

Classroom Temperature Sensors and Data Logging Software



Oak Park Elementary School District 97

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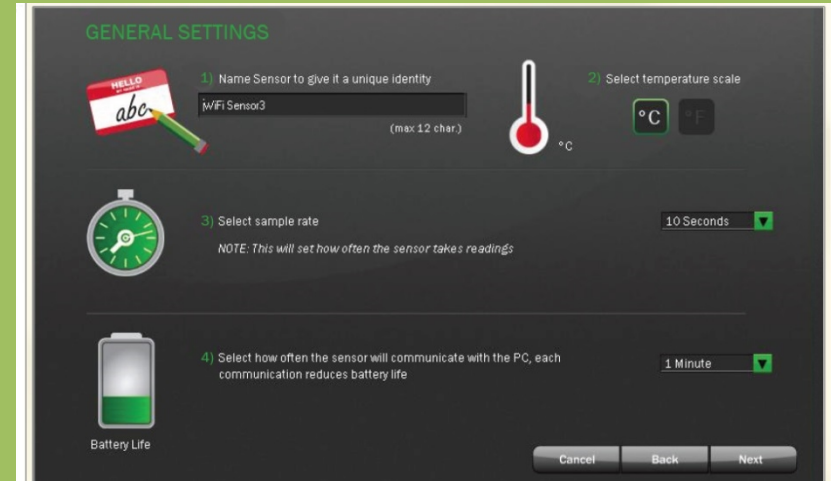
WiFi Temp and Humidity Sensors

- Thermoworks Easylog temperature and humidity sensors were purchased and placed in all classrooms
- Installation complete and data started being logged just before classes started
- Outdoor weather stations are planned for installation too in spring



Sensor Capabilities

- Stores up to 500,000 samples locally
 - Sampling currently time set at 1 min
- Communicates via WiFi for programming and download of data
 - One server PC at each school
- Alarms for max/min temperatures
 - Currently set up to notify staff if alarm is tripped



Analysis Software

- Select data over any range and plot
- Find data above or below a desired quantity
- Export data to text file or Excel spreadsheet



Microsoft Excel - Freezer Monitor.csv

	A	B	C	D	E	F	G	H	I
	Freezer Monitor	Time	Fahrenheit(°F)	High Alarm	Low Alarm	Humidity(%rh)	High Alarm rh	Low Alarm rh	dew point(°F)
1	1	4/6/2008 15:26	77	20	-20	50	70	50	56.9
2	2	4/6/2008 15:27	79	20	-20	25.5	70	50	40.7
3	3	4/6/2008 15:28	75	20	-20	20.5	70	50	31.9
4	4	4/6/2008 15:29	66	20	-20	19	70	50	22.6
5	5	4/6/2008 15:30	56	20	-20	20	70	50	15.6
6	6	4/6/2008 15:31	48	20	-20	22	70	50	11.1
7	7	4/6/2008 15:32	40	20	-20	24	70	50	6.2
8	8	4/6/2008 15:33	34	20	-20	25.5	70	50	2.4
9	9	4/6/2008 15:34	28	20	-20	27	70	50	-1.6
10	10	4/6/2008 15:35	24	20	-20	28.5	70	50	-3.9
11	11	4/6/2008 15:36	20	20	-20	30.5	70	50	-6
12	12	4/6/2008 15:37	16	20	-20	32.5	70	50	-8.2
13	13	4/6/2008 15:38	13	20	-20	34	70	50	-10
14	14	4/6/2008 15:39	11	20	-20	35	70	50	-11.2
15	15	4/6/2008 15:40	9	20	-20	37	70	50	-11.9
16	16	4/6/2008 15:41	7	20	-20	38.5	70	50	-12.9
17	17	4/6/2008 15:42	5	20	-20	39.5	70	50	-14.2
18	18	4/6/2008 15:43	4	20	-20	41	70	50	-14.4



Example Data

- Plots from 8/4 to 8/8 and 9/1 to 9/5
- Similar outdoor temp and humidity profile for both days with peak temperatures in high 80s and peak humidity in the 90% range.
- A/C Off for 8/4 to 8/8 and on 9/1 to 9/5



