.7	28.3	19.4
24.4	16.7	28.3	18.9
24.4	15.6	31.1	18.3
21.1	12.2	31.1	18.9
22.8	13.3	31.1	19.4
22.2	13.9	31.1	19.4
23.3	15	30	18.9
21.7	14.4	30	18.9
23.9	13.3	31.7	19.4

30.6	19.4	33.9	20
30.6	18.3	33.3	18.9
32.2	18.9	27.8	19.4
29.4	18.3	27.8	18.3
30.6	18.3	27.8	18.3
33.9	18.3	27.2	18.9
36.7	18.9	31.1	17.2
39.4	21.1	28.9	17.8
38.3	22.2	27.8	18.9
33.9	20.6	30.6	17.8
35.6	21.1	31.7	17.2
35.6	21.7	29.4	17.8
35.6	22.2	28.3	18.3
33.9	21.7	21.7	16.1
33.9	22.2	27.2	13.9
32.2	22.2	28.9	14.4
32.2	21.1	28.3	14.4
33.3	20.6	30.6	15
33.3	20.6	34.4	15.6
30.6	21.1	38.3	18.3
31.7	20	30.6	23.3
30	20	30.6	19.4
30	20.6	24.4	20
29.4	20	27.8	13.9
28.9	20	27.8	21.7
28.9	20	38.9	17.2
31.1	18.3	40.6	21.7
28.9	17.8	37.2	22.8
30.6	18.9	35	20.6
34.4	19.4	35	21.1
33.9	21.1	34.4	19.4
38.9	20.6	32.2	18.3
36.7	17.2	29.4	16.7
36.7	16.7	25	15.6
35.6	17.8	25.6	16.1
32.2	17.8	26.7	16.1
31.7	17.8	32.2	13.9
31.7	18.3	33.3	15
31.7	18.3	33.9	15.6
30.6	18.3	34.4	16.7
31.1	18.9	32.8	16.1
30	18.9	31.1	15
27.2	18.3	24.4	15
28.3	18.9	26.7	12.8
28.3	18.9	26.1	14.4
32.8	17.2	25	16.1
34.4	18.9	24.4	18.3

23.9	16.7	0.043333333	51.1515	37.3902
25.6	13.9	0.046666667	50.7647	37.3902
33.9	13.3	0.05	50.7647	37.3659
37.2	25.6	0.053333333	50.6176	37.3902
37.2	16.7	0.056666667	50.4118	37.4146
32.8	15	0.06	50.2647	37.439
28.9	15.6	0.063333333	50.1765	37.4878
23.3	18.3	0.066666667	50.1176	37.5366
25.6	13.3	0.07	50.0588	37.5854
26.7	13.9	0.073333333	50	37.6098
28.3	15.6	0.076666667	49.9412	37.6585
28.9	18.3	0.08	49.7941	37.7073
30.6	16.7	0.083333333	49.7353	37.7561
28.9	18.3	0.086666667	49.9412	37.8049
22.2	15	0.09	50.4118	37.8293
22.2	12.2	0.093333333	50.8529	37.878
28.3	11.7	0.096666667	51.2121	37.9268
31.1	20.6	0.1	51.6061	37.9756
30.6	14.4	0.103333333	51.8485	37.9756
28.9	13.9	0.106666667	52.1818	38.025
27.8	12.2	0.11	52.5455	38.075
29.4	12.8	0.113333333	52.9697	38.075
35.6	13.3	0.116666667	53.3438	38.15
36.1	19.4	0.12	53.7813	38.15
33.9	18.9	0.123333333	54.2903	38.225
31.7	17.2	0.126666667	54.7097	38.225
		0.13	55.1333	38.3
		0.133333333	55.4	38.3
		0.136666667	55.6667	38.375
		0.14	55.9667	38.4
		0.143333333	56.2	38.425
		0.146666667	56.5	38.475
		0.15	56.7667	38.525
		0.153333333	57.069	38.6
		0.156666667	57.2414	38.55
		0.16	57.5862	38.625
		0.163333333	57.7931	38.65
		0.166666667	58.0345	38.725
		0.17	58.2759	38.725
		0.173333333	58.4138	38.775
		0.176666667	58.6207	38.825
		0.18	58.7241	38.875
		0.183333333	58.8966	38.9
		0.186666667	59.0714	38.925
		0.19	59.0714	38.975
		0.193333333	58.931	38.95
		0.196666667	58.5172	39
		0.2	58.069	39.05
		0.203333333	57.5517	39.1
		0.206666667	57	39.1
		0.21	56.8	39.15
		0.213333333	56.6333	39.15
		0.216666667	56.5333	39.175
		0.22	56.2	39.225

Box 3 Data 1 hour:

B3(1hRL) Time (h)	B3(1hRL) Temperature 1 (°C)	B3(1hRL) Temperature 2 (°C)
0	55.5	37.4146
0.003333333	55.4667	37.2683
0.006666667	55	37.2683
0.01	54.4516	37.2927
0.013333333	53.9688	37.3171
0.016666667	53.375	37.2195
0.02	52.7879	37.2195
0.023333333	52.4545	37.2439
0.026666667	52.2727	37.3415
0.03	52.0303	37.3659
0.033333333	51.7273	37.3415
0.036666667	51.5152	37.4146
0.04	51.3636	37.4146

0.223333333	55.9	39.225	0.406666667	56.3667	39.875
0.226666667	55.9	39.225	0.41	56.3333	39.85
0.23	56.0333	39.25	0.413333333	56.3	39.85
0.233333333	56.2	39.275	0.416666667	56.1333	39.85
0.236666667	56.4	39.3	0.42	55.9333	39.9
0.24	56.5667	39.275	0.423333333	55.7	39.925
0.243333333	56.5333	39.325	0.426666667	55.6	39.875
0.246666667	56.5667	39.325	0.43	55.5667	39.9
0.25	56.5333	39.325	0.433333333	55.5333	39.875
0.253333333	56.7	39.35	0.436666667	55.6333	39.925
0.256666667	56.9	39.35	0.44	55.7	39.9
0.26	57.069	39.35	0.443333333	55.7667	39.9
0.263333333	56.9333	39.375	0.446666667	55.7667	39.925
0.266666667	56.9667	39.375	0.45	55.8	39.95
0.27	56.7667	39.425	0.453333333	55.7667	39.9
0.273333333	56.6667	39.425	0.456666667	55.8	39.95
0.276666667	56.6333	39.425	0.46	55.8333	39.95
0.28	56.5333	39.425	0.463333333	55.9	39.925
0.283333333	56.4	39.45	0.466666667	55.9	39.95
0.286666667	56.2333	39.45	0.47	55.9333	39.925
0.29	56.3333	39.45	0.473333333	56.0667	39.925
0.293333333	56.2667	39.475	0.476666667	56.2	39.925
0.296666667	56.4	39.5	0.48	56.3	39.975
0.3	56.5	39.5	0.483333333	56.5667	39.95
0.303333333	56.8	39.5	0.486666667	56.8	39.95
0.306666667	57	39.5	0.49	57.0345	39.975
0.31	57.2069	39.525	0.493333333	57.2759	39.975
0.313333333	57.3448	39.525	0.496666667	57.4483	40
0.316666667	57.4483	39.525	0.5	57.6897	40
0.32	57.4138	39.575	0.503333333	57.931	40.0769
0.323333333	57.4483	39.6	0.506666667	58.1379	40.0769
0.326666667	57.3793	39.575	0.51	58.3448	40.0769
0.33	57.4138	39.6	0.513333333	58.4483	40.0769
0.333333333	57.4828	39.625	0.516666667	58.4828	40.1026
0.336666667	57.4483	39.6	0.52	58.4483	40.1282
0.34	57.3448	39.625	0.523333333	58.3448	40.1538
0.343333333	57.2759	39.625	0.526666667	58.3793	40.1538
0.346666667	57.2414	39.65	0.53	58.3793	40.1282
0.35	57.2759	39.65	0.533333333	58.4483	40.1538
0.353333333	57.2414	39.7	0.536666667	58.5172	40.2051
0.356666667	57.1034	39.675	0.54	58.7241	40.2051
0.36	56.8667	39.7	0.543333333	58.8966	40.2308
0.363333333	56.8333	39.725	0.546666667	59.0357	40.2821
0.366666667	56.8333	39.75	0.55	59.0357	40.2821
0.37	56.9333	39.75	0.553333333	58.8966	40.2821
0.373333333	56.8667	39.75	0.556666667	58.7241	40.2821
0.376666667	56.8	39.75	0.56	58.5862	40.3333
0.38	56.7333	39.75	0.563333333	58.4138	40.359
0.383333333	56.5667	39.8	0.566666667	58.4483	40.3846
0.386666667	56.4	39.8	0.57	58.3793	40.3846
0.39	56.3667	39.8	0.573333333	58.3103	40.3846
0.393333333	56.4	39.825	0.576666667	58.3793	40.4359
0.396666667	56.3667	39.775	0.58	58.4828	40.4359
0.4	56.3333	39.825	0.583333333	58.4483	40.4359
0.403333333	56.3	39.85	0.586666667	58.4828	40.4615

