**TECHNOLOGY & LIBRARY**

# UPDATE

June 3rd 2019

Submitted by:

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Director of Technology & School Libraries

Respectfully submitted to the
School Committee of the Weston Public Schools.

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# UPDATES

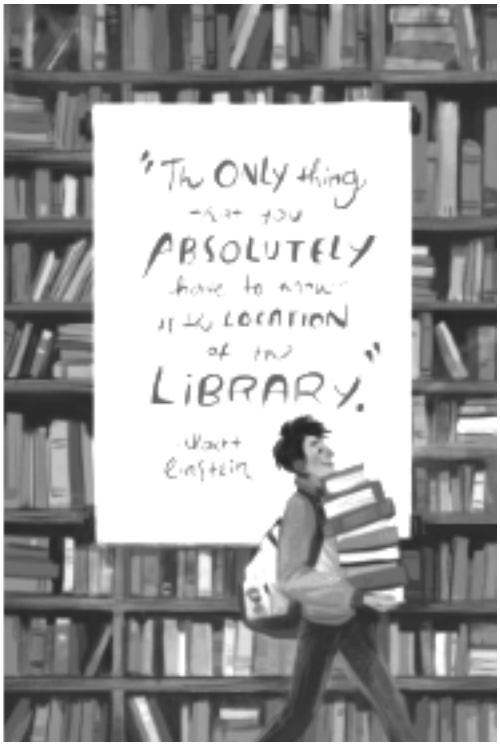
Updates on projects and activities since our last report.

## LIBRARY PROGRAM

Our Libraries have had a great year. Here are some stats and information:

- The Country School library circulated 15,573 books from September through May.
- The Woodland School library circulated 12,849 books from September through May.
- The Field School library circulated 10,872 books from September through May.

### K-5 AUTHOR VISITS 2018-2019




1. **Jon Agee** 10/05/2018 - combined presentation to 1st Grade CS & WS, featuring characters and a live demonstration of illustrations
2. **Rob Buyea** 10/16/2018 - 4 sessions presented to 5th Grade Field School, including discussion about reading, recommended authors and the writing process
3. **Greg Mone** 10/22 & 10/23/2018 - whole grade presentation followed by individual class writing workshops for 4th Grade Field School
4. **Giles Laroche** 11/08 & 11/13/2018 - individual class presentations & workshops to all 2nd Grade classes at CS & WS
5. **Lyn Littlefield Hoopes** October-December 2018 - poet in residence for all 3rd Grade classes at CS & WS
6. **Melissa Stewart** 12/04 & 12/05/2018 - individual class presentations to all Kindergarten classes at CS & WS, featuring non-fiction science literature
7. **Fabien Cousteau** 03/11/2019 - presentation to all 5th Grade classes at Field School, including environmental research and the underwater laboratory
8. **Matt de la Pena** (Newbery Medal) 04/09/2019 - Ben Sandalls Memorial Speaker - two presentations to all grades CS & WS
9. **Ross Burach** 04/22/2019 - combined presentation to all Kindergarten classes CS & WS
10. **Grand Conversations Book Club** 5/10/2019 - combined group of 4th & 5th Grade students at FS, co-facilitated by Emma Kwon & Maria Morong (ELL), hosted 3 times during the school year featuring different books and authors. Our last meeting of the

year was a Skype visit with author **Dusti Bowling** who talked about story ideas, research, character development, the writing process, and reading

11. **Scott Magoon** 05/13/2019 - combined presentation to all 2nd Grade students on art & literature, followed by a digital art residency at CS & WS (collaboration with art teachers)
12. **Melissa Stewart** 05/22/2019 - individual class presentations to all 1st Grade classes at CS & WS, featuring non-fiction science literature

