The Public Schools of Brookline
Strategic Plan Goals

Every Student Achieving

- Ensure that every student meets or exceeds Brookline's high standards and eliminate persistent gaps in student achievement by establishing educational equity across all classrooms, schools, and programs.

Every Student Invested in Learning

- Increase every student's ownership of his/her learning and achievement by using rigor, relevance, and relationships to foster a spirit of inquiry and the joy of learning.

Every Student Prepared for Change and Challenge

- Instill in every student the habits of mind and life strategies critical for success in meeting the intellectual, civic, and social demands of life in a diverse, ever-changing, global environment.

Every Educator Growing Professionally

- Foster dynamic professional learning communities that inspire inquiry, reflection, collaboration, and innovation, and use data to improve teaching, advance student learning, and refine the programs and practices of the Public Schools of Brookline.

The Public Schools of Brookline
Educational Technology Plan

STRATEGIC PLAN 2.0 GOALS

Goal 1: Every Student Achieving
Ensure that every student meets or exceeds Brookline's high standards and eliminate persistent gaps in student achievement by establishing educational equity across all classrooms, schools, and programs.

Goal 2: Every Student Invested in Learning
Increase every student's ownership of his/her learning and achievement by using rigor, relevance, and relationships to foster a spirit of inquiry and the joy of learning.

Goal 3: Every Student Prepared for Change and Challenge
Instill in every student the habits of mind and life strategies critical for success in meeting the intellectual, civic, and social demands of life in a diverse, ever-changing, global environment.

Goal 4: Every Educator Growing Professionally
Foster dynamic professional learning communities that encourage inquiry, reflection, collaboration, and innovation, and use data to improve teaching, advance student learning, and refine the programs and practices of the Public Schools of Brookline.

OVERALL TECHNOLOGY GOAL

By 2019, we will create the infrastructure, build instructional capacity, and support innovation for the full integration of technology into teaching, learning, and administration in the Public Schools of Brookline.

To meet our overall technology goal, areas of focus with goals and desired outcomes have been determined. Examples of these outcomes include:

- Network inventory falls within established lifecycle
- District maintains and monitors adequate bandwidth
- Every appropriate classroom has mounted projection
- Mobile inventory is properly secured and managed
- A lifecycle management plan is adequately budgeted
- Every student has an appropriate device and Internet access in and out of school (BYOD)
- All staff have an appropriate device to support their work
- Staff and students use a wide variety of peripherals to support teaching and learning
- Online state tests are administered successfully with the appropriate technology
- A Learning Management System is used in grades 6-12
- Educators use digital literacy self-assessment tools to gauge their technology learning needs
- Professional learning opportunities are differentiated and accessed by all staff

- 24/7 online resources are available to and accessed by students and educators
- Data collection and analysis applications and tools support student learning
- A K-12 digital literacy curriculum provides a developmentally appropriate scope and sequence
- Students' digital literacy is assessed with a nationally normed tool
- Students with disabilities utilize the appropriate Assistive Technology to meet their learning needs
- Redesigned curricula are relevant and require higher order thinking and complex problem solving
- Common practices are identified and implemented to improve communication with parents
- Common strategies are identified and implemented to increase personalized/individualized learning
- Online learning opportunities are available for and accessed by students and educators
- Online systems for standard operational processes are identified and implemented to improve work flow

MEASURES OF SUCCESS

- Strategic Plan 2.0 Metrics
- PSB surveys of educators, students, and parents
- Program Review
- Brookline Common Assessments
- Technology inventory and data use
- Budget analyses
- MCAS & PARCC

INTRODUCTION

The mission of the Public Schools of Brookline (PSB) is to ensure that every student develops the skills and knowledge to pursue a productive and fulfilling life, to participate thoughtfully in a democracy, and succeed in a diverse and evolving global society. The current kindergarten class will graduate from Brookline High School in the year 2026. To be true to our mission, we need to prepare students for their lives in 2026 – that's difficult to imagine. What will our "evolving global society" look like then? What will our schools look like then? Our schools need to be hubs of learning, with classrooms that are flexible and dynamic, with reliable access to the rich resources available to enhance teaching and learning. The appropriate use of technology is essential in order to meet our student learning goals. To this end, in Brookline we envision using technology to:

1. Communicate and collaborate in our schools, our community, and the evolving global society.
2. Maximize learning for all students using techniques and materials that take into account varying backgrounds, capabilities, and learning styles.
3. Ensure that all students obtain digital literacy skills that are required in the 21st century.
4. Create a well-integrated, learner-centered environment focused on inquiry into engaging problems.
5. Enrich and extend professional learning for all teachers and instructional leaders.
6. Enable all school personnel to effectively and comfortably use technology as a teaching and administrative tool so that more resources and time can be focused on teaching students.

An effective and responsible plan for technology investment not only provides what is necessary for the next fiscal year, it establishes funding to sustain these resources over time. Given that technology changes so rapidly, we crafted strategies for sustainability that also provide flexibility. With this plan we establish a platform for the continued

development of our uses of technology that will serve students best. The long-term spending plan for educational technology is organized around five (5) categories: devices, applications, professional development, staffing, and infrastructure.

DEVICES

A. Address Equity of Technology Inventory

Goal:
In order to meet the needs of all Brookline students, the PSB maintains an inventory of quality devices across all classrooms and schools to enhance teaching and learning.

Rationale:
Presently the PSB does not provide equitable access to mobile devices for student use in classes across all schools. The existing K-8 mobile access ratio for instruction differs widely across the schools. With the lowest ratio of 2.9 students/device and the highest ratio of 8.08 students/device, the range of access stretches 5.18 students/device. Additionally, our current computer inventory trails state and local community ratios. This proposal is designed to address inequitable distribution and increase the system's overall device inventory (see Attachment #1 - Equitable Access: Students Per Computer; Attachment #2 - Students Per Computer; and Attachment #3 - Proposed FY2015 Students Per Computer).

In addition to building our inventory to address the current equity needs across the schools, the district also needs to prepare for the anticipated adoption of the PARCC assessments. The following guidelines provided by the state recommend:

School Type	Recommended Devices
For a school with three tested grades (K-5, 6-8, 9-12)	One device per student for the largest tested grade
For a school with six tested grades (K-8)	One device per student for the two largest tested grades

Table from The Next Generation Classroom, MA DESE

With these recommendations, planning for ~ 1250 devices across the eight (8) elementary schools and 500 devices at BHS would require just under 1,800 devices.

The plan calls for addressing the equity need across the schools and preparing for online assessments with the adequate number of devices with the same initial strategy. Planning support for a full cart of devices (24) per grade/per school for 3-4 sections and adding an additional cart per grade for schools with 5-6 sections per grade would provide adequate access to support instruction and assessment needs.

The plan begins with a phase-in of 1,800 computers over the first three years (600 per year) to meet the initial assessment and instructional needs. It is difficult to predict changes in technology and overall device landscape more than three years out. As we implement the initial strategy of increasing our inventory to meet our immediate needs, the district will continue to develop policies and monitor readiness to welcome a transition to a more comprehensive Bring Your Own Device (BYOD) strategy which should eliminate the need to continue to grow the inventory beyond the total planned amount of 2400 devices on a four-year cycle. The current budget plan addresses the most immediate needs and helps prepare the organization with time to develop curriculum, policies and practices to welcome the transition to a BYOD.

Desired Outcome:
With this plan, every student will benefit from improved access to developmentally appropriate devices to meet their learning needs in the classroom. Staff will have access to a wide variety of peripherals (printers, scanners, probes, mounted projection, cameras, etc.) to support the full use of devices. There will be enough technology with the proper technical requirements to administer online assessments and high stakes tests (i.e., PARCC). Additionally, this plan addresses our ability to support ongoing needs and the transition to BYOD without additional budget expenditures.

- Approximately 200 devices to Brookline High School and 400 devices to the elementary schools in FY2015
- Acquire 600 additional devices annually for three years
- First year inventory increase reduces the ratio from 6.14 to 4.03 (reduces the range across schools to 1.60)
- Overall inventory increase of 1,800 computers over the three years
- Phased-in increase of mobile access to reach the ratio of one (1) full device cart (24 devices) for every four (4) classrooms in the elementary schools
- Student access is enhanced with district support of BYOD, first at Brookline High School then, after a thorough review of high school impact, consider middle grade BYOD adoption

Annual Cost Increases:

- FY2014 Budget: -0-
- FY2015: Increase of $200,000
- FY2016: Increase of $245,000
- FY2017: Increase of $245,000
- FY2018: Increase of $43,000
- FY2019 (and beyond): no anticipated increases

B. Student and Staff Computer Lifecycle

Goal:
To reduce the lifecycle on all existing computers from greater than five (5) years to four (4) years so that all devices are fully functioning, reliable, and up-to-date.

Rationale:
Computers within the existing inventory are replaced over a five-year period. Technology programs, systems, and applications are updated multiple times over a five year period. The longer the lifecycle for device replacement, the more likely that a device will be unable to accept newer programs as it will typically lack some technical requirements (e.g., memory demands or operating system). With a timelier lifecycle, and the operational budget to support the replacement of devices, we achieve inventory sustainability and device flexibility to make the appropriate adjustments as the technology advances.