Hatch 307 A/C Off

Sensor Session Data

Oak Park School District 97 / 03) Hatch School (UTC) / HATCH-307

Other
Sessions

Graph

Data

Summary



Back to
Devices



Print



Export

Display Options

Zoom 6h 12h 1d 1w 1m 1y All

From 20:27 03/08/2014 To 00:53 09/08/2014



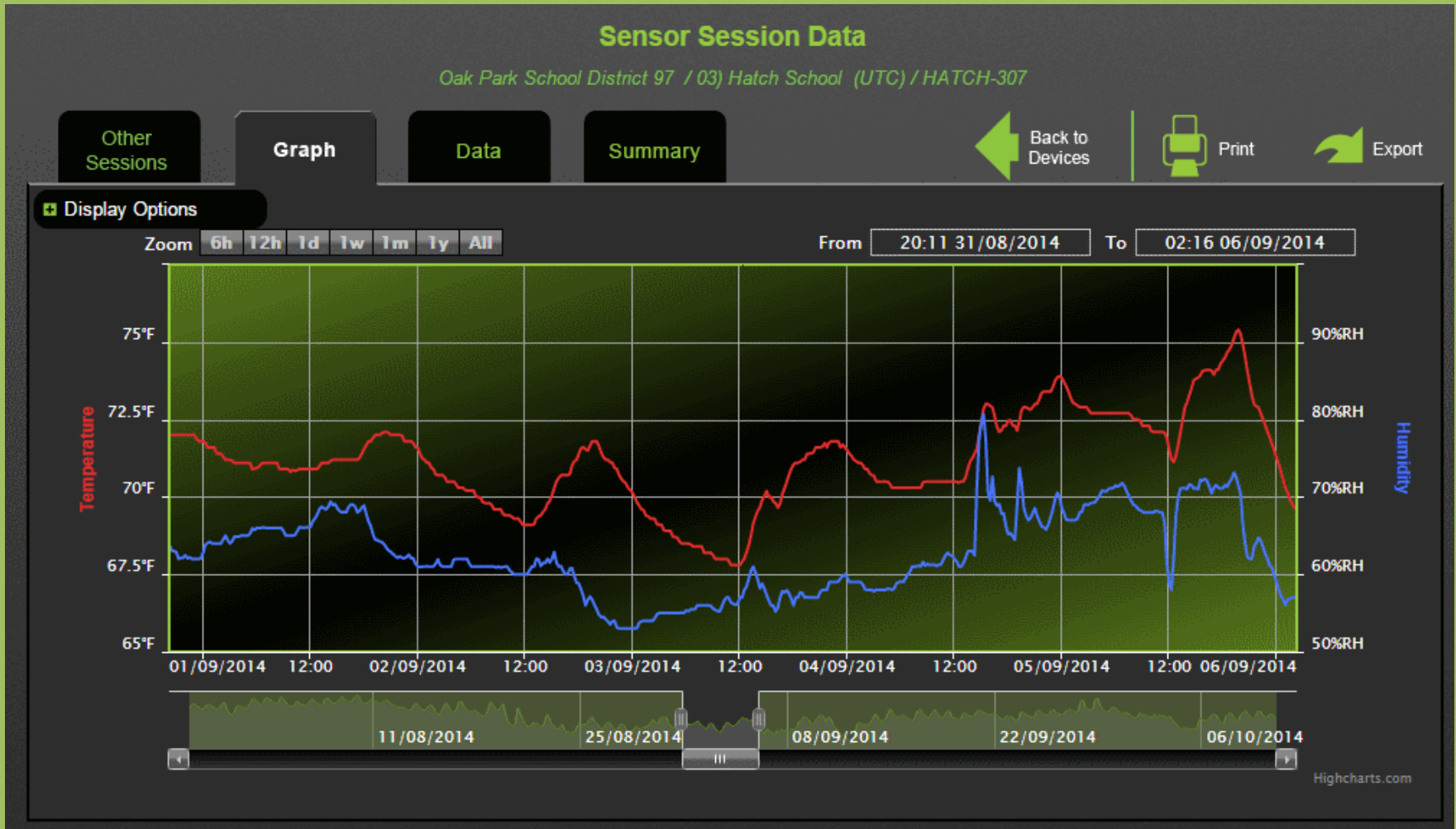
Highcharts.com



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Hatch 307 A/C On



Beye 300 Classroom, A/C Off

Sensor Session Data

Oak Park School District 97 / 01) Beye School (UTC) / BEYE-300

Other
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Zoom 6h 12h 1d 1w 1m 1y All