0.59	58.5172	40.4872	0.773333333	60.0741	41.6667
0.593333333	58.5517	40.5128	0.776666667	60.2593	41.6923
0.596666667	58.5862	40.5641	0.78	60.3333	41.7179
0.6	58.7586	40.5385	0.783333333	60.3333	41.7436
0.603333333	58.9655	40.5641	0.786666667	60.3704	41.7436
0.606666667	59.0714	40.5641	0.79	60.3333	41.7692
0.61	59.1429	40.6154	0.793333333	60.1481	41.7692
0.613333333	59.2143	40.6154	0.796666667	59.8929	41.7949
0.616666667	59.1429	40.6154	0.8	59.7143	41.8205
0.62	59.1429	40.6667	0.803333333	59.6429	41.7949
0.623333333	59.1429	40.6667	0.806666667	59.5	41.7949
0.626666667	59.0714	40.6667	0.81	59.3214	41.8205
0.63	59.1429	40.6923	0.813333333	59.3571	41.7949
0.633333333	59.3214	40.7179	0.816666667	59.3571	41.8205
0.636666667	59.3929	40.7436	0.82	59.4286	41.8718
0.64	59.5	40.7179	0.823333333	59.5714	41.8718
0.643333333	59.5714	40.7436	0.826666667	59.6786	41.8718
0.646666667	59.7857	40.7692	0.83	59.7857	41.8974
0.65	59.9286	40.7692	0.833333333	59.8571	41.9231
0.653333333	60.1852	40.8205	0.836666667	59.8929	41.9231
0.656666667	60.2963	40.8205	0.84	60	41.9487
0.66	60.3704	40.8718	0.843333333	59.9643	41.9231
0.663333333	60.4074	40.8462	0.846666667	59.8214	42
0.666666667	60.4074	40.8974	0.85	59.8929	41.9744
0.67	60.4074	40.8974	0.853333333	59.8929	41.9744
0.673333333	60.3704	40.8974	0.856666667	60	42
0.676666667	60.4815	40.9487	0.86	60.1111	42.0526
0.68	60.5556	40.9744	0.863333333	60.1852	42.0263
0.683333333	60.5185	41	0.866666667	60.3333	42.0263
0.686666667	60.5926	41.0256	0.87	60.4074	42.0526
0.69	60.7037	41.0769	0.873333333	60.5926	42.1053
0.693333333	60.8148	41.0769	0.876666667	60.7407	42.1053
0.696666667	61	41.1026	0.88	60.7407	42.1053
0.7	61.2593	41.1282	0.883333333	60.5926	42.1053
0.703333333	61.4074	41.1538	0.886666667	60.5926	42.1316
0.706666667	61.2963	41.1538	0.89	60.4444	42.1579
0.71	61.1111	41.2051	0.893333333	60.4444	42.1842
0.713333333	61.1852	41.2564	0.896666667	60.5556	42.1316
0.716666667	61.1111	41.2564	0.9	60.5556	42.1842
0.72	60.9259	41.2821	0.903333333	60.5185	42.2105
0.723333333	60.8148	41.3333	0.906666667	60.3333	42.2105
0.726666667	60.7778	41.359	0.91	60.1852	42.2105
0.73	60.8148	41.3333	0.913333333	60.0741	42.2368
0.733333333	60.7778	41.3846	0.916666667	60.037	42.2368
0.736666667	60.6296	41.4615	0.92	59.9643	42.2632
0.74	60.5556	41.4615	0.923333333	59.9286	42.2632
0.743333333	60.5185	41.4872	0.926666667	59.9643	42.3158
0.746666667	60.4444	41.4872	0.93	60	42.3158
0.75	60.4444	41.5128	0.933333333	60.0741	42.2895
0.753333333	60.3704	41.5641	0.936666667	60.2593	42.3158
0.756666667	60.2222	41.5897	0.94	60.2222	42.3684
0.76	60.0741	41.6154	0.943333333	60.1852	42.3684
0.763333333	59.9286	41.641	0.946666667	60.1481	42.3421
0.766666667	59.9643	41.6667	0.95	60.1111	42.3421
0.77	59.9643	41.6923	0.953333333	60	42.3947

0.956666667	59.8929	42.3947	4.5	36.2683	36.878
0.96	59.7143	42.3684	4.666667	35.2927	35.9756
0.963333333	59.4643	42.3947	4.833333	33.3095	34.8333
0.966666667	59.25	42.3947	5	31.6744	33.5952
0.97	59.1429	42.4211	5.166667	29.5952	32.2619
0.973333333	59.1429	42.4211	5.333333	26.5814	29.5
0.976666667	59.1071	42.4474	5.5	24.8605	27.8837
0.98	59.1071	42.4211	5.666667	23.5952	26.6279
0.983333333	59.0357	42.4474	5.833333	22.7045	25.5227
0.986666667	59.1429	42.4474	6	21.7143	24.5116
0.99	59.1786	42.4474	6.166667	21.1905	23.5238
0.993333333	59.25	42.4474	6.333333	20.2558	22.6818
0.996666667	59.3571	42.4474	6.5	19.4762	21.881
1	59.5	42.4737	6.666667	19.2619	21.381
			6.833333	18.881	20.8837
			7	18.5714	20.5349
Box 3 Data 48 hours:			7.166667	17.9762	20
Remote	Remote	Remote	7.333333	18.0238	19.8095
Data:	Data:	Data:	7.5	17.4524	19.4524
Time (h)	Temperature	Temperature	7.666667	16.9286	18.9524
	1 (Å°C)	2 (Å°C)	7.833333	16.5952	18.4048
0	53.9375	36.4146	8	16.1429	17.9762
0.166667	57.2414	40.8462	8.166667	15.7317	17.5
0.333333	58.7241	43.0526	8.333333	15.3659	17.1667
0.5	58.2414	44.2162	8.5	14.875	16.5952
0.666667	57.1379	44.1892	8.666667	14.675	16.4048
0.833333	57.0345	43.8421	8.833333	14.3	16.0952
1	56.1667	44.2973	9	14.2	15.8293
1.166667	56.5667	44.3243	9.166667	13.575	15.3171
1.333333	56.2667	44.4595	9.333333	13.5	15.3902
1.5	56.1667	45.027	9.5	12.95	14.925
1.666667	54.4516	44.5676	9.666667	12.75	14.475
1.833333	55.2	44.4595	9.833333	12.7	14.225
2	53.0938	44.4865	10	12.675	14.075
2.166667	53.4063	44.0811	10.16667	12.35	13.8
2.333333	51.8182	43.5789	10.33333	12.45	13.8
2.5	50.2353	42.6579	10.5	11.9487	13.575
2.666667	50.0882	42.8684	10.66667	11.5641	13.2
2.833333	49.7941	43	10.83333	11.5641	12.85
3	49.0588	42.6579	11	11.2308	12.7
3.166667	48.1765	42.4474	11.16667	11.0256	12.425
3.333333	45.6757	42.0263	11.33333	10.5385	12.05
3.5	45.6216	40.8718	11.5	10.7949	11.9487
3.666667	44.0811	40.6923	11.66667	10.7692	11.7436
3.833333	43.4474	40.359	11.83333	10.9744	11.8718
4	40.4359	39.425	12	10.1282	11.5641
4.166667	38.55	37.8537	12.16667	10.0769	11.359
4.333333	38.825	37.439			

12.33333	10.2564	11.3846	20.16667	47.1667	34.0238
12.5	9.92105	11.1282	20.33333	48.3824	34.7619
12.66667	9.71053	10.8462	20.5	49.2059	35.6829
12.83333	10.641	11	20.66667	50.6471	36.3171
13	10.5128	11.359	20.83333	51.7273	36.5366
13.16667	10.4103	11.3333	21	52.4545	37.3659
13.33333	10.1538	11.3846	21.16667	55.2333	38.425
13.5	9.8421	11.1282	21.33333	53.3438	38.85
13.66667	9.6579	10.9744	21.5	54.9032	39.4
13.83333	10.0769	10.8974	21.66667	57.3793	40.0256
14	10.8462	11.4615	21.83333	57.7586	40.7949
14.16667	10.1026	11.4359	22	58.931	41.3333
14.33333	9.28947	10.8718	22.16667	59.2857	42.4211
14.5	9.31579	10.5128	22.33333	60	42.7368
14.66667	8.97297	10.2564	22.5	59.2143	43.5263
14.83333	8.54054	9.94737	22.66667	58.3103	43.3947
15	8.81081	9.76316	22.83333	59.3929	43.9474
15.16667	8.86487	9.81579	23	59.4643	44.0541
15.33333	8.59459	9.71053	23.16667	59.3214	44.3243
15.5	8.62162	9.42105	23.33333	56.4	43.9211
15.66667	8.62162	9.47368	23.5	60.7407	44.2432
15.83333	8.40541	9.44737	23.66667	61.5185	44.6757
16	8.27027	9.23684	23.83333	59.25	45.3784
16.16667	8.72973	9.36842	24	56.1333	44.8378
16.33333	9	9.63158	24.16667	62.3077	45.6486
16.5	9.23684	9.6579	24.33333	56.6667	45.5946
16.66667	10.0256	9.97368	24.5	61.8148	45.3514
16.83333	10.6667	10.3333	24.66667	61.5926	46.0833
17	12.175	10.9231	24.83333	60.8519	46.1944
17.16667	13.175	11.7436	25	58.7586	46.4167
17.33333	14.625	12.65	25.16667	58.3793	44.973
17.5	17.4762	14.1	25.33333	57.5517	44.1622
17.66667	20.2326	15.7073	25.5	54.5806	43.8947
17.83333	22.5909	17.2619	25.66667	56.0667	43.7895
18	24.6512	18.5	25.83333	52.3939	43.7895
18.16667	27.2093	20.2558	26	56.0333	43.5526
18.33333	29.0476	21.9524	26.16667	56.5	44
18.5	31.1163	23.2619	26.33333	52.7879	43.9211
18.66667	33.2143	24.3023	26.5	52.7576	43.6053
18.83333	35.3902	25.6818	26.66667	53.2813	43.2895
19	36.6829	26.9767	26.83333	51.9394	43.1316
19.16667	37.8537	27.6744	27	49.9706	42.5526
19.33333	40.0256	28.9535	27.16667	50.5	42.5
19.5	41.9231	30.2326	27.33333	49.1765	42.3947
19.66667	44.027	31.4419	27.5	48.0294	41.8974
19.83333	45.4324	32.4762	27.66667	46.4722	41.5128
20	45.4865	33.1905	27.83333	44.8649	40.6154