Desired Outcome:
The lifecycle on student and staff devices will be reduced, such that:

- Educator and student devices will operate more effectively and efficiently
- Replacement of aging devices will reduce the technical support needed for their upkeep
- A four year life cycle allows for the turnover of particular devices to be adjusted as technology advances

Anticipated Cost Increases:
- FY2014 Budget: $356,000
- FY2015: Increase of $244,000
- FY2016 (and beyond): no anticipated increases

APPLICATIONS

A. Teaching and Learning Tools

Goal:
PSB invests in tools and data systems to improve curriculum, instructional strategies, overall student learning, and administrative efficiencies related to teaching and learning.

Rationale:
In order to establish deep integration of technology in support of learning, we will continue the ongoing work of updating curriculum lessons and units to foster 21st Century skills and knowledge. The subject specific curriculum will provide a scope and sequence of digital literacy skills to help eliminate learning gaps and the repeated application of limited skills (i.e., overuse of particular tools) over time. Students in grades 4 and 7 will participate in an external assessment to monitor the acquisition of skills at benchmark levels. Tools to monitor staff acquisition of skills will also be employed to better define professional learning opportunities.

In order to improve efficiencies around the digital management of classroom materials and assignments - to help support student organization and home-school communication - we intend to grow our BHS Learning Management System (LMS) and extend this tool to the middle grades in FY16. In FY17, we are seeking the integration of a portfolio management system that allows for the collection of evidence of student learning through the school year and from grade to grade. The improvement of teaching and learning tools will continue with the integration of the library system with video distribution/archiving ($40k) and an improved online learning tool for courses outside of PSB ($20k).

Desired Outcome:
Improvements in Teaching and Learning tools will allow effective and efficient organization, management, access and assessment through:

- Updated curriculum aligned with NETS-s and MA Technology and Informational Literacy Standards
- External student technology assessment to monitor skill development
- Consistent LMS across grades 6-12
- Advanced and improved online learning tools for students (i.e., Edgenuity)
- Creation of video distribution/archiving mechanism

Anticipated Cost Increases:

- FY2014 Budget: $32k (to support our Learning Management System at BHS and Virtual High School)
- FY2015: Increase of $10,650
- FY2016: Increase of $20,750
- FY2017: Increase of $10,000

- FY2018: Increase of $83,750
- FY2019: Increase of $11,500

B. Student Digital Content

Goal:
Continuously enhance the PSB portfolio of online subscriptions, and provide a range of content, intervention, extension and challenge to meet the needs of diverse learners.

Rationale:
We are committed to providing current, relevant, and timely access to high-quality online subscription content to support the general curriculum. This includes developing a collection of e-books, audiobooks, and vetted apps/specialty software to provide support for students with additional learning needs and interests. Access to specialty software and apps also address individual student learning needs and interests across the continuum of performance.

Average costs for adding a single managed eBook or audio book title is about $43. Costs of subscription services/software vary widely depending on the target audience of the application, resource, information and features provided. Apps, when not free, typically vary between $3 and $10. Building a portfolio of resources and advancing our digital collections of materials is phased in over time beginning with an initial investment of $4/student in FY15 and growing to ~$24 dollars a student in FY19.

Desired Outcome:
All students will have access to the information they need through:

- A robust portfolio of contemporary online subscriptions and services
- Appropriately enriched curriculum to challenge students and stretch their learning
- Support personalization and individualization of curriculum and assessment

Anticipated Cost Increases:
- FY2014 Budget: $13,000 (taken from library budget)
- FY2015: Increase of $32,000
- FY2016: Increase of $46,000
- FY2017: Increase of $30,000
- FY2018: Increase of $30,000
- FY2019 Increase of $30,000

C. Administrative Tools

Goal:
To establish ongoing support in tools to improve administrative efficiencies and advance the use of data for teaching and learning.

Rationale:
Immediately, these funds will provide technology support for the Educator Evaluation program (the FY2014 CIP funded the one-time pilot program); an IT management tool; and, funds to support the needed help desk supplies, due to an increase in inventory.

Additional administrative tools are needed and will be integrated over time, including: analytics dashboard software, management tools for inventory, curriculum resources, and an online 24/7 educator resource portal. Since our current PD management tool provides only limited functionality to assist with publication of the course catalog and course signup, we are seeking a more functional tool that will expand our use.

Desired Outcome:
Improved access to data will help build a culture of data-driven decision-making through:

- Fully fund X2 Aspen Student Information Management System (SIS) for anticipated enrollment increases
- Fully fund evaluation support tool (TeachPoint or equivalent)
- Establish an effective web presence with messaging to improve communication within the community
- Establish a professional development management tool to add functionality that includes managing teacher professional development; facilitate reporting; and better integration with existing SIS, evaluation, and HR systems
- Establish an Analytics Dashboard to support the gathering, analyzing, and visualization of essential student learning data for teachers, school-based and system-wide administrators
- Establish Curriculum Management Tool that will store and share all curriculum related documents, instructional videos, and resources. Possible tools include the DESE EDWIN Teaching and Learning tool, Curriculum and Learning add on to our Aspen SIS, or other
- Integrate Inventory Management Software: Follet Asset Manager will integrate with our Follet Destiny Server to provide inventory management to keep track of classroom assets, sports equipment, musical instruments, etc.
- Purchase Casper Licensing, an IT tool that assists with management of devices
- Software and apps available for the increase in devices and support

Anticipated Cost Increases:
- FY2014 Budget: $72k (to support our student management software); $40k (in CIP, to support our educator evaluation platform)
- FY2015: Increase of $38,400 (over the $72k in operating budget)
- FY2016: Increase of $74,400
- FY2017: Increase of $58,000
- FY2018: Increase of $50,000
- FY2019: Increase of $14,600

D. Innovation Fund

Goal:
PSB partners with community organizations, parent groups, and private enterprises to seed innovative practices and programming to deepen and extend learning for students, which strengthens their engagement and builds their investment in learning.

Rationale:
While the general technology budget plan addresses the overall conditions necessary to establish a sustainable technology infrastructure, the establishment of an innovation fund is necessary to help drive innovative practices tied to the district's Strategic Plan goals. As advances unfold in the research of teaching and learning, it is critical that the district stays current in the field of education. PSB will need to deliberately research innovative practices and create the conditions for advancing inquiry and creativity in teaching by investigating ideas and testing promising practices. Successful pilot initiatives would leverage the foundational investments already made and allow the district the opportunity to investigate practices and programs that show great potential without stripping existing monies needed to ensure accessibility and sustainability. Backed by data around new efficiencies in learning or administration, these programs could then be taken to scale.

Desired Outcome:
Brookline will be able to explore innovative ways to advance learning for all students, and become a leader in this area through:

- Establishment of a steering committee and decision-making processes
- Maintain a "watch list" of ideas and promising practices for further investigation
- Develop rubrics for effectiveness to guide decision making and ensure alignment to strategic initiatives
- Establish timelines and guidelines for submitted proposals
- Develop relationships with other potential funding and research partners

Anticipated Cost Increases:
- FY2015: -0-
- FY2016: Increase of $50,000
- FY2017: Increase of $25,000
- FY2018: Increase of $50,000
- FY2019: Increase of $25,000

PROFESSIONAL DEVELOPMENT

Goal:
PSB ensures that all staff have the appropriate skills and understandings of content, pedagogy and technology to support advances in teaching and learning.

Rationale:
Professional learning is an essential element of the successful integration of technology in teaching and learning. The Association for Supervision and Curriculum Development (ASCD) outlines the following six (6) areas for effective professional development that we are applying directly to our strategies to advance the best technology practices:

- Directly focus on helping to achieve student learning goals and supporting student learning needs
- A collaborative endeavor - teachers and administrators work together in the planning and implementation of adult learning
- School-based and job-embedded adult learning
- A long-term commitment
- Differentiated
- Tied to the district goals

Desired Outcome:
We will build a culture of technology users with the guidance of the Technology Professional Learning Plan. The plan supports and encourages Brookline teachers to lead and share their learning with other educators in Brookline. In addition, there are plans for accessing outside expertise by bringing consultants to Brookline, as well as sending educators out to other school systems and professional conferences.

Using self-assessments of International Society of Technology Education (ISTE) Standards for teachers, administrators, and instructional coaches, and the PSB educator evaluation process, teachers and administrators will pursue the appropriate learning opportunities to reach the stated goals (the alignment of goals includes: Strategic Plan, school improvement plans, and individual educator goals).

With this professional learning plan we will provide:

- Differentiated professional learning opportunities for all teachers across all areas of technology based on the individual's technology self-assessment and system needs;
- Workshops for teachers by teachers within the schools and across the school system;
- Job-embedded professional development on curriculum and technology integration with instructional coaching and support from the ETS staff and librarians, as well as coordinators and principals;
- Support for ambitious innovators of technology to gain Google certification; and,
- Evaluation of the effectiveness of the professional learning.

Anticipated Cost Increases:
- FY2014 Budget: $20,000 (embedded in Educational Technology budget and the Office of Teaching and Learning)
- FY2015: Increase of $50,000
- FY2016 (and beyond): no anticipated increase; additional supports will accompany any new initiative.

STAFFING

Goal:

To build necessary staffing to support increases in devices and applications with timely solutions and proactive systems maintenance.