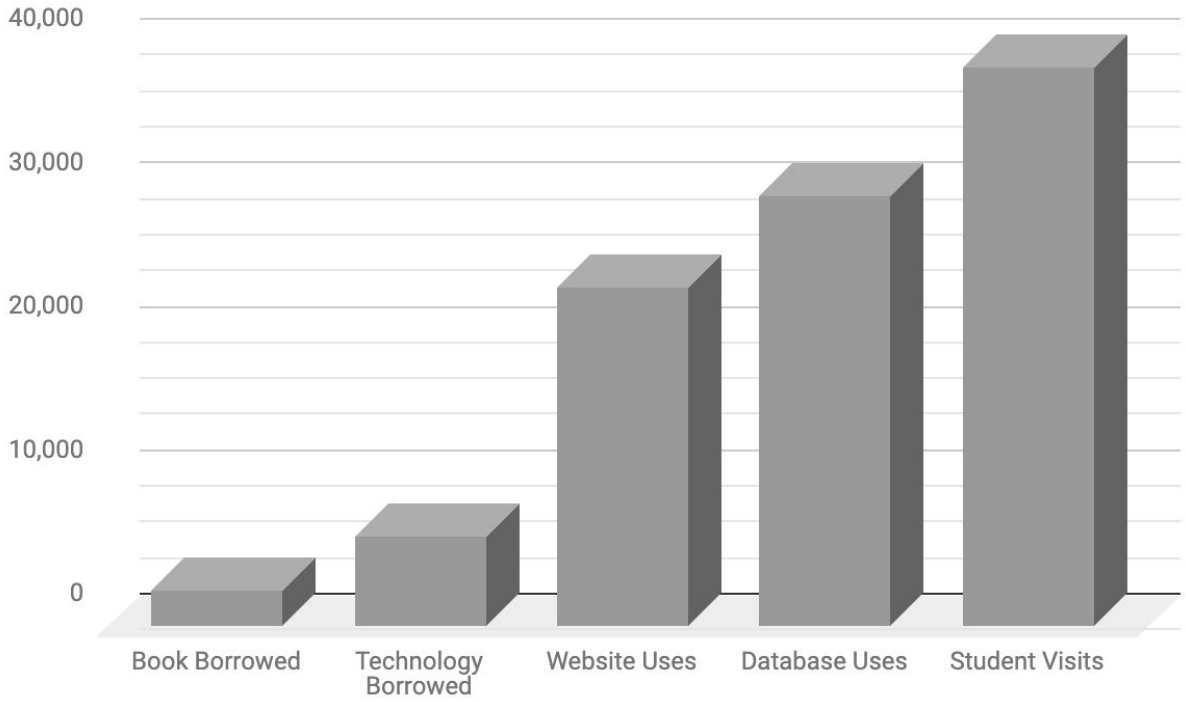
## MIDDLE SCHOOL LIBRARY PROGRAM

- 3,867 books circulated so far this year.
- The Middle School Book Club met several times a month, selecting and completing the ten novels at the top of this page.
- Media Literacy Parent Letter 3rd Quarter 2019
- Middle School Gale State Database Usage, 6640 searches.
- The Best Book Fair ran in February with all English classes visited, with the option to make purchases, parents volunteered.
- Each quarter, all Seventh Grade students checked out books of a specific genre, with their English classes as independent read.
- Summer Reading Lists were created and distributed for Sixth, Seventh, and Eighth grade.

Upon completion of 4th Quarter all Sixth Grade students will have completed Media Literacy. Topics covered included:

- Nine Elements of Digital Citizenship
- Evaluation of Websites
- Theft, Scams, and Schemes
- Creator's Rights and Responsibilities
- Cyberbullying, Being an Upstander
- Digital Footprint and a Research Project
- Sixth Grade Research Projects are in the Middle School Library

## HIGH SCHOOL LIBRARY PROGRAM




## HS LIBRARY INSTRUCTIONAL ACTIVITIES

- 80 Digital Literacy Seminar Courses taught to freshmen
- 41 Take 20: Library Instruction for Faculty and Staff classes offered before school
- 30 hours of individual bibliographic instruction to students
- 19 Research sessions with History classes
- 9 Book Browses with 9-12 English classes
- 7 in-class bibliographic instruction sessions
- 4 AP Psych Test review kinetic sand making sessions
- 1 June Academy course: Blogging and Vlogging

More information about the HS library program can be found here.

## PROFESSIONAL DEVELOPMENT & INTEGRATION

Our Integration Specialists had a busy year supporting students and faculty this year. Here is a brief snapshot of their great work:

### ELEMENTARY ACTIVITIES

This year's **professional development** was developed to support competencies with the standards for computational thinking and their connections to classroom curriculum. Coding with the Root Robotics Root robot workshop spread to all first-grade classrooms as a challenge to code a robot as a warning signal protecting salamanders crossing roads when returning to vernal pools after dark. A second workshop was delivered to support faculty with using Google Sheets as a way to collect, analyze, and present data.

Faculty continued to use digital tools like 30Hands, Book Creator, SeeSaw, and Prezi to support the **integration of digital creation and collaboration**. As digital citizens, this year's focus was with second and fourth-grade students. As second graders, students worked on awareness of how we feel when we are online. As fourth graders, students explored what it means to be an upstander, a digital citizen that contributes respectfully to the online community.

Intel's visit this past fall inspired an effort to apply to the Science Exploration Education Initiative for a **grant-funded underwater drone**. Students from Kindergarten through fifth grade engaged in the Case Campus Open Explorer Expedition. Their contributions exploring our vernal pools, brooks, streams, fields, and playgrounds led to our winning the granted OpenROV Trident. The underwater drone provided a view of what was happening in the vernal pool, Trident April 02. An air drone provided a view from above while our eyes observed at ground level. Students are currently using these three layers of perspective to compare and understand how changes and patterns in the weather connect to changes and patterns we observe on campus.

### MIDDLE & HIGH SCHOOL

The **Innovative Learning Team** is a group of grade 6-12 educators who began with a summer workshop and focused on G Suite, SAMR foundational projects and Student Digital Portfolios. The team continued to meet monthly and worked collaboratively on VR technology, website production, digital storytelling, and many other innovative practices. In October, the team presented at the MassCUE Technology

Conference - their presentation can be found here. By the end of the year, the team created a fully developed website to share their story. Visit the Innovative Learning Team website for more information.

**Google Workshops** were offered every Tuesday morning in the High School Mac Lab from September - January. The focus of these learning opportunities was to facilitate skills and competencies as we transitioned from Outlook to G Suite implementation. Twelve participants attended weekly (on average) and topics included: GMail, Docs, Slides, Sheets, Sites, and Calendar.

**Student Digital Portfolio** implementation began with a Curriculum Cabinet meeting (presentation). A Student Digital Portfolio was created for every student in grades 6-11. A spreadsheet was also created for every grade level so that locating individual portfolios would be a facile process for faculty. Students uploaded content in grades 6, 8, 9, and 10.

## PERSONNEL UPDATES:

The 2018-2019 year has been a challenging one for the technology department. In July of last year one of our staff members was hurt and was unable to work for more than 4 months. During this time we took a number of measures to keep our processes and services going. The effect of this absence was long lasting--much longer than the actual staffing shortage--but we are caught up and moving forward.

Last summer our Data Manager of 3 years took a job closer to home. After a lengthy search, we hired a recent graduate who has been helping us maintain our state reporting requirements for the year. This spring we opened the position again and enhanced the compensation in order to secure an experienced candidate. We have hired an individual that will begin July 1st.

Our long time Network Manager (since 2006) is moving to a .8 technical position in the Town and we have been searching for a replacement. After nearly 3 months, we have found a candidate we are considering for the position, perhaps by the time this report is released. If this does not work out, we will explore managed service contract options that may be more costly.

## NETWORK SECURITY

From a network security perspective, we, like everyone, have experienced a marked increase in spoofed messages, hacked accounts, phishing, and malware. The FBI has given municipal governments and public schools warning

notices about the increasing threat of ransomware attacks in the public sector. This threat is real and has serious consequences. The best defence is a multi-layered approach and rock solid backups.