28	41.9231	39.825	35.83333	12.3	13.9
28.16667	41.3077	39.375	36	11.9231	13.775
28.33333	40	38.625	36.16667	11.9744	13.675
28.5	38.425	38.025	36.33333	11.7692	13.525
28.66667	36.3659	37.122	36.5	11.7179	13.225
28.83333	35.1951	36.439	36.66667	11.5641	13.2
29	32.5238	35.3415	36.83333	11.3333	13.25
29.16667	30.4419	34.1429	37	11.0769	13.025
29.33333	27.3721	31.9767	37.16667	10.7179	12.65
29.5	25.8636	30.4884	37.33333	10.641	12.4
29.66667	25.0227	29.2381	37.5	11.0769	12.4
29.83333	23.7143	28.1163	37.66667	10.5897	12.3
30	22.75	27.0233	37.83333	10.7692	12.125
30.16667	22.1136	26.2326	38	10.5128	12.15
30.33333	21.4524	25.5	38.16667	10.3333	12.025
30.5	20.9535	24.907	38.33333	10.6154	11.9487
30.66667	20.1395	24.1395	38.5	11	12.05
30.83333	19.7381	23.5238	38.66667	10.7179	12.125
31	19.0714	22.8182	38.83333	10.6667	12.05
31.16667	18.8333	22.25	39	10.359	11.8974
31.33333	18.2619	21.7143	39.16667	10.9231	11.8462
31.5	18.3095	21.5476	39.33333	11.0769	12.075
31.66667	17.881	21.1667	39.5	11.359	12.125
31.83333	17.3333	20.5349	39.66667	11.9487	12.4
32	17.1667	20.3488	39.83333	12.6	12.7
32.16667	16.7619	19.881	40	12.875	12.925
32.33333	16.3095	19.4524	40.16667	13.15	13.2
32.5	16.0952	19.1429	40.33333	13.5	13.45
32.66667	15.7805	18.7143	40.5	13.75	13.675
32.83333	15.3171	18.4286	40.66667	13.975	13.9
33	14.95	17.881	40.83333	14.35	14.075
33.16667	14.6	17.5714	41	14.8	14.225
33.33333	14.625	17.1905	41.16667	15.3415	14.425
33.5	14.6	17.119	41.33333	15.5854	14.7
33.66667	14.425	16.7857	41.5	17.119	15
33.83333	14.075	16.6667	41.66667	16.8333	15.2683
34	13.85	16.5	41.83333	17.4048	15.4878
34.16667	13.375	16.1429	42	18.5238	15.7561
34.33333	13.175	15.8049	42.16667	20.5814	16.1667
34.5	13.1	15.6585	42.33333	23.0238	16.9048
34.66667	12.65	15.3415	42.5	24.1628	17.5476
34.83333	12.675	15.0976	42.66667	29.0238	18.2381
35	12.625	14.725	42.83333	30.0233	19.5238
35.16667	12.4	14.6	43	33.7381	20.7907
35.33333	12.3	14.4	43.16667	35.7561	22.0909
35.5	12.225	14.175	43.33333	37.6829	23.2619
35.66667	12.25	14.025	43.5	36.878	24.2558

43.66667	38.425	24.9302	0.05	38.3	35.5366	57.6897
43.83333	39.675	25.7955	0.05333			
44	42.2368	26.5814	3	38.3	35.4146	57.6207
44.16667	41.7949	27.2791	0.05666			
44.33333	43.5263	27.8837	7	38.4	35.7561	57.8276
44.5	44.2703	28.6744	0.06	38.525	35.7317	58
44.66667	48.0588	29.5476	0.06333			
44.83333	47.6667	30.6279	3	38.6	35.561	58.1379
45	50.6471	31.4884	0.06666			
45.16667	49.5588	32.381	7	38.7	35.6341	58.4138
45.33333	49.7941	32.9762	0.07	38.825	35.878	58.6897
45.5	52	33.381	0.07333			
45.66667	52.7879	34.1667	3	38.875	35.7317	58.7586
45.83333	54.129	34.9524	0.07666			
46	56.4333	36.0732	7	38.975	35.6829	58.8966
46.16667	57.6552	37.1951	0.08	39.125	35.6341	58.9655
46.33333	59.2857	38.15	0.08333			
46.5	58.5517	38.4	3	39.2	35.3171	58.931
			0.08666			
			7	39.3	35.3902	58.5862
Box 4 Data 1 hour:			0.09	39.4	35.3171	58.2759
			0.09333			
Remote	Remote	Remote	3	39.45	35.4878	57.7931
Data:	Data:	Data:	0.09666			
Time (h)	Temperatur	Temperatur	7	39.525	35.2439	57.3103
0	38.425	34.7619	0.1	39.5	35.3659	56.8333
0.00333			0.10333			
3	37.9512	34.4048	3	39.575	35.3659	56.5667
0.00666			0.10666			
7	37.6585	34.0714	7	39.65	35.4878	56.5333
0.01	37.5366	34.381	0.11	39.6	35.3171	56.3333
0.01333			0.11333			
3	37.4878	34.4286	3	39.6	35.2683	56.3
0.01666			0.11666			
7	37.439	34.5476	7	39.625	35.0732	56.2
0.02	37.5366	34.8333	0.12	39.6	35.3902	56.2333
0.02333			0.12333			
3	37.5854	35.1463	3	39.675	35.5366	56.5333
0.02666			0.12666			
7	37.6098	35.3415	7	39.575	35.5366	56.6667
0.03	37.6829	35.3415	0.13	39.7	35.5854	57.0345
0.03333			0.13333			
3	37.7561	35.3659	3	39.575	35.4146	57.1724
0.03666			0.13666			
7	37.878	35.1463	7	39.725	35.4878	57.2759
0.04	37.9756	35.2439	0.14	39.675	35.4146	57.2069
0.04333			0.14333			
3	38.075	35.4146	3	39.75	35.6585	57.4138
0.04666			0.14666			
7	38.15	35.4146	7	39.825	35.6098	57.6552

0.15	39.875	35.2195	57.931	0.25	40.2564	35.3902	54.2903
0.15333				0.25333			
3	39.9	35.4146	57.8276	3	40.3077	35.4634	53.9063
0.15666				0.25666			
7	39.95	35.6341	57.5862	7	40.2564	35.3171	53.4375
0.16	39.95	35.6098	57.5172	0.26	40.1795	35.2683	53
0.16333				0.26333			
3	39.975	35.5854	57.3448	3	40.2308	35.4146	52.6364
0.16666				0.26666			
7	39.95	35.6098	57.3793	7	40.1795	35.4878	52.2727
0.17	40.0769	35.439	57.4138	0.27	40.1795	35.439	51.9091
0.17333				0.27333			
3	40.0513	35.3415	57.3103	3	40.1538	35.122	51.6061
0.17666				0.27666			
7	40.1026	35.2439	57.2414	7	40.1538	35.2927	51.2424
0.18	40.0513	35.2683	57.1379	0.28	40.1282	35.3415	50.8824
0.18333				0.28333			
3	40.0769	35.3902	57.1034	3	40.1282	35.3902	50.6471
0.18666				0.28666			
7	40.1282	35.439	57.1724	7	40.0769	35.3415	50.4118
0.19	40.0769	35.5122	57.2414	0.29	40.0769	35.5122	50.2059
0.19333				0.29333			
3	40.1282	35.6585	57.4828	3	40.0769	35.5122	49.9706
0.19666				0.29666			
7	40.1026	35.7805	57.7241	7	40.0513	35.2439	49.7059
0.2	40.1282	35.6829	57.8966	0.3	40.0769	35.4878	49.5
0.20333				0.30333			
3	40.1795	35.561	58.1034	3	40.0769	35.6098	49.2647
0.20666				0.30666			
7	40.1795	35.6341	58.1034	7	40	35.5122	49.0294
0.21	40.2051	35.7805	58.2069	0.31	40.0256	35.6341	48.8235
0.21333				0.31333			
3	40.2051	35.7561	58.2414	3	40.1026	35.5854	48.6765
0.21666				0.31666			
7	40.2308	35.4878	58.1724	7	40.0256	35.3902	48.5
0.22	40.2821	35.6098	58.1034	0.32	40.0256	35.0488	48.2059
0.22333				0.32333			
3	40.3077	35.878	58.0345	3	40.0513	35.3415	48.0294
0.22666				0.32666			
7	40.2308	35.5122	57.6552	7	40.0256	35.0976	47.8611
0.23	40.3333	35.8049	57.2069	0.33	39.975	35.2927	47.6389
0.23333				0.33333			
3	40.3333	35.6829	56.7333	3	39.95	35.1463	47.6111
0.23666				0.33666			
7	40.2821	35.5122	56.1667	7	39.875	34.8571	47.4167
0.24	40.3077	35.9756	55.6667	0.34	39.875	35.2195	47.3056
0.24333				0.34333			
3	40.3846	35.9756	55.2333	3	39.9	35.5366	47.2222
0.24666				0.34666			
7	40.3077	35.3659	54.6774	7	39.85	35.3415	47.1111