Rationale:
Technology is currently served by several integrated organizations that include the Town-Schools Information Technology Department, Department of Educational Technology and Libraries, Research and Accountability Department, and the Help Desk:

- Town-Schools IT Department:
  - ✓ Chief Information Officer
  - ✓ Network Manager (1) and Network Engineer (1) provide network support
  - ✓ Additional supports for enterprise applications provided through variety of staff

- Educational Technology and Library Department
  - ✓ Director
  - ✓ Educational Technology Specialists (9)
  - ✓ Librarians (12)

- Research and Accountability Department
  - ✓ Director
  - ✓ Data and Application Support Specialists (3)

- Help Desk
  - ✓ Help Desk Manager
  - ✓ Technicians (4)

As the district plans for additional infrastructure, devices, applications, and better integration of all systems, more specialized support will be needed to guarantee the devices and tools work seamlessly in support of the core needs. To address these more specialty support areas, district and town administration are assessing existing roles, functions, and skills in order to align all support resources and limit the number of new hires long term. Discussions include creating internal tiered support mechanisms, possibly using short-term consulting services for targeted expertise, and prioritizing specialty hires.

Guiding documents from the Department of Elementary and Secondary Education (DESE) suggest one technician per 400 supported computers. Using the DESE formula, PSB would carry 12 FTEs for technicians by FY19. Although using a calculated support structure provides some ballpark for the level of support for consideration, these formulas do not address the variety of specialty support needed. Therefore, to best serve the needs of the Public Schools of Brookline, a second-generation support model will be developed to better align with the needs and capabilities required with the expected growth in digital learning. Moreover, positions and skills that do not exist in existing Town and School roles may need to be created to satisfy 21st Century learning requirements.

Desired Outcome:
The development of a holistic organizational technology support plan that defines necessary roles and responsibilities, budgetary impacts and expected performance metrics.

Core functions noted below are used to indicate specialty support needs, not actual proposed positions at this time.

- A highly specialized and dynamic support structure that addresses support needs in repair, applications, systems management, and networking. These include specialty supports like:
  - ✓ Project Management: To address the anticipated increase in building (Devotion/Driscoll/BHS) and special projects (mounted projection/wireless network) ongoing guidance, coordination, collaboration, is necessary to ensure timely and accurate delivery and project completion.
  - ✓ Systems Administration: System-wide senior technical support to work with existing technology leadership to develop and oversee policies and protocols for management of all devices including mobile device management, system-wide updates, image and systems maintenance.
  - ✓ Technical/Help Desk Support: Tiered supports or services to better address specialties around
    - Repair
    - Enterprise application support
    - Tier two troubleshooting
    - Networking support
- Specialty learning support needs include:
  - ✓ Assistive Technology Support: Provides specialty technology supports, guidance, and coordination to students with disabilities. Provides evaluation, acquisition, and training on AT devices and tools with any or all of the following services (as defined by American Foundation for the Blind (http://www.afb.org):
    - Evaluation of AT needs
    - Help in acquiring AT devices
    - Guidance in selecting, customizing, adapting, maintaining, repairing, or replacing AT devices
    - Coordinating and using necessary interventions (for example, low vision services) with the use of AT devices
    - Training or providing technical assistance to individuals with disabilities, family members or significant others, professionals, and employers in the effective use and integration of AT devices
  - ✓ Digital Learning Management: As more district-wide systems are used and introduced (i.e., online learning tools like Google Apps for Education, Learning Management Systems, online course management, and subscription-based tools and services) setups, management, and customization is best administered at the system level.
  - ✓ Building-based Technical Support: With increasing amounts of technology tools and applications, including a variety of online assessments, there is an increasing need for building-based technical support. Without this support, Educational Technology Specialists are pulled away from their primary role as instructional coaches to assist with increasing technical needs. These building-based roles would be responsible for setups, hardware/software testing, and first level technical support and troubleshooting.

Anticipated Cost Increases:

To support the second-generation staffing model that can best align with the needs and expected growth in digital learning, the following placeholders are provided:

- FY2014 (current):
- FY2015: Increase of -0-
- FY2016: Increase of $175,000
- FY2017: Increase of $175,000
- FY2018: $175,000
- FY2019: $125,000

INFRASTRUCTURE

A. Network Infrastructure

Supports for the sustainable maintenance of the network architecture are now covered in the CIO's budget. See CIO's Long-Term Support Strategy for PSB Network Infrastructure.

Goal:
PSB maintains a secure, reliable, robust, and available network to support the administrative, teaching, and learning needs of all users.

Rationale:
Switches, WAPS, servers, and Wism make-up the network infrastructure that, in combination with bandwidth delivery, provides a robust and reliable network that needs to grow as the number of network users increases, as well as to address curriculum and assessment demands. It is essential to provide for ongoing licensing, maintenance, and replacement of this essential hardware inventory.

Desired Outcome:
All PSB users can confidently plan and execute the full array of technology applications that support their work and the work of students.

Anticipated Cost Increases:
- FY2015: Increase of $75,000 to CIO Operating Budget for Schools; $80,000 to CIO Budget in CIP
- FY2016 (and beyond): increase CIO Budget in CIP to $270,000 ($80,000 for schools)

B. Classroom Infrastructure (Mounted Projection)

Goal:
PSB will provide each instructional space with the necessary equipment to support digital learning.

Rationale:
The classroom infrastructure for some schools have been supported by building projects, while other schools have been supported with financial assistance from their PTOs. In every new building project, a mounted projector/display is considered a foundational element of every classroom and is necessary to provide whole class display of digital resources. Currently the district has 71 classrooms with mounted projection at the elementary level, including 44 at Runkle and seven (7) at Heath (both provisioned as part of the building project) and 20 at Devotion (provided by the PTO). In addition, there are three (3) classrooms at Brookline High School with mounted projection.

The district plans to update our existing classrooms that are not scheduled to benefit from a planned renovation project to the same modern standard. This will ensure that all of our classroom spaces have large format displays to assist with demonstration and presentation of information in the classroom. The project will begin in FY2015 with the addition of 45+ classrooms and continue until all classrooms are brought to a similar standard.

Desired Outcome:
All classrooms throughout the schools will have mounted projection for large format display of information.

Anticipated Cost Increases:

- FY2015: $256,000 (from CIP)
- FY2016: Increase of $135,000
- FY2017: Increase of $25,000
- FY2018: Increase of $20,000
- FY2019: Increase of $20,000

C. Classroom Infrastructure (Mobile Carts)

Goal:

To ensure that new mobile inventory is secured and available to classroom teachers.

Rationale and Outcome:

With the planned purchase of more mobile computers for instructional and assessment use, an investment in additional carts to store and manage the inventory increase is necessary. The district currently maintains an inventory of 52 storage carts (40 K-8, 12 BHS). Many of these existing carts are over 12 years old and need replacing. This proposal will increase our available inventory by 37 carts, allowing for more student access to technology throughout the system.

Desired Outcome:

- New mobile inventory will be properly secured and managed.

Anticipated Cost Increases:

- FY2015: $63,000 (from CIP)
- FY2016: $40,000 (from CIP)
- FY2017: $40,000 (from CIP)

Budget Summary (Annual Increases over FY2014 Base):

Categories	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019
Devices: Addressing Equity	$0	$200,000	$245,000	$245,000	$43,000	$0
Devices: Lifecycle	$356,000	$244,000	$0	$0	$0	$0
Applications: T&L Tools	$32,000	$10,650	$20,750	$10,000	$83,750	$11,500
Applications: Digital Content	$13,000	$32,000	$46,000	$30,000	$30,000	$30,000
Applications: Admin. Tools	$72,000	$38,400	$74,400	$58,000	$50,000	$14,600
Innovation	$0	$0	$50,000	$25,000	$50,000	$25,000
Professional Development	$20,000	$50,000	$0	$0	$0	$0
Staffing		$0	$175,000	$175,000	$175,000	$125,000
Infrastructure: Network		$75,000	$0	$0	$0	$0
Mounted Projection	$0	$0	$135,000	$25,000	$20,000	$20,000
Totals		$650,050	$746,150	$568,000	$451,750	$226,100

Capital Improvement Plan:

Categories	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019
Infrastructure: Network (Total CIO Budget) (Schools)	 $74,900	 $250,000 $80,000	 $270,000 $80,000	 $270,000 $80,000	 $270,000 $80,000	 $270,000 $80,000
Applications: Admin. Tools	$40,000	$0	$0	$0	$0	$0
Mounted Projection	$0	$256,000	$0	$0	$0	$0
Mobile Carts	$0	$63,000	$40,000	$40,000	$0	$0

Technology Plan Overall Goal

By June 2019, we will create the infrastructure, build instructional capacity, and support innovation for the full integration of advanced technologies into teaching, learning, and administration in the Public Schools of Brookline.