## NETWORK ASSESSMENT

In February we had a state contract vendor (ePlus) do a switch and routing assessment due to concerns that our telephone infrastructure lacked resiliency when changes were made to network routing. This had affected Fire and Police dispatch communications, and we wanted to explore detail and options. We plan to make some adjustments this summer to increase the stability of these communication channels and will be looking at opportunities presented by two upcoming projects to further this work: the Town Center Project and the new Fire Department Radio System.

The Town Center Project will allow us to redistribute the number of fiber runs heading down Boston Post Road vs the fiber going through the Town Hall as well as cross-connect runs from two separate fiber cables. The new Fire Department Radio System may allow us to reclaim some fiber runs to various areas in town.

## MULTI-FACTOR AUTHENTICATION

Last year we implemented multi-factor authentication for about 60 employees with high level rights to critical systems and sensitive data. Over the next year we may be adding more users, but this time to the free Google version of multi-factor authentication. The digital world is wrought with individuals trying to steal data and credentials. Our responsibility to our students, employees and the Town necessitate vigilance.

## PHYSICAL SAFETY & SECURITY

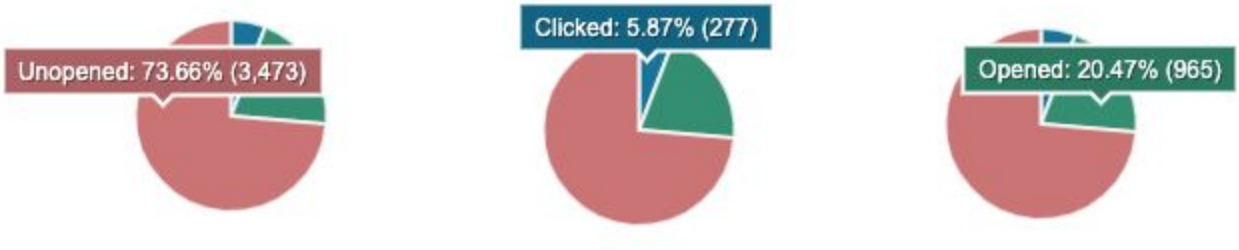
We are determining next steps and available funding for another phase of security enhancements to better secure our schools. As of the writing of this report, those enhancements have not been determined.

## DISTRICT WEBSITE STATISTICS

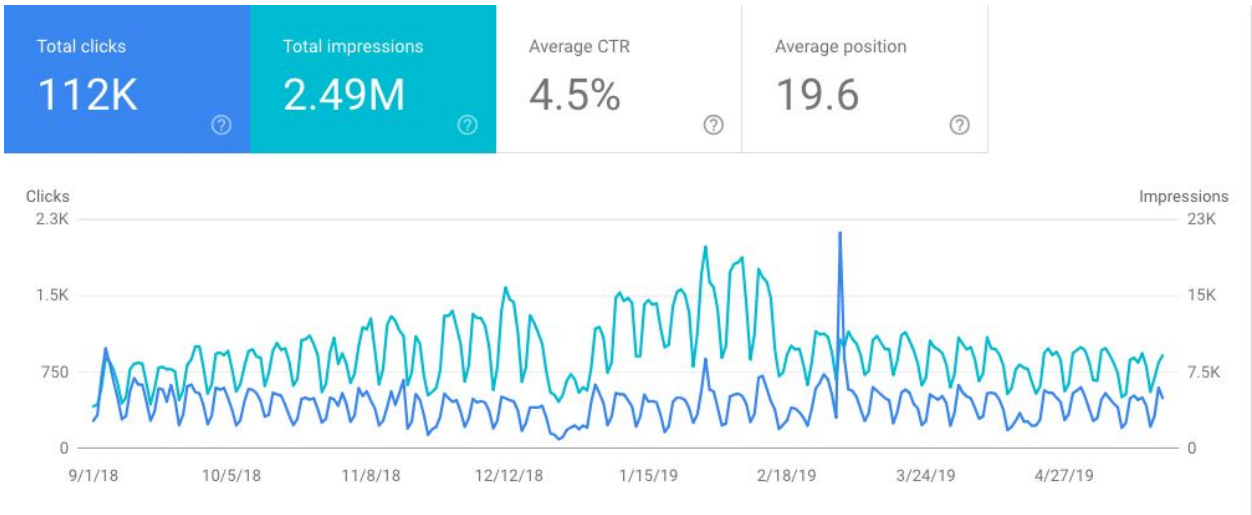
Our Website continues to play a critical role in communications for the district.

- Since September 2018 District Site published 45 unique blog posts
- Average open rate of emails is 20%

- Average click through for more information is 6%
- Current Subscribers is 4660 with an unsubscribe rate of .02% - .3%




**Open Rate** is defined by how many people opened the email to display the full contents.
**Clicked** is defined by how many people opened the email and then clicked on the links for more information.




**Legend**

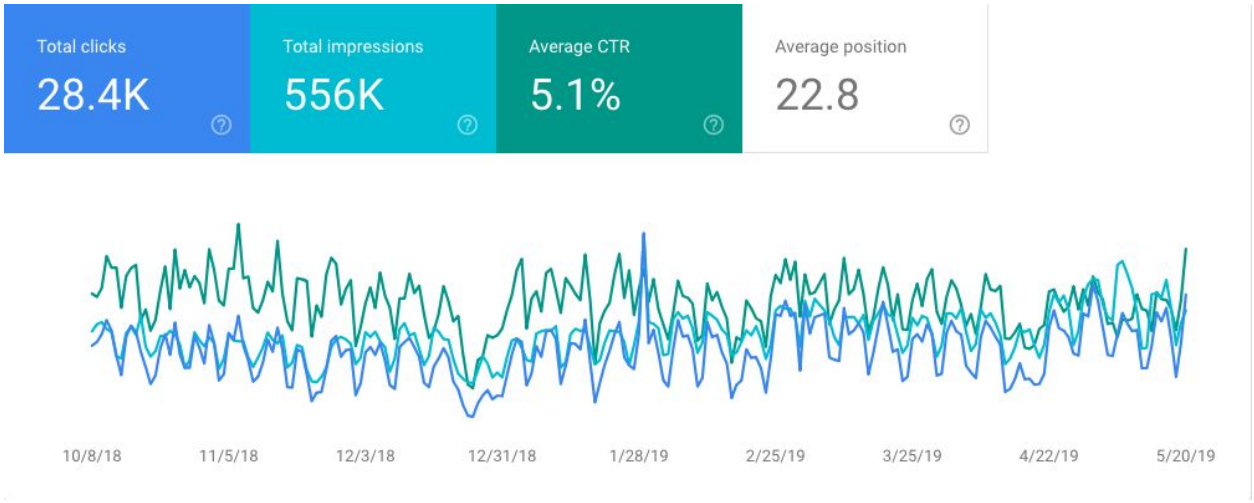
- **Total clicks** is defined by how many times a user clicked through to the site.
- **Total impressions** is defined by how many times a user saw a link to the site in search results.
- **Average CTR** (Click-through rate (CTR) is the ratio of users who click on a specific link to the number of total users who view a page, it is used to measure the success of a website. The average CTR for Education is 2%
- **Average position** is the average position of the site is search results