0.35	39.85	35.2683	46.9722	0.45	39.925	35.2927	53.9688
0.35333				0.45333			
3	39.825	35.2439	46.7778	3	39.95	35.4878	54.1936
0.35666				0.45666			
7	39.775	35.1707	46.6667	7	40.0256	35.8049	54.5484
0.36	39.775	35.1951	46.5556	0.46	40.0769	35.8537	54.871
0.36333				0.46333			
3	39.7	35.0732	46.4444	3	40.1282	36.2195	55.1
0.36666				0.46666			
7	39.725	35.3171	46.4167	7	40.1282	36.122	55.2
0.37	39.725	35.5854	46.2778	0.47	40.1282	35.9268	55.2667
0.37333				0.47333			
3	39.75	35.4634	46.1944	3	40.1026	36.0244	55.5
0.37666				0.47666			
7	39.675	35.439	46	7	40.2308	36.1463	55.7
0.38	39.65	35.6341	45.8378	0.48	40.2564	36.122	55.9
0.38333				0.48333			
3	39.7	35.6341	45.7027	3	40.3333	36.2683	56.2
0.38666				0.48666			
7	39.7	35.6341	45.6486	7	40.2821	36.2195	56.3667
0.39	39.725	35.6829	45.5946	0.49	40.3333	36.3902	56.6333
0.39333				0.49333			
3	39.675	35.7317	45.4865	3	40.359	36.4146	57
0.39666				0.49666			
7	39.625	35.6098	45.3243	7	40.4103	36.4634	57.2759
0.4	39.675	35.2439	45.7027	0.5	40.4359	36.3171	57.4828
0.40333				0.50333			
3	39.675	35.5122	46.3333	3	40.4615	36.0976	57.6552
0.40666				0.50666			
7	39.7	35.7561	46.4167	7	40.5385	36.2683	57.7586
0.41	39.725	35.4634	47.3611	0.51	40.5897	36.4634	57.931
0.41333				0.51333			
3	39.775	35.7561	48.1765	3	40.641	36.3659	58.0345
0.41666				0.51666			
7	39.775	35.878	48.9412	7	40.641	36.3171	58.069
0.42	39.75	36.0244	49.5294	0.52	40.7436	36.6341	58.1724
0.42333				0.52333			
3	39.775	35.878	49.9706	3	40.7692	36.5122	58.1724
0.42666				0.52666			
7	39.8	36.0976	50.6471	7	40.7692	36.3415	58.3448
0.43	39.8	35.9756	51.3333	0.53	40.8462	36.5366	58.4138
0.43333				0.53333			
3	39.825	36.0244	51.9697	3	40.8462	36.5854	58.4483
0.43666				0.53666			
7	39.875	36.0976	52.7273	7	40.8974	36.7561	58.7241
0.44	39.9	35.6098	53.375	0.54	40.9231	36.7317	59.0357
0.44333				0.54333			
3	39.9	35.561	53.6563	3	40.9744	36.8293	59.3214
0.44666				0.54666			
7	39.9	35.5366	53.8438	7	41.0256	36.8049	59.6429

0.55	41.0769	36.7317	59.8571	0.65	41.7179	37.0976	58.069
0.55333				0.65333			
3	41.1538	36.8293	60.0741	3	41.6923	37.1951	57.7241
0.55666				0.65666			
7	41.2308	36.7073	60.0741	7	41.6154	37.1951	57.8621
0.56	41.3077	36.8049	60	0.66	41.5897	37.2683	58.0345
0.56333				0.66333			
3	41.3846	37.0244	60.1111	3	41.5641	37.1463	58.069
0.56666				0.66666			
7	41.3846	36.9756	60.1481	7	41.5897	37.3171	58.4483
0.57	41.4615	36.9756	60.1852	0.67	41.641	37.3659	58.7241
0.57333				0.67333			
3	41.5385	37	60.2963	3	41.641	37.1951	58.8621
0.57666				0.67666			
7	41.5897	37.1707	60.3333	7	41.6923	37.2927	59.0357
0.58	41.6923	37.1951	60.5926	0.68	41.6923	37.3171	59.1071
0.58333				0.68333			
3	41.6923	37.0732	60.7037	3	41.641	36.9024	59.0357
0.58666				0.68666			
7	41.6923	37.0976	61.037	7	41.6154	36.878	58.9655
0.59	41.7949	37.1707	61.2222	0.69	41.6667	37.1463	58.8276
0.59333				0.69333			
3	41.8462	37.0976	61.4815	3	41.6923	37.0488	58.7586
0.59666				0.69666			
7	41.8974	36.9268	61.5926	7	41.6923	37.0244	58.6207
0.6	41.8974	36.9512	61.1111	0.7	41.6923	37.1951	58.5172
0.60333				0.70333			
3	41.9487	37.1463	60.9259	3	41.7179	37.2927	58.5517
0.60666				0.70666			
7	42.0526	37.2439	60.5185	7	41.6923	37.2195	58.6552
0.61	42	37.2439	60.1111	0.71	41.7436	37.4146	58.931
0.61333				0.71333			
3	42	37.122	59.8571	3	41.7949	37.439	59.1071
0.61666				0.71666			
7	41.9487	36.9512	59.75	7	41.7692	37.2683	59.4286
0.62	42.0263	37.1463	59.4643	0.72	41.7436	37.0976	59.3929
0.62333				0.72333			
3	41.9487	37.439	59.4286	3	41.8205	37.3659	59.4286
0.62666				0.72666			
7	41.8718	37.6341	59.1786	7	41.8462	37.5122	59.5714
0.63	41.8974	37.439	59.1429	0.73	41.8462	37.6829	59.75
0.63333				0.73333			
3	41.9744	37.4878	59.0357	3	41.8974	37.1463	59.7857
0.63666				0.73666			
7	41.8974	37.2439	58.8966	7	41.9744	37.3902	59.6786
0.64	41.8462	37.1463	58.6897	0.74	41.9744	37.7073	59.5
0.64333				0.74333			
3	41.8462	37.1951	58.7586	3	41.9487	37.6829	59.0357
0.64666				0.74666			
7	41.8205	37.3171	58.4483	7	41.8718	37.439	58.6552

0.75	41.8718	37.4634	58.5862	0.85	41.9744	37.6829	59.1786
0.75333				0.85333			
3	41.8718	37.439	58.5517	3	41.9487	37.5366	59
0.75666				0.85666			
7	41.7949	37.3659	58.6552	7	42.0263	37.561	58.8966
0.76	41.7949	37.5366	58.7241	0.86	42.0526	37.6585	58.8966
0.76333				0.86333			
3	41.7949	37.6585	58.8621	3	42.0263	37.5854	58.8276
0.76666				0.86666			
7	41.7436	37.6341	59.0714	7	42.0789	37.439	58.8276
0.77	41.7436	37.3171	59.1071	0.87	42.0263	37.2195	58.4483
0.77333				0.87333			
3	41.7436	37.3415	59.1786	3	42.0789	37.5854	58.3103
0.77666				0.87666			
7	41.8205	37.439	59.2857	7	42.0526	37.6098	58.2069
0.78	41.8462	37.4878	59.3214	0.88	42.0263	37.561	58.0345
0.78333				0.88333			
3	41.8974	37.6585	59.3571	3	42.0263	37.7561	58
0.78666				0.88666			
7	41.8718	37.6585	59.4286	7	42.0263	37.7317	57.8276
0.79	41.9231	37.5366	59.5714	0.89	42	37.7805	57.8621
0.79333				0.89333			
3	42	37.5854	59.6429	3	42.0263	37.8293	57.9655
0.79666				0.89666			
7	41.9744	37.5854	58.8966	7	42.0789	37.8049	58.1034
0.8	42	37.7805	58.7586	0.9	42.0789	37.8293	58.0345
0.80333				0.90333			
3	42.0526	37.7317	58.8621	3	42.0526	37.7561	58.069
0.80666				0.90666			
7	42.0263	37.6341	58.8276	7	42	37.7805	58.069
0.81	41.9487	37.7317	58.7931	0.91	42	37.878	58.1724
0.81333				0.91333			
3	41.9487	37.6829	58.7241	3	42.0263	37.9512	58.1379
0.81666				0.91666			
7	42	37.439	58.6897	7	42.0263	37.8293	58.2069
0.82	41.9744	37.4878	58.6552	0.92	41.9231	37.5122	57.931
0.82333				0.92333			
3	41.9487	37.7317	58.7241	3	41.9744	37.3171	57.5517
0.82666				0.92666			
7	41.9231	37.9024	58.6552	7	41.9231	37.9024	57.5517
0.83	41.8718	37.6829	58.3103	0.93	41.9744	38	57.6207
0.83333				0.93333			
3	41.8205	37.6585	58.4828	3	41.8974	37.7073	57.6897
0.83666				0.93666			
7	41.8462	37.4878	58.7241	7	41.8974	37.8049	57.7931
0.84	41.8718	37.6098	58.931	0.94	41.8974	37.9024	57.1034
0.84333				0.94333			
3	41.9231	37.6585	59.0714	3	41.8462	37.5854	57.1034
0.84666				0.94666			
7	41.9487	37.7805	59.25	7	41.8205	37.8049	57.1379