Focus Area	Goal:	Desired Outcomes: What will this look like when these goals are met?
Network Infrastructure	The PSB maintains a secure, reliable, and available network to support the administrative and teaching and learning needs of all.	• Network inventory falls within established lifecycle. • The district maintains and monitors adequate bandwidth
Devices	The PSB maintains an adequate amount of computers to meet the administrative, teaching/learning/and assessment needs of staff and students.	• All staff have an appropriate device to support their work • Every student has an appropriate device and Internet access in and out of school (BYOD) • Staff and students use a wide variety of peripherals to support teaching and learning (printers, scanners, probes, mounted projection, cameras, etc.) • Online state tests are administered successfully with the appropriate technology • Every appropriate classroom has mounted projection • Mobile inventory is properly secured and managed • Lifecycle management plan is adequately budgeted. • The district encourages and supports BYOD
Technical Supports	The PSB employs highly qualified technical staff and invests in appropriate tools to ensure hardware, software, and network issues are resolved quickly and adequately.	• All technicians earn and maintain appropriate certifications • Technicians have access to the necessary tools to efficiently support the inventory • All technology updates are carried out in a timely manner • All technical problems are resolved in a timely fashion

Policies and Procedures	The PSB have updated policies and procedures in place to support accountability and efficiency.	• Policies include:
		  ◦ Acceptable Use policy with Responsible Use Guidelines
		  ◦ BYOD policies
		  ◦ Social media policy
		• Documents are readily available (i.e., located in PSB portal) for employee access
		• Appropriate policies listed in Student handbooks
		• Policies voted and approved by school committee

Administrative Applications	The PSB invests in tools to support administrative efficiencies in the core business needs of the district.	Applications will be in place to support : • Fee Processing • Payroll and Human Resources Management (MUNIS) • Work orders system for Maintenance and Help desk • Facilities Scheduling (SchoolDude) • Data collection and analysis tools are in use to facilitate data to inform instruction in a timely manner.
Interoperable Data Processes	The PSB will automate ETL processes between core data systems	• Online systems for standard operational processes are identified and implemented to improve work flow • Reduction in manual processes for sharing data between systems • Reduction in multiple data entry points for data fields
Data Systems and Culture	The PSB invests in data systems and procedures that ensure timely and accurate data in support of core needs.	• Data Collection and analysis systems are in place to support the timely turnaround of assessment data necessary to inform instruction • Building and District staff have appropriate access to timely and accurate data • The culture throughout the schools is data literate • Data collection and analysis applications and tools support student learning

Focus Area	Goal:	Desired Outcomes: What will this look like when these goals are met?
Curriculum	The PSB curriculum identifies and develops skills and knowledge of 21st century tools to collaborate, solve problems and create new knowledge.	● Curriculum designs include: ○ Rigor and Relevance Framework ○ Instructional Framework ○ 21st Century Skills/ Habits of Mind ○ Digital Citizenship ○ Media Literacy ● Curricula is designed to leverage student inquiry and metacognitive reflection ● Curricula support student ownership of their own learning ● Redesigned curricula are relevant and require higher order thinking and complex problem solving ● Updated curricula aligned with NETS-s and MA Technology and Informational Literacy Standards ● A K-12 digital literacy curriculum provides a developmentally appropriate scope and sequence ● Technology skills and integration connections named in all curriculum documents and course syllabi ● All ASC course proposals are properly aligned and indicate how they prepare students to be college and career ready. ● Students' digital literacy is assessed with a nationally normed tool ● Common practices are identified and implemented to improve communication with parents ● Common strategies are identified and implemented to increase personalized/individualized learning
Resources	The PSB invests in resources so all learners have access to high quality materials in a variety of formats.	● 24/7 online resources are available to and accessed by students and educators ● All texts are provided in accessible formats. ● Online learning opportunities are available for and accessed by students and educators ● Students with disabilities utilize the appropriate Assistive Technology to meet their learning needs ● A Learning Management System is used in grades 6-12
Professional Development	The PSB ensures that all staff have the appropriate understanding of content, pedagogy and technology to support 21st teaching and learning.	● Professional learning communities that encourage inquiry, reflection, collaboration, and innovation, and use data to improve teaching, advance student learning, and refine the programs and practices of the Public Schools of Brookline ● Educators use digital literacy self-assessment tools to gauge their technology learning needs ● Professional learning opportunities are provided and accessed by all staff

Public Schools of Brookline

Tech Overview

Vision of Technology

Infusing technology into teaching and learning – using the tools of technology to enhance curriculum, instruction, and assessment around

- Critical thinking
- Creativity
- Collaboration
- Communication

Living in the digital world – creating digitally literate citizens who know how to use technology in responsible and meaningful ways

Operations – creating efficient and effective processes to run the school system, for example: scheduling facilities, required data gathering and reporting, and fee collection

Tech Plan

Overall Goal: By 2019, create the infrastructure, build instructional capacity, and support innovation for the full integration of technology into teaching, learning, and administration in the Public Schools of Brookline

Accessibility - Ensuring equitable availability of technology for all

Flexibility - Technology and innovation are ever-evolving. Technology planning, governing processes, and policies must remain responsive to changing conditions.

Sustainability - Ongoing lifecycle funding is required to maintain investments in devices and infrastructure.

Equitable Access in the Schools*

Goal One: Create equity among the schools
Goal Two: Increase access to devices across all schools, while maintaining equity

K-8 Students to Instructional Computer		
School	**Ratio FY14**	**Ratio FY15***
Baker	6.42	4.38
Devotion	6.25	4
Driscoll	6.26	3.54
Heath	2.9	3
Lawrence	6.92	4.36
Lincoln	7.62	4.12
Pierce	8.08	3.89
Runkle	4.06	3.72
Mean	6.06	3.87
Median	6.33	3.95
Range	**5.18**	**1.38**

**As of September 30, 2014*

WHERE WERE WE FIVE YEARS AGO?

- Average age of computer was close to 8 years old
- Teachers used shared desktops in classroom/office
    - Initiated shift to laptops for staff
- Reliable wireless was limited
- Computer lab and 1-2 carts were shared for entire school
- LCD media projection provided on shared carts for checkout

WHERE ARE WE NOW?

- High quality wireless connectivity to every school
- All full-time professional staff are provided an appropriate computer
- More equitable access to mobile/labs in schools for teacher/student use
- Learning Management System at BHS
- LCD media projector in or available for all classrooms/started mounting projection at BHS
- Rollout of Google Apps for Education for staff and students
- E-books and downloadable audio-books collection started in school libraries
- Adaptive mathematics assessment pilot to better individualize elementary instruction
- Fully provisioned Learning Centers and system-wide programs
- Educational Technology Specialists in schools provide ongoing “just-in-time” professional development and instructional support
- Professional development for redesigning learning for the digital age
- New website under development for District

WHERE ARE WE GOING?

Curriculum

- Meaningful learning that promotes critical and creative thinking, collaboration, and problem solving
- Technology skills and integration connections named in all curriculum documents and course syllabi
- K-12 digital literacy curriculum provides a developmentally appropriate scope and sequence
- Authentic curricula, instruction, and assessment to support student ownership of their own learning
- Common strategies are identified and implemented to increase personalized/individualized learning
- Common practices are identified and implemented to improve communication with parents

Resources

- Online resources available to and accessed by students and educators 24/7
- All texts in accessible formats
- Online learning opportunities are available for and accessed by students and educators.
- Students with disabilities utilize the appropriate Assistive Technology to meet their learning needs.
- Common Learning Management System in the elementary schools

Professional Development

- Professional learning communities that encourage inquiry, reflection, collaboration, and innovation, and use data to improve teaching, advance student learning, and refine the programs and practices of the Public Schools of Brookline.
- Educators use digital literacy self-assessment tools to gauge their technology learning needs.
- Professional learning opportunities are provided and accessed by all staff.
- Essential professional learning identified as required is provided and tracked.

Data Systems and Culture

- Data Collection and analysis systems are in place to support the timely turnaround of assessment data necessary to inform instruction.
- Building and District staff have appropriate access to timely and accurate data.
- The culture throughout the schools is data literate.
- Data collection and analysis applications and tools support student learning.

Interoperable Data Processes

- Online systems for standard operational processes are identified and implemented to improve workflow.
- Reduction in manual processes for sharing data between systems.
- Reduction in multiple data entry points for data fields.

Administrative Applications

- Applications will be in place to support:
    - Fee Processing
    - Payroll and Human Resources Management
    - Work orders system for Maintenance and Help Desk
    - Facilities Scheduling
    - Data collection and analysis tools are in use to facilitate data to inform instruction in a timely manner.

Devices

- All staff have an appropriate device to support their work.
- Every student has access to an appropriate device and Internet access in and out of school.
- Staff and students use a wide variety of peripherals to support teaching and learning (printers, scanners, probes, mounted projection, cameras, etc.).
- Online state tests are administered successfully with the appropriate technology.
- Every appropriate classroom has mounted projection.
- Mobile inventory is properly secured and managed.
- Lifecycle management plan is adequately budgeted.
- The district supports a “Bring Your Own Device” (BYOD) program for students.

Status Report on the STAR Chart Indicators – Spring 2015 Update

The Public Schools of Brookline continue to monitor progress using targets set forth in MA 2010 STAR Chart and MA DESE local technology guidelines 2010-2015.