## WESTON HIGH SCHOOL WEBSITE

- Since September 2018 HS published 360 unique blog posts

- Current subscribers to the HS update is 1852 with an unsubscribe percentage of .05% - .61%
- Open rate of emails is  22% - 31%
- Clicks through to more information is 10% - 17%


**Open Rate** is defined by how many people opened the email to display the full contents
**Clicked** is defined by how many people opened the email and then clicked on the links for more information.

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**MIDDLE SCHOOL WEBSITE**

- Since September 2018 MS Site published 112 posts
- Average open rate of emails is 28%
- Average click through for more information is 1% - most info on on first email page
- Current Subscribers is 1404 with an unsubscribe rate of .02%

**FIELD SCHOOL WEBSITE**

- Since September 2018 FS Site published 80 posts
- Average open rate of emails is 21%
- Average click through for more information is 6%
- Current Subscribers is 898 with an unsubscribe rate of .01%

**COUNTRY SCHOOL WEBSITE**

- Since September 2018 CS Site published 31 posts
- Average open rate of emails is 33%
- Average click through for more information is 7%
- Current Subscribers is 541 with an unsubscribe rate of 0%

**WOODLAND SCHOOL WEBSITE**

- Since September 2018 WS Site published 34 posts
- Average open rate of emails is 32%
- Average click through for more information is 5%
- Current Subscribers is 504 with an unsubscribe rate of 0%

Please note the information above does NOT include email communications sent via Infinite Campus or our Emergency Communications System.

## MCAS TESTING & TECHNICAL SUPPORT

This year all but one MCAS test, the 9th grade Science test, was given online. We are, however, participating in the pilot of the 9th grade online test in preparation for next year. All-told, that is 33 days of online testing--three days for grade 9 (2 days of paper based testing and one day online; four days each for grades 3, 4, 6, 7, and 10; six days of testing for grades 5 and 8 taking ELA, Math, and the Science tests.). We share/move student Chromebooks to implement the testing with each two day test taking away 5 days of instructional time from student use of the device. With 8 grade levels testing and 5 sets to devices, this could not be avoided. In total, 5,287 online test were administered this spring.

This June, for the HS Science Field test, we plan to pilot using student devices in 4 classrooms. If all goes well, next year we will use student devices to implement the

HS MCAS Tests. This would be VERY helpful to us and greatly reduce the time students are without their standard technology tools.

Next year we will purchase another set of Chromebooks for the 7th grade, completing our middle school transition to the Chrome device. This will also be very helpful for future MCAS testing.

## ONLINE AP TESTING

The AP exams are highly regulated, challenging, and labor intensive to administer. Here is a summary of the AP tests given online this year:

- **Chinese Language**: Must be given on a PC with a CD-ROM drive; the exam is not compatible with Apple computers. In 2018-19 we tested 18 students in the PC lab in room 201. This is problematic as our PC lab is very old and we do not need more than 5 or so for instructional purposes. I had planned to reduce this lab to 5 PC computers, but will keep the old ones running until the AP Chinese test is updated.
- **Spanish Language & Culture**: In 2018-19 we tested 38 students using the language lab, the Mac lab, and Mac laptops for small group/extended time testing.
- **French Language & Culture**: In 2018-19 we tested 12 students using the language lab.
- **Music Theory**: In 2018-19 we tested 9 students using the Macs in the band room and 2 practice rooms.

There is always a handful of students who have special exam accommodations that require the use of a computer, for example, students who are able to submit typed responses for essay questions, and these are handled using a Mac laptop.