0.95	41.8462	37.9024	57.3793	2.5	41.1026	40.0769	49.8
0.95333				2.666666667	41.8974	40.1282	51.2
3	41.8205	38.1	57.6897	2.833333333	41.4872	39.8	49.6
0.95666				3	41.2821	40.0769	48.8
7	41.8205	38.125	57.8276	3.166666667	40.6923	39.425	47.3
0.96	41.8462	37.9268	57.9655	3.333333333	39.475	39.15	44.6
0.96333				3.5	39.45	39.075	45.1
3	41.8718	37.9512	58.1724	3.666666667	38.675	38.75	43.1
0.96666				3.833333333	38.175	38.425	41.4
7	41.9231	38.05	58.4828	4	36.3415	36.4878	38.5
0.97	41.9231	38.025	58.7241	4.166666667	36.0244	36.6585	38.5
0.97333				4.333333333	35.6829	36.5122	37.1
3	41.9487	38.1	59.0357	4.5	34.9048	35.878	36.2
0.97666				4.666666667	34.2857	35.1951	34.3
7	42.0789	38.125	59.4286	4.833333333	32.4048	33.5952	31.6
0.98	42.1579	38.225	59.6071	5	30.7674	32.4286	27.4
0.98333				5.166666667	28.5814	30.6512	25.9
3	42.1842	38.3	59.8214	5.333333333	27.2326	29.2857	24.5
0.98666				5.5	26.3953	28.4884	23.7
7	42.2895	38.15	59.7857	5.666666667	25.3864	27.5116	22.9
0.99	42.3421	38.275	59.5714	5.833333333	24.4884	26.5349	22.2
0.99333				6	23.5476	25.4318	20.9
3	42.3947	38.15	59.5357	6.166666667	22.9091	25	20.3
0.99666				6.333333333	22.1818	24.186	19.4
7	42.4474	38.325	59.5714	6.5	21.6667	23.7381	19.0
1	42.5	38.4	59.6429	6.666666667	21.2857	23.0238	18.4
				6.833333333	20.907	22.8864	18.5
				7	20.5349	22.2955	17.9
				7.166666667	20.1395	21.9286	18.0
				7.333333333	19.9286	21.5476	17.9
				7.5	19.5	21.1667	17.0
				7.666666667	18.9524	20.6512	16.4
				7.833333333	18.4524	20.0465	15.5
				8	18.2143	20.2093	15.9
				8.166666667	17.9048	19.5238	15.7
				8.333333333	17.3571	18.7857	14.5
				8.5	17	18.5714	14.5
				8.666666667	16.6667	18.4524	14.5
				8.833333333	16.4048	17.881	14.5
				8.933333333	15.9756	17.2857	13.5
				9	15.8537	17.619	13.5
				9.166666667	15.6098	16.9524	13.5
				9.333333333	15.0976	16.5238	12.5
				9.5	15	16.5714	13.5
				9.666666667	14.8	15.9024	12.5
				9.833333333	14.575	15.9512	12.5
				10	14.2	15.3902	12.5
				10.166666667	14.3	15.5122	12.5
				10.333333333	13.775	15.1707	11.5
				10.5	13.35	14.9	11.5
				10.666666667	13.25	14.5	11.3
				10.833333333	13.025	14.4	11.1
				11	12.725	14	10.9
				11.166666667			

Box 4 Data 48 hour:

Remote Data: Time (h)	Remote Data: Temperature 1 (°C)	Remote Data: Temperature 2 (°C)	Remote Data: Temperature 3 (°C)	Remote Data: Temperature 4 (°C)	Remote Data: Temperature 5 (°C)	Remote Data: Temperature 6 (°C)	Remote Data: Temperature 7 (°C)
0	38.95	31.3256	57.8276	57.8276	57.8276	57.8276	57.8276
0.166666667	42.5789	40.6667	55.8333	55.8333	55.8333	55.8333	55.8333
0.333333333	44.1622	41.2051	57.7951	57.7951	57.7951	57.7951	57.7951
0.5	43.3684	40.6923	55.9333	55.9333	55.9333	55.9333	55.9333
0.666666667	43.1842	40.7436	55.6	55.6	55.6	55.6	55.6
0.833333333	43.3684	40.8462	9.3333	9.3333	9.3333	9.3333	9.3333
1	43.1842	41.2051	53.9688	53.9688	53.9688	53.9688	53.9688
1.166666667	43.1316	40.5641	55.3333	55.3333	55.3333	55.3333	55.3333
1.333333333	43.8158	40.9744	56.7	56.7	56.7	56.7	56.7
1.5	43.6316	40.6154	55.1667	55.1667	55.1667	55.1667	55.1667
1.666666667	43.1053	40.4872	10.3333	10.3333	10.3333	10.3333	10.3333
1.833333333	43.3684	40.7436	54.6774	54.6774	54.6774	54.6774	54.6774
2	42.3947	40.8718	50.2121	50.2121	50.2121	50.2121	50.2121
2.166666667	42.1316	40.8718	51.303	51.303	51.303	51.303	51.303
2.333333333	41.7949	40.4615	11.1667	11.1667	11.1667	11.1667	11.1667

11.33333333	12.45	13.875	10.8462 20.5	32.6667	27.7907	49.2
11.5	12.475	13.6	12.06666667	32.5952	28.7442	48.8
11.66666667	12.35	13.575	12.05333333	33.8571	29.2619	50.8
11.83333333	12.35	13.4	10.7179 21	34.381	30.3953	51.7
12	11.9231	13.15	12.110266667	35.8293	30.6047	51.6
12.16666667	11.8718	13.2	12.14533333	36.0976	30.9302	52.7
12.33333333	11.7692	13.075	10.0769 21.5	36.6341	31.6977	53
12.5	11.4872	12.75	9.273666667	37.9512	32.6667	56.2
12.66666667	11.359	12.575	9.183333333	38.3	33.2381	57.1
12.83333333	11.8462	12.9	10.7692 22	39.3	34.0476	58.9
13	11.8974	12.925	12.248766667	40.0769	34.5	56.9
13.16666667	11.7436	12.825	12.33333333	40.5897	35.8293	58.3
13.33333333	11.5128	12.6	9.78947 22.5	40.6923	35.5122	57.3
13.5	11.2564	12.6	9.226666667	40.4872	35.7073	57.1
13.66666667	11.2308	12.625	9.228333333	41.0513	36.5122	58.5
13.83333333	11.6667	12.825	11.1282 23	41.4359	37.0488	59.6
14	11.9231	12.8	12.361666667	40.9744	37	57.2
14.16666667	11.4103	12.35	9.236833333	40.1026	36.7317	5
14.33333333	10.7692	11.8974	9.36842 23.5	41.3077	37.7317	58.2
14.5	10.5897	11.6154	23.66666667	41.9231	38.05	58.1
14.66666667	10.2308	11.4872	8.245833333	41.7692	38.225	5
14.83333333	10.2308	11.4615	8.72973 24	41.5897	38.75	57.2
15	10.0513	11.3333	9.241666667	42.9737	38.725	55.8
15.16666667	10.1282	11.1538	8.243333333	41.6923	38.575	54.1
15.33333333	9.71053	10.8718	8.18919 24.5	43.2105	40.1795	60.8
15.5	9.78947	10.7949	8.239666667	43.5789	40.0256	57.4
15.66666667	9.81579	10.7436	8.242633333	43.9737	40.4103	59.6
15.83333333	9.68421	10.641	8.45946 25	43.6053	40.0769	5
16	9.6579	10.6923	8.248266667	42.2368	39.95	54.5
16.16666667	10	11.0769	9.251333333	42.7105	40.5128	52.6
16.33333333	10.0256	11.1538	9.1579 25.5	41.5641	40.1538	52.9
16.5	10.2821	11.3333	9.258666667	42.6316	40.6154	55.7
16.66666667	10.6667	11.5128	12.53333333	42.2105	40.5128	54.7
16.83333333	11.2051	11.8205	11.2308 26	42.8947	40.8718	56.7
17	12.275	12.5	12.76666667	42.6842	40.8974	5
17.16666667	13.625	13.4	26.34333333	42.4211	40.7692	52.1
17.33333333	14.8	13.925	15.5122 26.5	42.1316	40.6667	52.7
17.5	16.3333	14.9	12.61666667	42.1579	40.5385	52.2
17.66666667	17.5	15.6341	12.67833333	40.7692	40.2564	48.8
17.83333333	18.1429	16.2857	22.4545 27	41.3077	40.5385	49.7
18	19.2143	17.0238	25.48666667	41.3846	40.3846	49.7
18.16666667	20.6977	17.8095	27.37333333	41.1538	40.2821	47.9
18.33333333	21.5476	18.3571	30.1395 27.5	40.3333	40.1538	47.4
18.5	22.7273	18.9762	31.95666667	40	39.775	44.6
18.66666667	23.4048	19.8095	32.58333333	38.675	39.225	42.6
18.83333333	24.4186	20.7674	35.6585 28	38.1	38.775	41.1
19	24.8372	21.4286	38.51666667	37.5366	38	40.4
19.16666667	25.5909	21.9048	28.27333333	36.9756	37.2439	38.1
19.33333333	26.7209	22.5682	40.6667 28.5	35.9756	36.6341	36.6
19.5	28.3488	23.6429	42.07666667	35.2683	36.3171	35.4
19.66666667	28.8837	24.6279	28.83333333	34.0238	34.6667	
19.83333333	29.881	25.1818	45.027 29	31.7674	33.0476	28.1
20	31.0698	26.0233	42.93666667	29.4762	31.6279	26.3
20.16666667	31.1628	26.6744	42.94333333	27.9302	30.2326	25.1
20.33333333	31.9767	27.186	48.0588 29.5	27.0465	29.4048	24.6