SCHOOL TECHNOLOGY AND READINESS CHART			
KEY AREA: TEACHING AND LEARNING			
Focus Area	**Proficient / Advanced Tech**	**Current-**	**2015 Goal**
Impact of Technology on Teacher Role	Prof- Mostly teacher facilitated learning. Students use technology for cooperative projects in their own classroom. Adv- Mostly student-centered learning, teacher as mentor/facilitator. Students use technology to communicate and collaborate outside the classroom.	Computer use is mostly facilitated as a whole class activity that takes place in the lab or with mobile carts. Teachers use student centered pedagogy for projects, with technology when available.	Provide teachers with models to support inquiry-based student-centered technology use. Promote project-based learning, collaboration, and student communication in support of learning. Promote 21st C skills. Implement Cloud-based productivity suite (ie. GAFE) to provide collaboration tools.
Patterns of Teacher Use	Prof- 90% of teachers use technology for research, lesson planning, multimedia and graphical presentations and simulations, and share technology uses with colleagues. Adv- 90% of teachers integrate evolving technologies that transform the teaching process by allowing for greater levels of access, interest, inquiry, analysis, collaboration, creativity, and content production.	97% of teachers self-report using technology for administrative use nearly every day. (TSAT) 81% of teachers self-report using technology for instructional use at least once weekly. (TSAT)	To increase the frequency of teacher use for integration while maintaining use for productivity.
Design of Instructional Settings	Prof- Lab, libraries, all classrooms, and portable technology (e.g. wireless laptops or handheld electronic devices); flexible scheduling. Adv- Seamlessly integrated throughout classes and all content areas. Technology is available anytime both in school and within the community.	Six K-8 schools have both a single computer lab that is flexibly scheduled and access to mobile carts. The Lawrence School and Baker uses all mobile carts. The HS has multiple labs and some mobile carts in use. The Runkle School includes mounted interactive whiteboards in all teaching spaces with two classroom computers, a document camera, and a teacher laptop. Other elementary schools in Through the help of PTO and Education Foundation initiatives, some schools are exploring the use of ipads, IWBs, etc.	All schools will have a variety of access options that include open computer labs, mobile carts, and community spaces like libraries. Yearly planning supports adjustments needed to meet the needs of instruction. All Full-time professional staff have access to a teacher laptop. Mounted projection added to BHS Classrooms starting in Fall

Curriculum Areas	Prof- Integrated into most Framework curricular areas and activities at all grade levels. Adv- Integral to all curricular areas at all grade levels.	Technology is integrated across various curriculum areas and grade levels. Much of the curriculum in science and social studies is being rewritten and aligned with new Learning Expectations. As units are created, technology uses and integration ideas are added to curriculum design.	Appropriate technology skills and practices will be woven throughout all curriculum content areas, course syllabi, and unit designs.
Patterns of Student Use	Prof- Almost all of students show proficiency in all Massachusetts Technology Literacy Standards and Expectations for their grade. Adv- All students show proficiency in all Massachusetts Technology Literacy Standards and Expectations for their grade.	Student proficiency is currently measured by the Educational Technology Specialist while working directly with students in the middle grades. ETS report that 47% of students have met nearly all the standards with 48% mastering half or more than half.	The goal is to administer a common grade level assessment in 6th grade to determine a more accurate way to measure proficiency of meeting expectations by end of 8th grade.
Content of Training	Prof - Training directly ties technology to its use in content areas and how to effectively manage it in the classroom. Adv- Training focuses on modeling, mentoring, and adopting new technologies as well as the integration of Universal Design and access considerations for all students.	Training opportunities exist for both admin uses and integration. Integration strategies allow users to design for specific content areas. Ed Tech Specialists in each school provide job-embedded curricular design and instructional supports.	Increase training opportunities aligned with specific content areas. Empower and encourage teacher leaders to share best practices in formal settings (workshops/PD day/faculty meetings).

KEY AREA: EDUCATOR PREPARATION AND DEVELOPMENT			
Focus Area	**Proficient Tech/Advanced**	**Current**	**2015 Goal**
Capabilities of Educators	80% meet TSAT and/or local district teacher technology competencies and implement them into the school environment.	Self reported Data: K-12 Teachers Early Tech: 7% Developing Tech: 46% Proficient Tech: 37% Advanced Tech: 10% Source: TSAT 2010 -2015 Self Reported Data: Beginning: less than peers 11% Average: same as peers 63.0% Adv: more expert than peers 26.0% Source: Speakup results- Feb 2014	Continue to move teachers toward advanced/proficient tech: Early Tech: 0% Developing Tech: 20% Proficient Tech: 55% Advanced Tech: 25%
Leadership and Capabilities of Building Principals and District Administrators	Prof- Recognizes and identifies exemplary use of technology in instruction. Uses technology skills in daily work such as research and communication and models appropriately with staff. Provides constructive feedback to teachers on their technology use. Adv- Promotes exemplary use of technology in instruction. Models and uses in daily work in communication, presentations, online collaborative projects, and management tasks. Develops a school culture that expects all teachers to use technology. Advocates in the community for the integration of technology in instruction. Expects all teachers to use technology well.	All administrators use technology for daily work, research, and communication. Administrator knowledge of exemplary use in various content areas varies. Administrators do provide a variety of supports to help develop a school-wide culture of technology use.	Administrators will continue to support a technology using culture in their schools. Expectation for use and integration will continue with the development of integrated curriculum/ learning expectations and sharing of best practices. Begin learning series for Administrators to help support their role in leading for technology change.
Models of Professional Development	Prof- Coaching, modeling best practices, district-based mentoring. Involvement in a development / improvement process. Study groups. Adv- Creates a culture of inquiry, sharing and knowledge building. Anytime learning available through a variety of delivery systems (e.g., just-in-time support, mentoring, peer observation).	Full time ETS in each building provide job-embedded opportunities for coaching, modeling, and technology mentoring. Small study groups and PLCs are active in many schools. Participate in EDCO summer collaborative and sponsor district workshops and conference attendance. Offered district designed online PD opportunities in science, math, and technology.	Use various strategies to reach more users. Strategies include: ▪ Increase opportunities for empowering teachers to share best practices (Tech Talks, workshops). ▪ Develop opportunities to share work online (Portal, Wikis, GAFE) ▪ Develop cadre of technology teacher leaders ▪ Design more blended opportunities for learning.
Levels of Understanding	Prof- Most at appropriation stage (technology is integrated, used for its unique capabilities). Adv- Most at invention stage (teachers discover and accept new uses for technology).	Most teachers are at the adaptation stage with some at the appropriation stage. ETS work with staff on models of integration. Although technology is used to enrich curriculum there are many powerful examples of	Continue to move teachers and users along the levels of understanding spectrum with higher level uses/users acting as models for staff at earlier stages. This is the ongoing work of the ETS in each building.

		integration.	
Universal Access: Integration of Universal Design and Assistive Technology	Prof- Awareness of universal design and assistive technologies (hardware/software) by special educators & most general educators; universal design strategies or assistive technology used to promote access to the general curriculum demonstrated across all grade levels; staff are designated to provide AT assessment, procurement, support (training) and maintenance. Adv- Systemic adoption of universal design strategies throughout the curriculum and the seamless integration of assistive technology to promote access to the general curriculum for all students; staff are designated to provide AT assessment, procurement, support (training), and maintenance.	Working closely with the Assistant Superintendent of Special Services to develop needs/standards hardware, software for all Learning centers and special programs. Set up new processes and protocols for creating determinations and acquisitions. Adopted Solo Suite licensing district-wide (2011) and provided training to all ETF, Special Educators, and ETS. Consulting Assistive Technology Specialist (2 days/wk) Structured rollout of Bookshare/Learning Ally	Increase understanding among all special ed staff around universal design and assistive technology. Better facilitate process and procedure for determining and acquiring necessary tech needs. This work is ongoing.

KEY AREA: ADMINISTRATION AND SUPPORT SERVICES			
Focus Area	**Proficient/ Advanced Tech**	**Current**	**2015 Goal**
Vision and Planning	Prof- In addition, the Technology Plan is integrated into district plan; used for internal planning, budgeting, applying for external funding and discounts. Teachers and administrators have a vision for technology use in support of student learning, teacher professionalism, and data management. Adv-The technology plan and vision are focused on improving the success of all students based on needs, research, proven teaching and learning principles and is actively supported by the School Committee and Superintendent. Technology plan is collaboratively developed, guiding policy and practice; updated at least annually.	The technology plan aligns with Massachusetts Technology Plan. Our plan integrates into district plans through the District's Program Review Process, which helps guide planning, budgeting, and use of external funds as well as the annual budget planning process. The district is working on a revision of the strategic plan which will also include a greater emphasis on the role of technology in the District. Early draft of Tech Plan along with budget forecast is being shared among stakeholders.	Technology planning is an ongoing process that seeks to balance development with sustainability. The plan is collaboratively developed and guides our actions. Teaching and learning stays at the center of the technology discussion so that we can build appropriate data, admin, learning, and assessment systems.
Technical Support (hardware, operating system, network)	Prof- Sufficient technical staff and support tools to resolve 95% of problems within two days. Same-day in-classroom technical support available. Problems infrequently cause major disruptions to curriculum delivery using technology. Network administrator. Adv- Sufficient technical staff and support tools to resolve 95% of problems within one day. Technical support is readily available on-site for both infrastructure and application problems. Problems do not cause major disruptions to curriculum delivery using technology. Network administrator.	Staffed help desk with Track-it online work order system in place. Response time varies depending on problem, often greater than 24 hours. Problems still cause disruptions to curriculum delivery using technology. Increased bandwidth in summer 2013 to 500mbps town/school.	Purchase of Filewave (Summer 2014) to replace Casper. Switch technology work order system to SchoolDude. New system should provide better adoption, monitoring and reporting. Maintain current staffing; Decrease support times and disruptions to curriculum delivery. Ongoing assessment of bandwidth usage and needs. Plan for more support in coming years.
Technology Integration Specialist	Prof- District level Technology Director. Dedicated instructional technology specialist - one half person per 30-60 staff. Dedicated staff at district level for data management and assessment. Adv- District Technology Director. Dedicated instructional technology specialist—one half person per 30-60 staff. Dedicated staff at district level for data management and assessment and to help produce integrated curriculum content.	District level Technology Director with one full-time ETS in each school Data Management Team consists of one data support staff and one database admin. New Director of Research and Accountability started in January 2014.	Maintain current staffing but work to maximize efficiencies, develop clear policies, procedures, and practices for better alignment of efforts. Plan to add new district-wide Digital Online Learning Specialist and Data analyst.