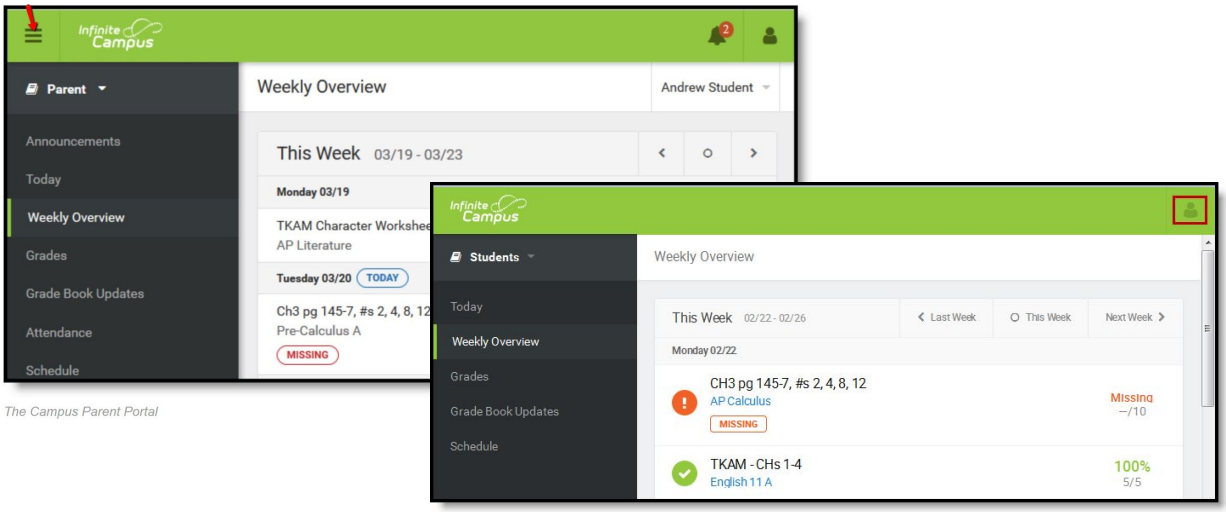
## ED TECH TOOL EVALUATION

We have joined a group called the Massachusetts Personalized Learning Edtech (MAPLE) Consortium to participate in a project aimed to help us gain greater visibility into the online education tools being used by our faculty, assist vetting them, and then provide our faculty with a library of educator rated resources. This dCURATE (Digital CUrriculum RAted by TEachers) project is also in partnership with the DESE. We are only in the beginning stages of this project, which will continue next year and beyond.

One of my goals for this project is also to use this data to inform our priorities and needs to ensure appropriate student data privacy.

## UPDATED PARENT AND STUDENT INFINITE CAMPUS APPS AND ONLINE PORTAL

Infinite Campus has released a new version of the Student & Parent online portal as well as mobile apps. Over the next few months we will be messaging parents with links to the new versions.


*The Campus Parent Portal*

# ACTION & PRESENTATION ITEMS

The items below will be what I focus on during the School Committee presentation on June 3rd.

## ACCEPTABLE USE POLICY:

Submitted for your approval are a proposed change to the AUP and the creation of separate Responsible Use Guidelines with versions by level. We want to simplify the policy and make the guideline document more targeted and nimble.

**See separate Acceptable Use and Responsible Use Guideline Documents.**

## HARDWARE REPLACEMENT DISCUSSION

We have a budget busting bubble coming in FY21. Here are the important factors:

### CHROMEBOOKS & MCAS TESTING:

We have student device challenges coming up in FY21

- Chromebooks are subject to an End of Updates (EOU) schedule. This does not mean the device will cease to function, it means the operating system (OS) version for that model will no long be updated. The device may still be usable until unpatched security vulnerabilities or other capabilities become unsupported and render the device unsafe or uncapable.
- The DESE & the Pearson TestNav system used to implement the MCAS testing publishes a list of compatible Chrome OS versions 9 to 12 months prior to the following year's test administration.
- We will not be able to implement MCAS testing on devices with an OS version not supported by the Pearson Access Next TestNav app.

**GOOGLE CHROME OS END OF UPDATE SCHEDULE: WPS Devices Expiring**

- June 2019 (284 devices)
- June 2020 (419 devices)
- June 2023 (205 devices)

**DESE MCAS TESTNAV APP:**

- Annonces Chrome OS versions supported by the TestNav app about 12 months prior to the next test administration date
- For future planning, guidelines state TextNav will support devices that manufacturers support as of each July 15 for the next school year

**A FACTOR DRIVING OUR DEVICE REPLACEMENT CYCLE**

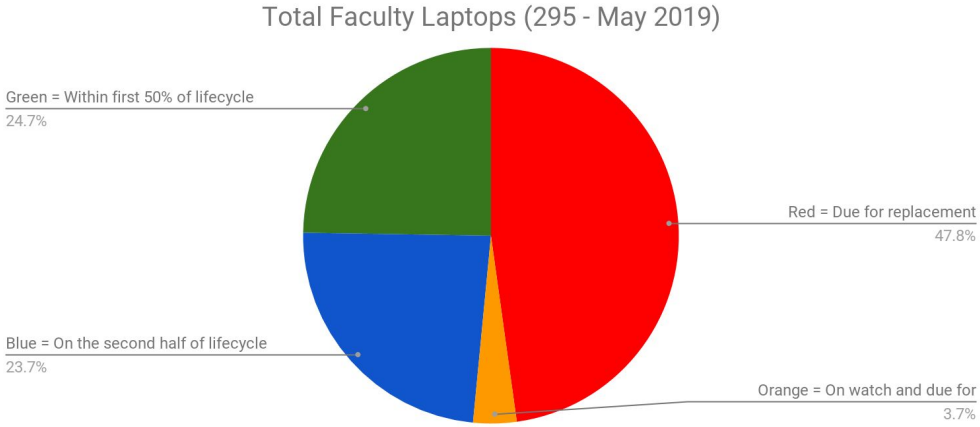
| Device End of Updates Status: | | | Capable of MCAS Testing | |
|---|---|---|---|---|
| *WPS Devices:* | *Model:* | *EOU Schedule:* | *Spring 2020* | *Spring 2021* |
| 284 | Dell 11 CB1C13 | June 2019 | Yes | No |
| 419 | Dell 11 (3120) | June 2020 | Yes | Unknown |
| 205 | HP G6 EE | June 2023 | Yes | Yes |
| 165 | Lenovo 100E G2 | June 2025 | Yes | Yes |

*Planned purchase summer of 2019 for the 7th grade

Bottom line, we have a lot of Chromebooks approaching or at EOU, and, we cannot count on more than 5 years for student Chromebooks.

## FACULTY LAPTOPS

We have 141 faculty laptops in need of replacement--these were purchased in 2012. I had proposed tackling half of them in FY20 and the other half in FY21. However, we have other pressing purchases looming and I'm looking for a way to smooth this out. We'll discuss this during the presentation of this report.