29.66666667	26.1628	28.4884	23.085233333	11.6154	12.625	10.1
29.83333333	25.2273	27.8372	22.0227 39	11.5641	12.8	10.3
30	24.3488	26.3256	23.942666667	11.6667	12.6	11.0
30.16666667	23.7143	25.6818	23.037333333	11.9744	12.925	
30.33333333	23.0714	25.2727	20.8372 39.5	12	12.85	11.4
30.5	22.4318	24.6512	19.952666667	12.425	13.3	12.
30.66666667	21.9286	24.0233	19.813333333	12.975	13.65	12.
30.83333333	21.3333	23.5714	18.7619 40	13.225	13.875	13
31	20.9302	23.2857	18.021666667	13.375	13.9	13.
31.16666667	20.5349	22.5	17.833333333	13.55	13.925	13.
31.33333333	20.0698	21.881	17.881 40.5	13.75	14.075	13
31.5	19.9286	21.8571	17.065666667	14.025	14.425	13.
31.66666667	19.2857	21.0476	16.783333333	14.2	14.55	14.
31.83333333	18.9762	20.3488	16.9286 41	14.45	14.775	14.
32	18.7619	20.5116	16.151666667	14.7	15.0244	1
32.16666667	18.2857	20.0698	15.931233333	14.75	15.1463	15.6
32.33333333	17.9048	19.4762	15.6341 41.5	15.2439	15.439	16.1
32.5	17.6905	19.1905	15.566666667	15.3415	15.6098	15.2
32.66666667	17.4048	19.0476	15.183333333	15.561	15.8049	17.1
32.83333333	16.9524	18.5952	14.5 42	16.0476	16.1905	18.1
33	16.7381	18.6429	42.146666667	16.6667	16.5714	22.7
33.16666667	16.4048	18.3333	42.343333333	17.6667	17.119	24.4
33.33333333	16.2143	17.6905	14.1 42.5	18.4524	17.3333	24.5
33.5	16.0714	17.7619	42.676666667	19.6905	18.5238	30.4
33.66666667	15.9268	17.3571	42.333333333	20.8837	19.0714	31.6
33.83333333	15.6341	17.381	13.675 43	22.1364	19.881	34.7
34	15.3171	16.9524	43.366666667	23.5476	20.814	36.5
34.16666667	15.1707	16.8333	43.323333333	24.4419	21.5	38.
34.33333333	14.85	16.7381	12.85 43.5	25.4091	22	3
34.5	14.65	16.1429	42.676666667	26.093	22.8409	40.2
34.66666667	14.4	16	43.823333333	27.093	23.4762	40.8
34.83333333	14.125	15.7561	12.175 44	28.1163	24.0233	41.5
35	14.1	15.7561	42.266666667	28.6977	24.5581	42.8
35.16666667	13.975	15.6341	44.233333333	29.619	25.4773	44.
35.33333333	13.825	15.122	11.8205 44.5	30.5349	25.9545	45.7
35.5	13.625	15.0976	14.966666667	31.7674	27.3488	49.7
35.66666667	13.675	14.975	44.833333333	32.881	27.907	49.7
35.83333333	13.7	15.1951	12.05 45	34.1667	28.7442	52.7
36	13.3	14.725	14.516666667	34.4286	29.5238	52.4
36.16666667	13.175	14.375	45.333333333	34.881	29.619	51.6
36.33333333	13.025	14.375	11.2308 45.5	34.9286	29.9286	51.5
36.5	13.025	14.475	14.566666667	35.9268	30.9767	53.5
36.66666667	12.75	14.05	14.583333333	36.3659	31.6977	54.6
36.83333333	12.675	14.1	11.1282 46	37.8537	32.7619	56.4
37	12.475	13.825	16.946666667	38.625	33.9524	57.1
37.16666667	12.1	13.35	16.258333333	39.5	33.3571	56.1
37.33333333	12.1	13.35	10.359 46.5	39.625	34.4286	57.9
37.5	12.225	13.725	16.876666667	39.95	35	58.4
37.66666667	11.9487	13.25	10.4103			
37.83333333	11.8718	13.025	10.5128			
38	11.8462	12.875	10.6923			
38.16666667	11.8718	13.225	10.4615			
38.33333333	11.8974	13.075	10.5385			
38.5	11.9231	12.9	10.8974			
38.66666667	11.7436	12.85	10.2051			

Box 5 1 hour Data:

Remote Data: Time (h)	Remote Data: Temperature 1 (°C)	Remote Data: Temperature 2 (°C)			
0	45.8108	46.0556	0.146666667	48.4706	48.1765
0.003333333	45.7568	45.3514	0.15	48.5294	48.1176
0.006666667	45.7027	45.2973	0.153333333	48.5294	48.0294
0.01	45.7297	45.5946	0.156666667	48.5588	47.9722
0.013333333	45.7838	45.7838	0.16	48.5588	47.8611
0.016666667	45.8378	46.0556	0.163333333	48.5588	47.8333
0.02	45.8919	46.3056	0.166666667	48.5882	47.8056
0.023333333	45.973	46.5	0.17	48.6176	47.8611
0.026666667	46.0556	46.6389	0.173333333	48.6176	47.8889
0.03	46.1944	46.8056	0.176666667	48.6176	47.8889
0.033333333	46.25	46.8611	0.18	48.6471	47.8889
0.036666667	46.3611	46.8889	0.183333333	48.6765	47.8611
0.04	46.5	46.9167	0.186666667	48.6765	47.8889
0.043333333	46.5556	46.9167	0.19	48.6765	47.9722
0.046666667	46.6389	46.9722	0.193333333	48.7059	48.0588
0.05	46.75	47.0833	0.196666667	48.7059	48.1176
0.053333333	46.8056	47.0833	0.2	48.7647	48.1471
0.056666667	46.8889	47.1111	0.203333333	48.7647	48.2059
0.06	46.9722	47.1111	0.206666667	48.7941	48.0882
0.063333333	47.0278	47.1389	0.21	48.8529	48.0588
0.066666667	47.1389	47.1944	0.213333333	48.8235	48.0882
0.07	47.1389	47.25	0.216666667	48.8529	47.9722
0.073333333	47.2222	47.25	0.22	48.8529	48.0588
0.076666667	47.25	47.25	0.223333333	48.8529	48
0.08	47.2778	47.2778	0.226666667	48.8824	48.0294
0.083333333	47.3333	47.3611	0.23	48.8824	48
0.086666667	47.3889	47.4722	0.233333333	48.9118	48.0294
0.09	47.4444	47.6111	0.236666667	48.9412	48.1471
0.093333333	47.4722	47.6667	0.24	48.9118	48.1765
0.096666667	47.5556	47.7778	0.243333333	48.9412	48.2647
0.1	47.6111	47.8333	0.246666667	48.9412	48.2941
0.103333333	47.6944	47.9167	0.25	48.9412	48.3824
0.106666667	47.75	48.0294	0.253333333	49	48.4412
0.11	47.7778	48.0588	0.256666667	49	48.4706
0.113333333	47.8333	48.1765	0.26	49.0588	48.5588
0.116666667	47.9167	48.2353	0.263333333	49.0588	48.6176
0.12	47.9444	48.3235	0.266666667	49.0882	48.6176
0.123333333	48	48.4118	0.27	49.1471	48.7059
0.126666667	48.0882	48.5588	0.273333333	49.1471	48.7353
0.13	48.1471	48.5588	0.276666667	49.2059	48.7059
0.133333333	48.2353	48.5294	0.28	49.2647	48.7059
0.136666667	48.2941	48.5	0.283333333	49.2353	48.6176
0.14	48.3529	48.4118	0.286666667	49.2941	48.6176
0.143333333	48.4118	48.2647	0.29	49.3529	48.6765
			0.293333333	49.3529	48.6176
			0.296666667	49.3529	48.5588
			0.3	49.3824	48.6471
			0.303333333	49.4412	48.5294
			0.306666667	49.4118	48.5
			0.31	49.4412	48.5882
			0.313333333	49.4706	48.6176
			0.316666667	49.4706	48.5588
			0.32	49.4412	48.3824
			0.323333333	49.5	48.3235
			0.326666667	49.4412	48.3235