Budget Levels	Budget for purchases, professional development, adequate staffing support, and ongoing costs. Other state, federal, and local programs directed to support technology funding. Business partnerships, donations, and other local funding designated for technology. Adv- Budget for purchases, incentives for professional development, sufficient staffing support, and ongoing costs. Appropriate budget to support district technology plan.	Current funds in operational budget allocate include PD, staffing (educational and technical) and life-cycle management for support of hardware. These funds fall short of fully supporting our existing inventory and leave little room for advancing. Existing funds do fall short Funds have been added to specifically support peripherals, and some software.	Increased funding to support four-year life cycle on all current desktop/laptop inventory and all ongoing annual maintenance costs. Added 80k to CIO budget to support infrastructure lifecycles. Target new developments with special funding allotments with lifecycle awareness.
Budget Allocated for Technology (Total Cost of Ownership)	Prof- Between $300 - $425 per student Adv- $425 or more per student	Currently approximately $377. Calculated from FY13 ET and IT budget book amounts divided by 7000 students (FY13). Note: does not include librarian salaries and/or book budgets.	Ongoing assessment of needs to sustain lifecycles for all major areas (hardware, software, support, PD, network infrastructure) is ongoing.
Universal Design and Accessible Technology Considerations (e.g. Section 508)	Prof- Considerations for universal design and accessible technologies are established in areas of high student use (e.g., libraries, computer labs), some classrooms and administrative offices; routine implementation of procurement policies for information and instructional technologies that ensure usability, equivalent access, and interoperability. Adv- Universal design and accessible technologies considerations are established throughout the district; procurement policies for information and instructional technologies that ensure usability, equivalent access, and interoperability in accordance to the guidelines established by Section 508.	The Special Education department uses both local expertise and contracted services when investigating accessible technologies. Direct work between assistive technology consultant Education, Assistant Superintendent of Student Services, and the Director of Educational Technology and Libraries is addressing ways to improve process and procedures.	Better and consistent procedures to support routine implementation of procurement policies for information and instructional technologies that ensure usability, equivalent access, and interoperability.
Students per Instructional Computer	Prof- Fewer than 5 students per Type A and B computer; replacement cycle established for 6 years or less; one computer per teacher—possibly a laptop for working at home. Most students have access to handheld electronics. Maintains a list of places students can use technology outside of school. Adv- One student per Type A and B computer or other electronic device. Replacement cycle established for 5-6 years or less; one computer per teacher—possibly a laptop for working at home. 75% of computers meet Massachusetts A/B	Computer ratio is less than 5 students per computer though some computers are over 6+ years. Most computers currently meet this standard: • Intel based Mac • 4 GB Ram • Mac OS 10.7.5 Anticipated Standard (FY15) • Intel based Mac • 4 GB Ram • Mac OS Mavericks	▪ Maintain current inventory #s and increase funding to support a transition to a 4-year cycle on all hardware. ▪ Laptops for teachers ▪ Laptops for specialists ▪ Add devices to address student mobile access needs for instruction and assessment.

	standards. School works with community to provide equitable access to technology for students and community members after school hours.	Annual Next Steps Planning process by school used to monitor needs and ongoing distribution of replacement computers.	

KEY AREA: INFRASTRUCTURE FOR TECHNOLOGY			
Focus Area	**Proficient / Advance Tech**	**Current**	**2015 Goal**
Internet Access Connectivity/ Speed	Prof - District Internet connection of 10 Mbps per 1,000 students and staff district-wide. School connection to district WAN of 100 Mbps per 1,000 students/staff to avoid most delays. Easy access for students and teachers, including some wireless. Adv- District Internet connection of 100 Mbps per 1,000 students and staff district-wide. School connection to district WAN of 1,000 Mbps per 1,000 students/staff. Easy access for students and teachers including most wireless connectivity to enable interactive presentations and video.	Most LAN switches throughout the district are gigabit with fiber WAN backbone Establish Cisco Wireless infrastructure standard and created wireless campus at all schools. Upgraded Proxy and web filtering hardware/software (2011) District bandwidth increased to 500mbps town/school in Summer 2013	All switches to gigabit standard on a 10 gb fiber backbone Enterprise Wireless network in every school. Current bandwidth ~550 Mbps Up/Down shared between schools Monitor bandwidth use with appropriate network tools. Continue to upgrade bandwidth to keep in line with SETDA recommendations.
E-Learning Environments	Prof- Development of connections for improved access to web-based and/or interactive IP-based video learning on the local, state, regional, national, and international level (school to school, district to district, school/district to state, state to state, country to country). Applications to include courses, cultural projects, virtual field trips, etc. Adv- Seamless IP-based infrastructure expanded to K-16 to allow development of high-quality web- and video-based content. Content distribution available for all students and teachers. Archives allow for content review asynchronously and sharing/distribution of these resources.	Limited bandwidth often presented challenges for success and promotion of these activities. Participation in Skype conferences and other global activities/projects have occurred. Participation in Virtual High School (VHS) provides opportunities for acceleration. BHS use of Canvas LMS. Used to deliver several mandatory trainings.	▪ Explore e-content delivery tools ▪ Use Learning Management System to support more E-learning and training efficiency.
LAN	All rooms connected to Internet with significant wireless connectivity at each school with sufficient bandwidth for effective student access. Minimum 100 Mbps Cat 5e switched network. District-owned servers or cloud computing provides secure storage, backups, applications, schedule, email, and website. Students, teachers and parents have easy access to educational resources from home and school (e.g., web portal). Adv- All rooms connected to Internet with significant wireless connectivity at each school with sufficient bandwidth for effective student access. Minimum 100 Mbps/1 Gbps Cat 5e/6 switched network to classroom. Different services (data,	All rooms connected to internet with Cat 5 min. Servers exist in all K-8 schools for file storage. No access to student files from home. All schools have an Cisco enterprise wireless infrastructure Opened Parent Portal at BHS. Library catalog is online and provides links to subscription databases and other resources. First Class	All schools with enterprise wireless standard for effective access. Add Active Directory solution at HS. Use X2 to for more integration of and access to data. Provide access to online productivity suite to student (ie. GAFE) to provide access to tools between home and school.

	phone, video, guest access, etc.) on different virtual LANs. All schools have sufficient bandwidth for content delivery through resources such as video streaming and conferencing. Students, teachers and parents have easy access to educational resources from home and school (e.g., web portal).	PSB Portal provide staff access to some materials. Canvas LMS provides access to students to course materials 24/7 at BHS.	
Other Technologies	Dedicated and assigned use of common technologies such as telephone, computer video projectors, or interactive white boards. Programmable calculators assigned to each student as needed. In each school, there is shared use of specialized technologies, digital cameras, scanners, handheld electronic devices. Adv- Readily available fully equipped classrooms with computer/video projectors, interactive whiteboard, and other technology to enhance student instruction. Use of new and emerging technologies.	A selection of peripherals and other technologies exist in each of the schools including digital cameras, scanners, projectors, document cameras. Shared resources are often signout from libraries and computer labs. Some internal and external funding sources (PTOs, Education Foundations) provide opportunities to pilot new technologies like iPads, Chromebooks, subscription services.	Implement a classroom standard that includes a projector in each teaching space while expanding other existing and emerging tools such as IWBs, document cameras, response systems. Begin update of classroom spaces with mounted projection solutions
Security	Prof- To Developing Tech, add adequate network and server availability protection for expanded capabilities and to ensure dependable access. Protection of workstations from internal network attacks. Encryption of sensitive personal data on local networks. Network supports board policy on connecting student/staff-owned devices (guest devices) on the network. Adv- Usage authentication added for mobile computer and home/external access requirements. Use of virtual LANs (VLANs) to protect network infrastructure and sensitive data. If guest devices are allowed on the network, guest traffic is on an isolated VLAN and/or guest devices are checked for currency of anti-virus software and operating system security patches.	IT performs and maintains: ▪ Backup and restore procedures ▪ virus protection for individual computers. ▪ Basic firewall protection ▪ diligent upgrading of network vulnerabilities ▪ Requiring Usage authentication for mobile computers in new enterprise wireless model	▪ Develop enterprise model for authenticating all users to all provided services ▪ Build supports to assist with BYOD ▪ Add budget support into Network Infrastructure

How do we use technology? Ask our teachers….

TO COMMUNICATE AND COLLABORATE

GRADE 1: With Twitter, my students have communicated with other first graders in Hong Kong, Mexico, Ireland, Australia, and more locations around the world. This has led to shared book projects, cultural Skypes to supplement our Social Studies units, and increased geographic awareness. This year, I began having each student share their leaning with a global audience using individual student blogs. My first graders have blogged about all subject areas and have learned how to comment on the work of other students both here in Brookline and globally.

BHS: Students are using social media and online sales to gather donations for a new Senior-to-Senior scholarship fund. They are working in conjunction with the 21st Century Fund and Alumni Association to raise money and promote philanthropy.