## FY21 STUDENT DEVICE PRIORITY NEEDS:

This list of student devices is from preliminary planning for FY21. Some important item to note.

| | Priority FY21 Replacement Planning items | Model | | Aprx. Cost |
|---|---|---|---|---|
| All | Faculty Laptops | [2012] | 60 | $66,000 |
| MS | 8th grade student Chromebooks | [2016] | 197 | $55,160 |
| FS | 4th and 5th Grade Student Chromebooks | [2014] | 327 | $81,750 |
| CS | 3rd Grade & 2nd Grade Chromebooks | [2015] | 75 | $18,750 |
| WS | 3rd Grade & 2nd Grade Chromebooks | [2015] | 75 | $18,750 |
| HS | Foreign Language Lab | [2009] | 31 | $51,150 |
| HS | Art Lab Desktops | [Mid 2012] | 24 | $39,600 |
| HS | Library laptop loaners | [2012] | 20 | $14,250 |
| HS | Science laptops | [2012] | 15 | $14,250 |
| MS | Robotic Lab | [Late 2012] | 12 | $17,400 |
| MS | Faculty Laptops | [Early 2015] | 18 | $17,100 |
| MS | Library Projection | [2010?] | 1 | $7,500 |
| CS | iPads | [2014] | 20 | $7,200 |
| WS | iPads | [2014] | 20 | $7,200 |
| CS | Front office desktops? | | 2 | $2,000 |
| WS | Front office desktops? | | 2 | $2,000 |
| CS | Mac Minis (replace with Chromebox) | [Late 2012] | 25 | $5,040 |
| WS | Mac Minis (replace with Chromebox) | [Late 2012] | 24 | $6,160 |
| All | Printers | | | $3,500 |
| All | Unknown items more than 2 years out | | | $10,000 |
| | | | | **$444,760** |
| **Standard Infrastructure Maintenance items:** | | | | |
| | AV replacement of 45 to 60k | | | $45,000 |
| | Switching | | | $15,000 |
| | Servers | | | $15,000 |
| | Access Points | | | $5,000 |
| | | | | **$80,000** |
| | | | | |
| | | | **Total:** | **$524,760** |

## POSSIBLE PATHS FOR DEVICE REPLACEMENTS IN FY20 AND FY21

### LEASING FACULTY LAPTOPS:

I propose leasing faculty laptops over the next few years. Here is why:

- The devices we had purchased in years past were serviceable and upgradable; this is no longer true. A Macbook Air cannot be upgraded with more RAM or a larger hard drive. They cannot be upgraded to extend their useful life.
- The use of laptops by faculty is essential to delivering instruction, attendance, grading, and feedback, etc. Having stable devices for faculty is critical, and a leasing arrangement gives us a refresh lifecycle to help ensure these devices are stable.
- Fixing older devices is labor intensive and often not cost effective.
- I would like to do a 5 year lease for faculty MacBook Air laptops. Apple offers 0% financing, so the cost is the same as purchase--just spread out.
- We have a bubble of devices to replace soon. Leasing these laptops will help us smooth out the bubble. I calculate we can apply 83k to smooth out the FY21 funding need by leasing faculty laptops starting in FY20. How? By holding the difference between budgeted purchases and lease and applying those to FY21. Over the 2 years, pay 2/5ths the cost and apply the rest of those funds to smooth down the FY21 bubble--approximately 83k.

### SEPARATE WARRANT ARTICLE FOR TECHNOLOGY REPLACEMENTS

Another option is to start conversations now with Leon Gaumond about the need for a capital investment in FY21 to address these Technology needs.

## WHAT LEVEL OF FUNDING IS REQUIRED TO SUSTAIN OUR TECHNOLOGY?

The base funding amount within the schools budget was set to 272k before I began working here in 2008. I am not aware of how that number was calculated, but, needless to say, it is no longer a valid number. It is my duty and responsibility to raise the red flag when we are underfunding the basic educational resources we use to meet our mission as a school system. It is important that we understand the short and long term consequences of our actions and work with real numbers to have a shared understanding.

The calculation of funding needs vary from year to year--we did not purchase everything at once, nor would we want (or be able to) replace it all at once. We do, however, need a baseline measure of funding needs in order to start this discussion. Therefore, I propose we discuss the three basic components needed to calculate a yearly base average for replacement equipment.

- Number of devices
- Expected life of the device
- Cost of the device

With this information we can calculate base funding needs. This is an oversimplification, but it provides us with an effective gauge to help signal whether we are on track to maintain our infrastructure and digital resources.

***The Formula:*** The number of devices multiplied by the cost of the device, divided by the expected life cycle.

$$\frac{(Number\ of\ Devices)\times(Cost\ of\ Device)}{Expected\ Life\ Cycle} \approx Yearly\ Replacement\ Expense$$

Example: 100 computers at $500 each equals $50,000.00. Then divide $50,000 by the expected life cycle of 5 years equals $10,000. Therefore, to maintain computing resources we should be spending $10,000 a year on replacements (assuming they were purchased in lots of ⅕ per year) or, budget for the total cost at the end of the life cycle.

## THE RATIO & SATURATION OF DEVICES

The following device ratios were used in the tables below:.

| | Sections | iPads (6 per classroom) | Chromebooks |
|---|---|---|---|
| **Kindergarten:** | 7 | 42 | |
| **Grade 1:** | 6 | 36 | |
| **Grade 2:** | 8 | 48 | Shared Cart of 25* |
| **Grade 3:** | 7 | 42 | Two shared carts of 25* |
| **Grade 4:** | 8 | | 1:1 |
| **Grade 5:** | 7 | 1 Shared Cart | 1:1 |
| **MS:** | | 2 Shared Carts | 1:1 |
| **HS:** | | N/A | Short & long checkout 20 & 20 |

*A key aspect of these numbers is the need for the total of grade 2 and grade 3 Chromebooks to be enough for the implementation of grade 3 MCAS testing

## FACULTY DEVICES

| | |
|---|---|
| **Faculty:** | Laptop |
| **Instructional Support Staff:** | Chromebook or iPad as determined by student support needs, otherwise access to a desktop |
| **Staff:** | Desktop Computer |

Real-world budgeting is more complex, but the formula and ratios above provide enough data to calculate a baseline. The following tables calculate a theoretical cost using these factors.