0.33	49.4412	48.2353	0.513333333	50.0882	49.6176
0.333333333	49.4412	48.2941	0.516666667	50.1471	49.7059
0.336666667	49.5	48.3529	0.52	50.1765	49.7059
0.34	49.4706	48.3824	0.523333333	50.1765	49.7353
0.343333333	49.4706	48.3824	0.526666667	50.2353	49.7353
0.346666667	49.5	48.3824	0.53	50.2647	49.7647
0.35	49.5	48.2941	0.533333333	50.3529	49.8824
0.353333333	49.4412	48.3529	0.536666667	50.3529	49.9412
0.356666667	49.4412	48.3235	0.54	50.3824	49.9118
0.36	49.3824	48.2941	0.543333333	50.3824	50
0.363333333	49.3824	48.2353	0.546666667	50.4706	50.1176
0.366666667	49.3529	48.2059	0.55	50.4706	50.1176
0.37	49.3824	48.2059	0.553333333	50.5	50.0882
0.373333333	49.3529	48.1765	0.556666667	50.5294	50.0882
0.376666667	49.3235	48.1471	0.56	50.5882	50.1471
0.38	49.3824	48.2059	0.563333333	50.6765	50.2059
0.383333333	49.3529	48.2059	0.566666667	50.6765	50.2353
0.386666667	49.3824	48.2059	0.57	50.7647	50.2941
0.39	49.3824	48.2059	0.573333333	50.7647	50.3235
0.393333333	49.3529	48.2353	0.576666667	50.7941	50.3824
0.396666667	49.3529	48.2059	0.58	50.8824	50.4118
0.4	49.3824	48.1765	0.583333333	50.8529	50.4412
0.403333333	49.4118	48.2059	0.586666667	50.9118	50.5
0.406666667	49.3824	48.1471	0.59	50.9412	50.6176
0.41	49.4412	48.1765	0.593333333	51	50.7059
0.413333333	49.4412	48.2647	0.596666667	51.0606	50.7647
0.416666667	49.4412	48.3235	0.6	51.1515	50.8529
0.42	49.4412	48.4118	0.603333333	51.2121	50.9706
0.423333333	49.4412	48.4412	0.606666667	51.2424	51
0.426666667	49.4706	48.4706	0.61	51.3333	51.0606
0.43	49.4706	48.5294	0.613333333	51.3636	51.0606
0.433333333	49.5	48.5882	0.616666667	51.4242	51.1515
0.436666667	49.4412	48.5882	0.62	51.4848	51.2121
0.44	49.5	48.6765	0.623333333	51.5455	51.2424
0.443333333	49.5	48.7941	0.626666667	51.6364	51.3636
0.446666667	49.5	48.8235	0.63	51.697	51.4545
0.45	49.5588	48.9118	0.633333333	51.7576	51.5152
0.453333333	49.5294	48.9706	0.636666667	51.8182	51.6061
0.456666667	49.5588	49	0.64	51.8788	51.6667
0.46	49.5882	49.0588	0.643333333	51.9697	51.697
0.463333333	49.6176	49.0882	0.646666667	52.0303	51.7273
0.466666667	49.6765	49.2059	0.65	52.0303	51.6667
0.47	49.6765	49.1765	0.653333333	52.1212	51.7273
0.473333333	49.7059	49.2059	0.656666667	52.1515	51.7879
0.476666667	49.7059	49.2353	0.66	52.1818	51.7576
0.48	49.7353	49.2353	0.663333333	52.1818	51.6667
0.483333333	49.7647	49.2941	0.666666667	52.2424	51.6667
0.486666667	49.7941	49.3824	0.67	52.2727	51.6667
0.49	49.8235	49.4706	0.673333333	52.2424	51.6364
0.493333333	49.8824	49.4412	0.676666667	52.2424	51.4848
0.496666667	49.9118	49.3824	0.68	52.2424	51.4242
0.5	49.9412	49.4412	0.683333333	52.2727	51.3636
0.503333333	49.9706	49.4412	0.686666667	52.2424	51.303
0.506666667	50	49.4412	0.69	52.2424	51.2727
0.51	50.0588	49.5	0.693333333	52.2121	51.2121

0.696666667	52.1515	51.0909	0.88	51.7879	51.1515
0.7	52.1515	51.0303	0.883333333	51.7576	51.0606
0.703333333	52.0909	50.9118	0.886666667	51.697	51
0.706666667	52.0606	50.8824	0.89	51.697	50.9412
0.71	52.0303	50.8235	0.893333333	51.7273	51.0303
0.713333333	52	50.7941	0.896666667	51.7273	51
0.716666667	51.9697	50.8235	0.9	51.697	50.9412
0.72	51.9394	50.8529	0.903333333	51.697	50.8824
0.723333333	51.8788	50.7941	0.906666667	51.697	50.8235
0.726666667	51.8788	50.8529	0.91	51.7576	50.8529
0.73	51.9091	50.8529	0.913333333	51.7273	50.8235
0.733333333	51.8788	50.8235	0.916666667	51.7273	50.7941
0.736666667	51.9091	50.7941	0.92	51.7576	50.8235
0.74	51.9394	50.7647	0.923333333	51.7879	50.8235
0.743333333	51.8485	50.7647	0.926666667	51.7576	50.7941
0.746666667	51.8788	50.6471	0.93	51.7273	50.7647
0.75	51.8485	50.6765	0.933333333	51.7273	50.7941
0.753333333	51.8485	50.6176	0.936666667	51.7273	50.7647
0.756666667	51.8182	50.6471	0.94	51.7576	50.7647
0.76	51.8485	50.6765	0.943333333	51.7273	50.7647
0.763333333	51.7879	50.6765	0.946666667	51.7273	50.8235
0.766666667	51.7879	50.7647	0.95	51.697	50.8529
0.77	51.8485	50.7941	0.953333333	51.697	50.8529
0.773333333	51.8182	50.8235	0.956666667	51.697	50.7941
0.776666667	51.7879	50.8529	0.96	51.6667	50.7353
0.78	51.7879	50.8529	0.963333333	51.6364	50.7059
0.783333333	51.7879	50.9118	0.966666667	51.6061	50.7059
0.786666667	51.7576	50.8824	0.97	51.5758	50.6765
0.79	51.7576	50.9412	0.973333333	51.5455	50.6176
0.793333333	51.7576	51	0.976666667	51.5152	50.5588
0.796666667	51.8182	51.0303	0.98	51.5152	50.5294
0.8	51.7879	51	0.983333333	51.4242	50.4412
0.803333333	51.7576	51	0.986666667	51.4242	50.4118
0.806666667	51.7879	51.0303	0.99	51.3939	50.4412
0.81	51.7879	51.0303	0.993333333	51.3636	50.3529
0.813333333	51.7879	51.0606	0.996666667	51.3333	50.2941
0.816666667	51.7576	51.0303	1	51.303	50.2647
0.82	51.7879	51.0606			
0.823333333	51.7576	51.0909	Box 5 Data 48 hours:		
0.826666667	51.8485	51.0909	Remote	Remote	
0.83	51.8485	51.1818	Remote	Data:	Data:
0.833333333	51.8485	51.2121	Data:	Temperature	Temperature
0.836666667	51.8485	51.2121	Time (h)	1 (°C)	2 (°C)
0.84	51.8788	51.2727	0	38.075	40.9231
0.843333333	51.8788	51.2727	0.166667	46.8611	49.3235
0.846666667	51.8788	51.2727	0.333333	49.6765	50.5
0.85	51.9394	51.303	0.5	50.0882	50.7353
0.853333333	51.8485	51.2424	0.666667	49.7647	50.2647
0.856666667	51.8485	51.2121	0.833333	49	50.1176
0.86	51.8182	51.2121	1	49.5588	50.1176
0.863333333	51.8182	51.2121	1.166667	49.2941	49.8529
0.866666667	51.8485	51.1515	1.333333	49.2941	49.8529
0.87	51.8182	51.1818	1.5	50	50.5882
0.873333333	51.7879	51.0909			
0.876666667	51.7879	51.1212			