BHS: A student is using the professional social network *LinkedIn* to build alumni connections that could link current BHS students to job shadowing/mentoring

TO FOSTER INNOVATION AND CAREER READINESS

BHS: In our senior class, *Communications for Entrepreneurs*, the students are working on senior projects. One senior set out to build phone chargers powered by a bicycle. Earlier today, the student had a demo of his prototype available while he was taking pre-orders. He (and all of our other students) used an app/site called Trello to manage their project tasks and deliverables. He used 3D modeling software, Sketchup, to design a case for his charger and then printed this case on the school's 3-D printer. Earlier this morning, he was talking to his science teacher and me about using some data software to show the difference in capabilities of this charger vs. a traditional wall-based phone charger. We discussed trying to use this to build an interactive display to increase his ability to promote and sell the product....It was authentic, interdisciplinary, real-world learning in action.

BHS: A student is building a website to clarify the college process for parents who did not attend university in our country.

TO PROVIDE GREATER ACCESS TO THE CURRICULUM

BHS LEARNING CENTER: Technology allows me to help my students by using tools that would not be available to us otherwise. It opens up new windows and helps my students' with disabilities navigate through school, which is often very difficult for them…. Overall in my learning center I use any bit of technology that I can get my hands on to help them. I have brought in old bluetooth keyboards, old iPod touches, and a bamboo writing tablet. This is all on top of the laptops and desktops that get used everyday.

TO PROMOTE STUDENT OWNERSHIP

VISUAL ARTS: Teachers are capturing images of work in progress and final results to demonstrate growth, remind students of the stages of their work and create portfolios for students.

7/8 ELA: Writing workshops have become so much more engaging, interactive, and student-centered with the use of the Smart board and document projector. Students share their writing using the projector and the class gives suggestions for revision, so everyone can see the writing process modeled for them by one of their own.

TO HELP STUDENTS BE MORE PRODUCTIVE:

LEARNING CENTERS: Technology also helps my students with executive functioning concerns. Technology from Google Drive to Canvas helps to keep students organized in a way they would not be without technology. I have a student who struggles with taking notes and remembering things that teachers say in lectures. As a result, we use technology to have him record lectures and he now uses his textbooks, the Internet, etc. to help him create his own podcasts. He records himself and listens to them later to review.

TO CREATE EFFICIENCIES – ABLE TO DO MORE, QUICKLY, IN GREATER DEPTH

7/8 MATH - We use Desmos, an incredible online graphing calculator. We can use it to explore fairly high level math concepts. Because it does all the calculations, it levels the playing field for kids at various levels and with various needs. We can work on Problems of the Week (POWs) in class so children can get on the spot feedback and I can do on the spot assessment. Work is stored in Google Drive and students can get feedback and improve their work. We also use Google Spreadsheets to do lots of data analysis that we could never have done by hand. We could not meet the data analysis requirements of the 8th Grade Math Frameworks without technology, because it would just take too much time.

ECS - Because of the iPad and MacAir I am able to take pictures of student work and use it immediately to teach from. Sounds basic but I couldn't make this happen in seconds before. I can do this in two steps instead of four steps.

7/8 ELA - Google Forms allows me to quickly assess students' knowledge on a topic prior to teaching or after teaching a lesson and have the results sent to a spreadsheet where I can quickly eyeball the students who need more help on a concept--versus the old method of leafing through stacks of papers, etc.

TO FACILITATE COLLABORATION AMONG EDUCATORS

GRADE 1: I borrowed the idea of using Edublogs along with Easyblog Jr. from both a BLC conference presenter and a fellow Brookline teacher. I have only one iPad in my classroom and it was important that students have a very simple interface with the iPad. This blog looks relatively simple, but doing the coding that allows the Easy Blog app to interface with Edublog took a lot of back-end work, which was all done by our fantastic and helpful education technology specialist.

A COMMENT ABOUT THE NEED FOR SUFFICIENT ACCESS TO TECHNOLOGY

BHS: We have added two computer carts to our rotation in the last year and they, along with the Humanities Lab, are frequently booked all blocks of the day. It is like adding lanes to a highway in a metropolitan area -- new lanes are immediately packed with traffic. Demand always exceed supply. *Any group project is enhanced by access to devices* -- putting together iMovies, Prezis, PowerPoints, blogs, podcasts. We could do so much more of this with more devices and more Ed Tech support. Without the certainty of knowing that the devices will be ready and accessible, and that tech support will be available, teachers are reluctant to plan lessons that require technology.

Professional Learning for Technology

Public Schools of Brookline Plans for Technology PD

Currently the Public Schools of Brookline offers a slate of professional learning opportunities for educators ranging from internally offered workshops, to courses through our EDCO partnership, to district-funded conference attendance. Some of this work is sustainably funded and other aspects are funded through generous support from the Brookline Education Foundation and the 21st Century Fund.

As We Move Forward
Through the technology plan outlined in conjunction with the override budget the districts intends to further develop our ability to offer sustainable professional learning for educators by providing courses and workshops, on the job coaching, and continuous leadership development. Passage of the override will allow us to expand offerings and to move funding from unsustainable grants onto a more sustainable operating budget.

As a district we will be offering a more consistent and focused menu of no-cost trainings on hardware basics, Google Apps for Education (GAFE), and other district wide systems during the summer and at various times during the school year. We are currently testing methods by offering after-school options for GAFE facilitated by Educational Technology Specialists (ETS), and integrating TeachPoint training into New Educator Orientation. We additionally offer technology-focused professional learning as part of the Mentored Professional Learning program. Offerings will change as the district adopts new systems and jettisons old systems. Opportunities for new trainings will be considered in the annual professional learning needs assessment.

The ETS at each building will continue serving as an on-the-job tech-focused instructional coach for day-to-day support and to accelerate our educators' growth. Their work will be highly tailored to individual teachers' goals and will focus on integrating technology into student learning experiences on a consistent basis to create the highest quality learning experiences possible. The ETS staff will engage in professional learning specifically designed to increase their skills in adult-to-adult coaching so as to best serve teachers' needs.

Our building and district administrators will continue engaging in professional learning to lead for technology integration. Through long-term, continuous, professional learning our district leadership will be able to lead in this arena. They will do so through modeling effective technology usage in adult learning environments and explicitly encouraging application in the classroom. Curriculum coordinators in particular will work collaboratively and with consultants to design and encourage transformative learning experiences that were previously impossible without consistent access to digital learning tools.

As an example of our current leadership efforts, Janet MacNeil began piloting a BEF funded program to integrate iPads in all 7th and 8th grade science classrooms to increase the options for students to present their lab reports in terms of format by adding video with voiceover recording, and in terms of improved data collection by using photography and video alongside traditional reports. This allows students more options for presenting their data and allows reports to more authentically model the work of practicing scientists.

The following pages describe the currently available professional learning including workshops that supplement our ongoing collaborative, job-embedded, professional learning.

PSB PROFESSIONAL DEVELOPMENT IN TECHNOLOGY SY14-15

PSB INTERNAL OFFERINGS

(OFFERINGS IN BROOKLINE, BY BROOKLINE EDUCATORS)

DIGITAL STORYTELLING IN THE CLASSROOM

Participants in this workshop develop editing skills in iMovie and learn how to create and manage student projects. Class sessions will include instruction and discussion. Online sessions will feature self-paced instruction and templates for project development.

IPADS IN THE CLASSROOM

In this class participants will learn the basic components of the iPad and how to use them in more complex ways. In addition, participants will understand how to navigate around on an iPad. They will learn art apps, how to write text, how to stay organized, and up to date on the latest news in education and technology.

TWITTER IN THE CLASSROOM

This course examines ways to use Twitter in an educational seeing in order to connect beyond Brookline and engage with parents.

GOOGLE DRIVE 101: A COMPLETE INTRODUCTION

Level: Beginner

Learn to work more efficiently and empower your students with Google Apps for Education. This workshop provides a complete overview of GAFE that's tailored to participants. Topics include:

- Organizing and Sharing Documents
- Creating Forms for Data Collection and Assessment
- Creating Presentations
- Using Chrome Browser Add-ons
- Building Web Workspaces with Sites
- Chromebook Basics
- Google Classroom

ENHANCING THE CURRICULUM WITH GOOGLE DRIVE AND OTHER TOOLS

Level: Intermediate and Advanced

Learn to use a Google App or other tech tool to enhance a curriculum project. This *Bring-Your -Own-Idea* workshop leverages peer coaching for project development. Bring a project idea or technology tool you'd like to master and take advantage of the dedicated time and the expertise of your peers.

EDCO COURSES 2014-15

(OFFERED THROUGH PARTNERSHIP WITH EDCO COLLABORATIVE)

GOOGLE DRIVE FOR EDUCATION: CREATING AND COLLABORATING IN THE 21ST CENTURY CLASSROOM

This blended workshop will allow participants to explore the many uses of Google drive as a creation, collaboration, organization, and storage tool for both teachers and students. All resources are online, and can be accessed at home or in school with no hardware or software to install or maintain. This class is divided into one face-to-face session and four online sessions (one per week,) so that participants will be able to fully explore all that Google drive has to offer.

During the face-to-face session, participants will learn the basics of Google drive, including how to create, share, organize, and collaborate on documents. We'll demonstrate some of the differences between Google drive and Google drive for education, and explain how to get Google drive for education for your district. We'll also touch on some great uses (as well as limitations) for Google Drive on the iPad.