## REAL DEVICE NUMBERS FOR A CALCULATING BASE REPLACEMENT FUNDING

| ***Student Devices*** | | | | | |
|---|---|---|---|---|---|
| **Item Description** | **Cost** | **Number of Units** | **Life cycle** | **Investment** | **Yearly Investment Maintenance** |
| iPads w/Case K-3 | $335.00 | 168 | 5 | $56,280.00 | $11,256.00 |
| iPads (in cart) w/Case Grade 4-5 | $335.00 | 25 | 5 | $8,375.00 | $1,675.00 |
| Assistive Tech iPads. ELL, OOD | $335.00 | 61 | 5 | $20,435.00 | $4,087.00 |
| Elem. Student Chromebook G2-5 | $250.00 | 467 | 5 | $116,750.00 | $23,350.00 |
| MS Chromebook w/Case & License | $250.00 | 491 | 4 | $122,750.00 | $30,687.50 |
| MS iPad Carts (2) | $330.00 | 50 | 4 | $16,500.00 | $4,125.00 |
| HS Chromebook w/Case & License | $350.00 | 20 | 3 | $7,000.00 | $2,333.33 |
| Laptops (Library Loaner, Sci, TEC) | $1,100.00 | 41 | 5 | $45,100.00 | $9,020.00 |
| | | | | *$393,190.00* | *$86,533.83* |

| ***Student Instructional Spaces*** | | | | | |
|---|---|---|---|---|---|
| **Item Description** | **Cost** | **Number of Units** | **Life cycle** | **Investment** | **Yearly Investment Maintenance** |
| K-5 Innovation Spaces | $850.00 | 18 | 5 | $15,300.00 | $3,060.00 |
| MS Art Lab | $1,450.00 | 27 | 5 | $39,150.00 | $7,830.00 |
| MS Robotics Lab | $1,450.00 | 12 | 5 | $17,400.00 | $3,480.00 |
| MS Video Lab | $1,600.00 | 6 | 5 | $9,600.00 | $1,920.00 |
| HS Photo Lab | $1,650.00 | 24 | 5 | $39,600.00 | $7,920.00 |
| HS Foreign Lang Lab *1 | $1,450.00 | 31 | 5 | $44,950.00 | $8,990.00 |
| HS Math Lab *2 | $850.00 | 5 | 5 | $4,250.00 | $850.00 |
| HS General Use Mac Lab | $1,400.00 | 5 | 5 | $7,000.00 | $1,400.00 |
| HS Video Production Lab | $2,400.00 | 18 | 5 | $43,200.00 | $8,640.00 |
| HS/MS Music *3 | $1,450.00 | 6 | 5 | $8,700.00 | $1,740.00 |
| HS TEC Desktops/Laptops *4 | $1,350.00 | 6 | 5 | $8,100.00 | $1,620.00 |
| HS Engineering Classroom | $1,450.00 | 3 | 5 | $4,350.00 | $870.00 |
| HS Lib Curc / METCO Office | $1,250.00 | 6 | 5 | $7,500.00 | $1,500.00 |
| HS/MS Student Support Classrooms | $600.00 | 11 | 5 | $6,600.00 | $1,320.00 |
| | | | | *$255,700.00* | *$51,140.00* |

| ***Faculty Devices*** | | | | | |
|---|---|---|---|---|---|
| **Item Description** | **Cost** | **Number of Units** | **Life cycle** | **Investment** | **Yearly Investment Maintenance** |
| Laptops *5 | $1,100.00 | 295 | 5 | $324,500.00 | $64,900.00 |
| iPad (faculty) *6 | $335.00 | 20 | 5 | $6,700.00 | $1,340.00 |
| iPad Mini (K3 for SeeSaw) | $400.00 | 32 | 5 | $12,800.00 | $2,560.00 |
| Chromebook (Staff) *7 | $400.00 | 33 | 5 | $13,200.00 | $2,640.00 |
| Desktops (offices and classrooms) | $650.00 | 176 | 5 | $114,400.00 | $22,880.00 |
| Printers | $375.00 | 193 | 8 | $72,375.00 | $9,046.88 |
| Classroom AV Systems (176 Total)*8 | $5,500.00 | 169 | 10 | $929,500.00 | $92,950.00 |
| Other AV *9 | $6,000.00 | 13 | 10 | $78,000.00 | $7,800.00 |
| | | | | *$1,551,475.00* | *$204,116.88* |

| ***Infrastructure*** | | | | | |
|---|---|---|---|---|---|
| **Item Description.** | **Cost** | **Number of Units** | **Life cycle** | **Investment** | **Yearly Investment Maintenance** |
| Core Switching *10 . (30% erate) | $25,000.00 | 3 | 10 | $52,500.00 | $5,250.00 |
| WAN Switching *10 . (30% erate) | $15,000.00 | 5 | 10 | $52,500.00 | $5,250.00 |
| IDF Switching (30% erate) | $8,000.00 | 18 | 10 | $100,800.00 | $10,080.00 |
| Edge Switching *11 . (30% erate) | $3,500.00 | 61 | 15 | $149,450.00 | $9,963.33 |
| Firewall . (30% erate) | $25,000.00 | 1 | 6 | $17,500.00 | $2,916.67 |
| Wireless Access Points (30% erate) | $850.00 | 253 | 12 | $150,535.00 | $12,544.58 |
| Wireless Controllers (30% erate) | $20,000.00 | 2 | 8 | $28,000.00 | $3,500.00 |
| Telephone Routers | $3,500.00 | 6 | 12 | $21,000.00 | $1,750.00 |
| Servers *12 | $15,000.00 | 10 | 5 | $150,000.00 | $30,000.00 |
| Chassis | $10,000.00 | 1 | 8 | $10,000.00 | $1,250.00 |
| SAN *13 | $150,000.00 | 1 | 5 | $150,000.00 | $30,000.00 |
| UPSs | $1,000.00 | 38 | 5 | $38,000.00 | $7,600.00 |
| Monitor Sensors | $500.00 | 24 | 15 | $12,000.00 | $800.00 |
| | | | | *$932,285.00* | *$120,904.58* |

Light gray shaded area represent devices we can purchase at a 30% discount via e-rate--as long as the program continues. The 30% discount HAS BEEN APPLIED in

the table above. Also note the original purchase of much of the Network was a Capital Article at Town Meeting many years ago.

| | | | | | |
|---|---|---|---|---|---|
| **Table Total:** | | | | **$3,132,650.00** | **$462,695.29** |

*** Table Notes:**

*1 The Foreign Language Lab functions cannot by implemented on student devices because of AP, ACCESS, and Foreign Language Assessment testing.