1.666667	49.0294	49.1176	9.5	13.125	20.1628
1.833333	48.8824	49.4706	9.666667	12.6	19.8333
2	48.1471	47.8611	9.833333	12.625	14
2.166667	47.5556	47.8333	10	12.45	13.6
2.333333	46.5833	46.3333	10.16667	12.325	13.475
2.5	45.2162	45.1351	10.33333	12.275	13.55
2.666667	45.2432	45.3784	10.5	12.05	13.025
2.833333	44.9459	44.7297	10.66667	11.5128	12.55
3	44.2162	44.2162	10.83333	11.359	12.5
3.166667	43.8947	43.8158	11	11.3846	12.6
3.333333	42.7368	42.3684	11.16667	10.9744	12.075
3.5	41.359	41.5641	11.33333	10.6667	11.6667
3.666667	41.1282	41.1795	11.5	10.641	11.7692
3.833333	40.6667	40.5897	11.66667	10.4615	11.641
4	38.85	38.625	11.83333	10.641	11.8462
4.166667	36.8049	36.8537	12	10.2821	11.4359
4.333333	36.439	36.7073	12.16667	10.1538	11.3333
4.5	35.2439	35.2683	12.33333	10.1795	11.1795
4.666667	34.1905	35.1463	12.5	10	11.0769
4.833333	32.7381	33.0238	12.66667	9.81579	10.8718
5	30.9767	31.814	12.83333	9.94737	11.0769
5.166667	28.2093	28.5581	13	10.3333	11.3333
5.333333	26.0698	26.907	13.16667	10.2564	11.2564
5.5	24.7442	25.6818	13.33333	10.2564	11.2308
5.666667	23.619	24.6977	13.5	9.94737	10.8205
5.833333	22.7045	23.9048	13.66667	9.97368	10.8205
6	21.7619	22.8864	13.83333	10.0513	11.0769
6.166667	20.907	22.1818	14	10.5385	11.4615
6.333333	20.0233	21.1667	14.16667	10.3077	10.9231
6.5	19.2857	25.3636	14.33333	9.60526	10.2051
6.666667	18.9524	22.5682	14.5	9.36842	10.0769
6.833333	18.381	21	14.66667	9.07895	9.71053
7	18.2857	20.7674	14.83333	8.81081	9.6579
7.166667	17.7619	21.2381	15	8.62162	9.44737
7.333333	17.6429	19.6667	15.16667	8.83784	9.57895
7.5	17.2857	20.9767	15.33333	8.7027	9.3421
7.666667	16.6905	18.4286	15.5	8.48649	9.23684
7.833333	16.119	21.6667	15.66667	8.56757	9.28947
8	15.6829	22.25	15.83333	8.48649	9.1579
8.166667	15.3902	19.6429	16	8.35135	9.10526
8.333333	15	18.8333	16.16667	8.51351	9.5
8.5	14.625	16.9524	16.33333	8.89189	9.6579
8.666667	14.325	15.8293	16.5	8.89189	9.68421
8.833333	14	18.7857	16.66667	9.44737	10.359
9	13.825	20.4186	16.83333	10.1026	10.9231
9.166667	13.575	21.6667	17	10.9744	11.8718
9.333333	13.55	21.4286	17.16667	11.8462	12.575

17.33333	12.8	13.45	25.16667	51.4545	50.3529
17.5	14.225	14.75	25.33333	50.0882	49.4412
17.66667	15.8293	16.2143	25.5	48.5882	47.1944
17.83333	17.4524	17.7143	25.66667	48.2059	47.9722
18	19.0238	19.3333	25.83333	48.4118	46.7222
18.16667	21.3333	21.4286	26	48.6176	48.2647
18.33333	23.4286	26.1395	26.16667	49.0588	48.3824
18.5	25.4091	28.9535	26.33333	47.7778	46.6389
18.66667	26.9767	26.4884	26.5	46.8611	46
18.83333	28.6744	27.907	26.66667	46.75	46.1389
19	30.3488	29.2381	26.83333	46.4167	45.6757
19.16667	31.3488	30.3488	27	45.0541	44.2162
19.33333	33.1905	32.0476	27.16667	45.1892	44.4595
19.5	35.1707	33.9762	27.33333	44.7027	43.8684
19.66667	37.2683	35.9024	27.5	43.7368	42.8947
19.83333	38.7	37.122	27.66667	42.9474	42.2105
20	39.475	37.6829	27.83333	41.6667	40.9744
20.16667	40.5385	38.55	28	39.95	39.175
20.33333	41.2821	39.675	28.16667	39.05	38.55
20.5	42.2895	40.2821	28.33333	38.1	37.6585
20.66667	43.1053	41.0256	28.5	36.8293	36.4878
20.83333	43.4211	41.7692	28.66667	35.1463	34.9048
21	44.6757	42.8947	28.83333	33.9048	33.7619
21.16667	46.2222	44.8649	29	31.8372	32.3571
21.33333	46.5278	44.4054	29.16667	28.9302	28.9767
21.5	47.2222	45.5946	29.33333	26.6977	27.093
21.66667	48.5	47.1111	29.5	25.2727	25.8864
21.83333	48.9412	46.9722	29.66667	24.093	24.7442
22	49.8235	48.5	29.83333	22.9091	29.2381
22.16667	51.2424	49.3529	30	21.9286	26.7674
22.33333	51.8485	50.0588	30.16667	21.2619	26.7674
22.5	51.7273	49.5882	30.33333	20.7209	22.7727
22.66667	50.8529	48.6765	30.5	20.0465	21.119
22.83333	51.8788	49.8235	30.66667	19.3571	20.3721
23	51.7273	50	30.83333	18.8333	20.8837
23.16667	51.3333	49.6176	31	18.3095	21.9762
23.33333	49.6765	47.6389	31.16667	17.9286	23.2619
23.5	50.9412	49.7059	31.33333	17.4762	20.2791
23.66667	51.6667	50.9706	31.5	17.4286	20.4884
23.83333	52.0303	50.1765	31.66667	17.1429	19.5714
24	50.3235	48.4118	31.83333	16.6667	19.2143
24.16667	52.7576	52.2727	32	16.5476	17.5714
24.33333	51.1212	49.2647	32.16667	16.1667	17.2381
24.5	51.3939	50.9118	32.33333	15.7805	16.8095
24.66667	52.7576	52.3636	32.5	15.561	16.6429
24.83333	51.7576	51	32.66667	15.3415	16.4524
25	51.9697	50.6765	32.83333	15.0976	16.1667

33	14.6	15.8049	40.83333	13.625	14.3
33.16667	14.275	16.4286	41	14.025	14.675
33.33333	14.1	20.093	41.16667	14.275	14.95
33.5	13.975	15.2195	41.33333	14.45	15.0488
33.66667	13.85	15.0732	41.5	15	15.6341
33.83333	13.75	14.875	41.66667	15.3659	15.7561
34	13.725	14.775	41.83333	15.4878	16.0476
34.16667	13.325	14.4	42	16.119	16.7143
34.33333	13.025	14.1	42.16667	16.9524	17.7143
34.5	13.025	14.125	42.33333	18.5	19.2619
34.66667	12.8	13.75	42.5	19.9286	20.5349
34.83333	12.55	13.575	42.66667	21.5238	22.4545
35	12.5	13.5	42.83333	23.881	24.1163
35.16667	12.3	13.3	43	26.2326	26.4651
35.33333	12.15	13.05	43.16667	28.6047	28.3953
35.5	12.05	12.95	43.33333	30.6047	30.2791
35.66667	12.05	13.05	43.5	31.9767	30.7907
35.83333	11.9231	13	43.66667	32.881	31.9767
36	11.7949	12.725	43.83333	34.5714	33.2381
36.16667	11.6667	12.625	44	36	34.5952
36.33333	11.5897	12.525	44.16667	36.7317	35.0976
36.5	11.5385	12.5	44.33333	38.025	36.5122
36.66667	11.4872	12.375	44.5	39.525	37.6829
36.83333	11.4872	12.425	44.66667	41.0513	39.925
37	11.1795	11.9231	44.83333	42.8421	40.7692
37.16667	10.8974	11.6667	45	43.8947	42.5
37.33333	10.641	11.4615	45.16667	44.8919	42.5526
37.5	10.6154	11.5385	45.33333	45.027	42.7368
37.66667	10.5641	11.3333	45.5	45.4324	43.2632
37.83333	10.4615	11.359	45.66667	46.6389	44.8108
38	10.5385	11.3846	45.83333	47.2222	45.6757
38.16667	10.5128	11.3077	46	48.5882	46.9167
38.33333	10.4615	11.2564	46.16667	49.8824	48.2941
38.5	10.5897	11.5385	46.33333	51.1515	49.3824
38.66667	10.5897	11.3333	46.5	51.2424	49.7941
38.83333	10.4615	11.2564			
39	10.3333	11.0513			
39.16667	10.4103	11.2821			
39.33333	10.7949	11.5641			
39.5	10.9744	11.8462			
39.66667	11.3846	12.225			
39.83333	11.9231	12.8			
40	12.275	13.1			
40.16667	12.65	13.4			
40.33333	12.925	13.625			
40.5	13.175	13.825			
40.66667	13.475	14.1			