USING iPADS AND iPODS IN PHYSICAL EDUCATION
In this course participants will be shown how to use an iPad to enhance instruction in the Physical Education classroom. A number of different applications will be presented that will help Physical Educators in the areas of assessment, lesson planning, social media, movie creation, content knowledge, P.E. tools, and productivity. Participants will be shown how to search for applications that can benefit their teaching in the classroom. In addition, a variety of technological devices will be shown that can assist Physical Education teachers with their instruction

GOOGLE APPS FOR EDUCATION BOOTCAMP
This intensive training is designed to introduce experienced users of Google Apps to advanced applications of the most useful tools for educators. The training will be broken up into two parts: each morning, participants will spend hands-on time learning new functions and short-cuts in the tools they are already using: Docs, Gmail, Sites, Calendar, Forms, Chrome, Drive and more. In the afternoon, time will be spent reviewing and preparing for the requirements to become a Google Educator. Participants can sign up for the morning practice sessions only, or for the whole day. Please note: participants will not be certified by the end of the training, as they have to submit additional material and take tests on their own.

TEACHING MATH WITH TECHNOLOGY
This two-day workshop provides participants with hands-on experience with technologies that can be employed in meeting the new Common Core Standards for Mathematical Practice. Participants will work with math and Web technologies that enhance problem analysis and empower the interactive blended learning classroom. They will learn how to create and use a PBWorks wiki and an Edmodo microblog. TI-Nspire CAS math technology will be featured as will the integration of Microsoft Office, Smart Notebook, and MathType in math teaching. Participants will build a course wiki, an Edmodo microblog, and create lessons and support materials.

Other technology focused professional learning opportunities are available to educators through the district's partnership with EDCO. The above courses represent only courses that educators selected to attend to date. (As of April 6th 2015.)

KOCHI FUND STEM PROJECT 2013-2017

BUCK INSTITUE FOR EDUCATION: PBL 101
PBL 101 is BIE's foundational three-day (consecutive, 7.0 hours per day, including lunch) onsite workshop. It provides participants with the skills and knowledge needed to design, assess and manage a rigorous, relevant, and standards-based project. The workshop models the project process. Facilitated by one of BIE's expert National Faculty, the workshop is a balanced blend of direct instruction, video analysis, hands-on work, resource sharing, and peer collaboration and feedback. Participants are actively engaged in project design, with the expectation that every teacher or teaching team will generate a project plan that receives formative feedback from both participants and BIE National Faculty.

7/8 SCIENCE iPAD PROJECT
2014-2015 activity: Every middle school science teacher will participate in a project to investigate uses for the "Explain Everything" iPad app with students in the classroom (assessment, tutorials, presentations); continuation of use of this app by Math Specialists with students in primary grade math. During release days, curriculum coordinators will engage teachers in collaborative learning using the work with "Explain Everything." This is ongoing work facilitated by K-8 Science Curriculum Coordinator Janet MacNeil.

CURATING MATH APPS
2014-2015 activity: Pilot and review of digital resources in elementary math (using rubric), including suggestions for use with students. This is ongoing work facilitated by K-8 Math Curriculum Coordinator Karen Wolfson.

CONFERENCE ATTENDANCE

BUILDING LEARNING COMMUNITIES

Join colleagues from around the world who care deeply about bringing the best innovative and practical learning resources to our students. Our 16th BLC education conference will provide you with inspiration, practical skills and expand your professional network with educators from around the world.

GOOGLE APPS SUMIT

This two-day high-intensity even focuses on deploying, integrating, and using Google Apps for Education (and other Google tools) to promote student learning in K-12 and higher education.

BHS STEAM TEAM PROJECT GRANT

A combined group of math, science, art, and engineering teachers at Brookline High School were awarded a competitive STEAM grant by the Massachusetts Department of Elementary and Secondary Education (DESE). As part of this grant, the grant leaders attended DESE sponsored professional learning on project based learning that leverages technology.

MENTORING AND INDUCTION

Scott Moore presented the district's vision to all newly hired Unit A educators during new teacher orientation to give new teachers a proper overview of expectations upon entry into the district.

MENTORED PROFESSIONAL LEARNING

Incorporated a 2-hour session of technology related professional learning for participants in the district's Mentored Professional Learning program for 2nd and 3rd year teachers in the district. Topics included iPads in the classroom, Google Apps for Education, Twitter in the Classroom, and Blogging.

LEADERSHIP DEVELOPMENT

In partnership with November Learning the district is engaging building and district administrators in professional learning for technology leadership and integrating technology into adult learning experiences to serve as a model for work with students. This work is expected to continue into the 2015-16 school year and beyond.

Students Who are College and Career Ready
in Reading, Writing, Speaking, Listening, and Language

The descriptions that follow are not standards themselves but instead offer a portrait of students who meet the standards set out in this document. As students advance through the grades and master the standards in reading, writing, speaking, listening, and language, they are able to exhibit with increasing fullness and regularity these capacities of the literate individual.

They demonstrate independence.
Students can, without significant scaffolding, comprehend and evaluate complex texts across a range of types and disciplines, and they can construct effective arguments and convey intricate or multifaceted information. Likewise, students are able independently to discern a speaker's key points, request clarification, and ask relevant questions. They build on others' ideas, articulate their own ideas, and confirm they have been understood. Without prompting, they demonstrate command of standard English and acquire and use a wide-ranging vocabulary. More broadly, they become self-directed learners, effectively seeking out and using resources to assist them, including teachers, peers, and print and digital reference materials.

They build strong content knowledge.
Students establish a base of knowledge across a wide range of subject matter by engaging with works of quality and substance. They become proficient in new areas through research and study. They read purposefully and listen attentively to gain both general knowledge and discipline-specific expertise. They refine and share their knowledge through writing and speaking.

They respond to the varying demands of audience, task, purpose, and discipline.
Students adapt their communication in relation to audience, task, purpose, and discipline. They set and adjust purpose for reading, writing, speaking, listening, and language use as warranted by the task. They appreciate nuances, such as how the composition of an audience should affect tone when speaking and how the connotations of words affect meaning. They also know that different disciplines call for different types of evidence (e.g., documentary evidence in history, experimental evidence in science).

They comprehend as well as critique.
Students are engaged and open-minded—but discerning—readers and listeners. They work diligently to understand precisely what an author or speaker is saying, but they also question an author's or speaker's assumptions and premises and assess the veracity of claims and the soundness of reasoning.

They value evidence.
Students cite specific evidence when offering an oral or written interpretation of a text. They use relevant evidence when supporting their own points in writing and speaking, making their reasoning clear to the reader or listener, and they constructively evaluate others' use of evidence.

They use technology and digital media strategically and capably.
Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. They are familiar with the strengths and limitations of various technological tools and mediums and can select and use those best suited to their communication goals.

They come to understand other perspectives and cultures.
Students appreciate that the twenty-first-century classroom and workplace are settings in which people from often widely divergent cultures and who represent diverse experiences and perspectives must learn and work together. Students actively seek to understand other perspectives and cultures through reading and listening, and they are able to communicate effectively with people of varied backgrounds. They evaluate other points of view critically and constructively. Through reading great classic and contemporary works of literature representative of a variety of periods, cultures, and worldviews, students can vicariously inhabit worlds and have experiences much different than their own.

EDWARD DEVOTION ELEMENTARY SCHOOL
EDUCATIONAL PROGRAM[1]

The Public Schools of Brookline (PSB) provides education to pre-school through twelfth grade students in eight elementary schools, one comprehensive high school, and early childhood programs in rental spaces across town. In addition to school-based programs, the Public Schools of Brookline offers continuing education courses, summer school, enrichment programs, and numerous athletic opportunities.

For more than two decades, the Public Schools of Brookline has been guided by four core values: high achievement for all, excellence in teaching, collaboration, and respect for human differences. More recently, a fifth core value was added – educational equity. The core values, along with a vision, mission, and set of goals, establish the four cornerstones of our strategic plan[2]. Once finalized, the second version of our strategic plan will provide inspiration and direction, while holding us accountable to fulfilling our vision, which begins with:

Brookline provides an extraordinary education for every child. Each child's unique path to achievement is supported in academically exciting and programmatically rich environments.

These two sentences could be part of a school system's vision statement today or 50 years ago; however, the reality of what these schools would look like would be vastly different. Fifty years ago, or in some cases just ten years ago, what was considered extraordinary, exciting, and programmatically rich is practically irrelevant for the teaching and learning that is required today. No longer is learning confined to the classroom. Learning is ubiquitous. No longer is there a finite body knowledge that a teacher imparts to her students. Now, there is a vast amount of information available to students, not just by way of the teacher, but by virtue of access to technology. Described as the "Four Cs" or "super skills" for the 21st century – communication, collaboration, critical thinking, and creativity, are redefining the basics of children's learning experiences. No longer is "smart" defined solely by scores on standardized tests. Instead, intelligence and talent is expressed in a variety of ways: applying knowledge, creating products, solving complex problems, systems thinking, design and testing, and knowing how to learn[3].

In the year 2014, our vision statement challenges us to shift the traditional paradigm of school to a new definition of a 21st century preK-12 education. Our strategic plan, specifically the four strategic plan goals, serves as our guide as we challenge ourselves to fully prepare children for their futures in an extraordinary time.

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[1] Revised for September 2014

[2] See Appendix A: *Public Schools of Brookline: Strategic Plan – Vision, Mission, Core Values, and Goals*

[3] M. Neumeier, *Metaskills: Five Talents for the Robotic Age,* New Riders, 2013