From 15:48 03/08/2014 To 00:18 09/08/2014



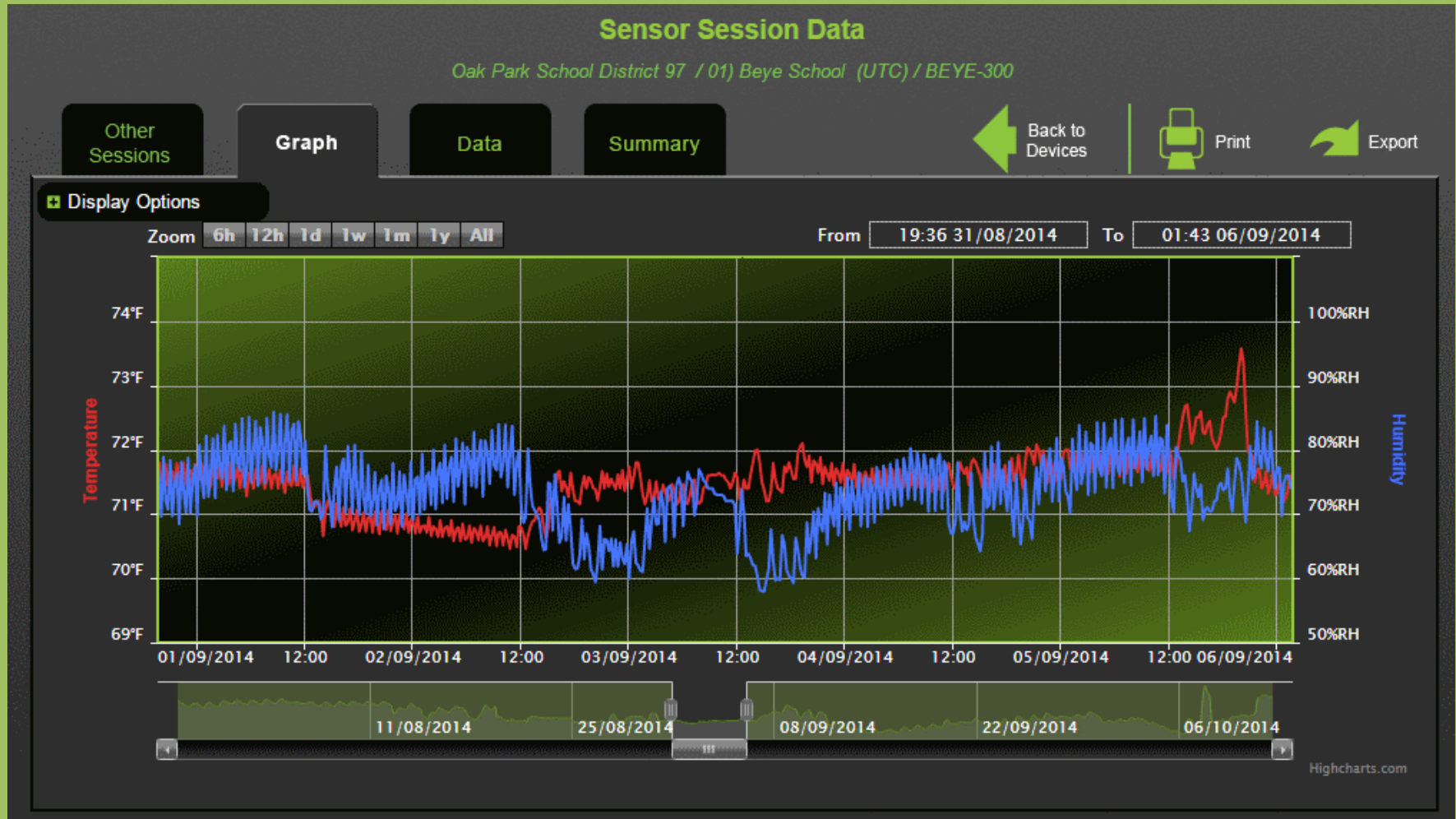
Highcharts.com



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Beye 300 Classroom, A/C On



Possible Analysis of Data

- Identify faulty HVAC equipment/settings
- Determine hottest/coldest classrooms in each building
- Study patterns of hot and cold with season and class usage
- Compute Thermal Comfort / Heat Index from temp and humidity data



Questions?



FAQ

- Where are new sensors installed?
 - New sensors have been installed in classrooms only.
- When an alarm “trips” who is notified
 - Norm is notified via an email and text
- When are outdoor sensors anticipated to be installed
 - Norm is talking with installers. There are problems with wireless connectivity to outside so installation is not imminent and installation is not expected until for several months at least
- How long is the expected interval between system identifying over heating/cooling and staff intervention
 - During school hours, within a couple hours. Out of school hours, by start of next school day.



FAQ

- At what point/level is variation between classrooms considered as needing remedy/intervention
 - This is TBD. Norm is alerted to problems in individual classrooms but a maximum allowable variation between classrooms is a policy that that the board should set.
 - The board should also develop a policy for intervention for individual classrooms as well rather than just leave that to Norm
- How often is data to be analyzed and by whom?
 - This is TBD. Norm is alerted to problems but other analysis will require hiring the district architect or a consultant to analyze the data.
 - One thing the board needs to decide is what sorts of analysis are desired in order to determine who can analyze and get quotes for this service