*2 The use of HS Math computer lab (used for computer programming) has dropped, thus will replace 5 of the computers for student use. The remaining older DELL 780 desktop computers will stay for the Chinese AP exam.

*3 These 4 practice room computers support music instruction and the AP testing

*4 The number of TEC desktops are being reduced to a smaller number of laptops.

*5 Faculty will have the option to use a Chromebook instead of a laptop.

*6 Faculty iPads will be phased out unless necessary to support student use (504/IEP)

*7 Chromebooks or Chromeboxes will be the prefered replacement if possible.

*8 Unused elementary classrooms are not counted in the short term.

*9 This number does not accommodate major systems such as the HS auditorium.

*10 Listed as 3 instead of 4 because we are responsible for 50% of the main server core switch use/replacement.

*11 We purchase “equal to new” edge switches at significant savings from new

*12 We plan to pilot the use of some servers from private cloud services. Over time some portion of server/storage funding will move to subscription and out of replacement.

*13 Our SAN device is used for more than just data storage and backup. They also run every server and are critical components of the infrastructure. Some portion of the load on the SAN will get transferred to the cloud (with some servers) but local storage will always be required.

There are, of course, many factors involved in long term planning. We are making changes to better achieve the most efficient use of our resources, and these numbers will ebb and flow as we embrace more Google technologies (Chromebooks). I do not foresee, however, any possibility of maintaining the long term viability of our resources at a base level of $271,688 for yearly replacement funding. For these reasons I recommend we discuss resetting the base technology hardware budget.

# ON THE HORIZON

I'm adding the following items to this report as informational. I see these as aspects of our educational system that will need our attention in the future

## WORKFLOW PROCESSES

We have not made any progress with our workflow goals. We need to handle complex processes better. Employee entry, employee exit, field and room rental/reservations, student registration, student exit, and field trips are just a few examples of processes involving many people performing interrelated and dependent tasks. I feel we would greatly benefit from a workflow system to improve the speed and efficiency of these processes. I believe a system could pay for itself many times over in saved manpower. I hope to reboot this project next year. Turnover in staff, both in Technology and in HR, necessitated delaying the project.

## GOOGLE ANNOUNCES PAID VERSION FOR EDUCATION

I noted last year that Google has announced it will split the current education G-Suite offering into a free and paid version in 2019. This does not come as a big surprise; considering the success and widespread usage of Google's education tools, it was just a matter of time. I'm keeping this on the radar, but there has been no movement by schools to this paid offering. At this point, the paid version does not offer anything worth paying for.

## STUDENT DATA PRIVACY VIA TEC COLLABORATIVE

The TEC collaborative is offering a service call the "Student Data Privacy Alliance" I would like to contract. They have vetted and negotiated educational software product contracts for compliance with student data privacy laws for their member districts. This would be an arduous and costly task individually, but when done for one public school, largely applies to all.

## PROFESSIONAL DEVELOPMENT PLANS

The Differentiated Learning Team is a concept developed by the MS/HS Technology Integration Specialist. Ultimately, the goal of this team is to provide the support and scaffolding for teachers to implement best practices for struggling students. Professional development, instructional modeling, and coaching will be provided to maximize student growth and individual success for all learners. Team members will collaboratively develop a toolkit of online resources to include assessments, note taking, study guides, nightly homework, and extra credit

opportunities as well as lesson exemplars and resources. In addition, two books ("The Differentiated Classroom: Responding to the Needs of All Learners, 2nd Edition," Carol Ann Tomlinson and "Integrating Differentiated Instruction & Understanding by Design: Connecting Content and Kids," Carol Ann Tomlinson, Jay McTighe) will serve as instructional guides for review, reflection and discussion. Participants should note, their involvement includes one summer workshop day, monthly meetings, and a willingness to present and share. By the end of the school year, this team will produce: an online digital toolkit, a published website for reference, and serve as a support team for further development.

More information on the Differentiated Learning Team can be found here.

## WIRELESS (CELLULAR PHONE) COVERAGE WITHIN SCHOOLS

Over the last year, a group was formed to look into the cellular phone challenges in town. The group is comprised of the Town Manager, Police Chief, Fire Chief, A Town Selectman, a School Committee member, and Town/School Technology. A survey was funded to measure the signal strength throughout town for the major carriers -- Verizon, AT&T, Sprint, and T-Mobile. The big picture here is how can we, as a town, encourage the major carriers to improve the reception in town by analyzing the problem and looking for ways the town can facilitate solutions.

This spring, a survey was done of signal strength within the school buildings and public library. The findings were as we experience--very poor to no signal within our buildings.

This is a safety and security issue for us that we need to have addressed. The path to resolution here is unclear as we do not have authority over the problem. We will, however, explore options with the carriers and leverage whatever possible to increase communication capabilities within our school buildings.

## CODING AND COMPUTER SCIENCE

At the elementary level, our Science, Math, and Technology Integration Specialists have been working to bring lessons into classrooms. If you have not had a chance to witness this, they are masterful lessons with very engaging tools. Student program devices to take specific actions using block based programming software. This provides a base of knowledge about the sequential and logical nature of programming that can be built over time. Ensuring all students have these experiences is difficult.

At the middle school level, coding is part of the 7th grade math courses, honors 8th grade Math, and the robotics elective.

At the high school level, coding offered via two elective programming courses, specific engineering projects, and the CP Applied Discrete Math course.

One of our long term goals is to more formally weave coding and computer science into curriculum and course offerings. We are interested in exploring opportunities to provide every student basic coding competencies by working with Kimo, department heads, grade leaders, curriculum specialists, and faculty who are willing to pilot programs, games, and tutorials in an online learning environment. With a focus on college and career readiness, we feel it is important to explore opportunities that build upon the basic coding competencies and develop a future focused computer science literacy relevant to globalized living.