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Appendix A:

Public Schools of Brookline:

Strategic Plan – Vision, Mission, Core Values and Goals

PUBLIC SCHOOLS OF BROOKLINE
STRATEGIC PLAN

Vision Statement

Ten Year Vision

The Public Schools of Brookline
Dynamic, Collaborative, Equitable
Engaged with the Community
Contributing to the World

Brookline provides an extraordinary education for every child. Each child's unique path to achievement is supported in academically exciting and programmatically rich environments. A dynamic, diverse community of teaching professionals works collaboratively, innovating and inspiring each other and their students. Staff gets to know students intellectually, developmentally and culturally. Students are encouraged to question and challenge ideas and participate as active citizens. Schools use a variety of assessments to get the fullest picture of student learning and growth over time. These data are shared regularly with the community, and they form the basis of how we understand and improve student, teacher and administrator performance. Parents are partners with the schools in supporting their children's education, and schools communicate effectively so that parents are confident of the response to their child's circumstances and needs. The community, well informed and involved in the schools, supports these efforts that continue a tradition of challenging ourselves to do better, efforts that ensure the enduring value of a Brookline education.

Mission

Our mission 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.

Core Values

High Achievement for All
We inspire our students to develop a passion for learning. We realize the power of holding high expectations for every student, and we understand that intelligence grows with effort and cultivation. We emphasize rigor and relevance, placing great importance on curriculum, instruction, and assessment that challenge students to develop the capacity to synthesize information, acquire knowledge, exercise judgment, and apply their understanding to solve complex, real-world problems. We support students through strong relationships to become invested in their learning, develop the confidence and persistence to grow as learners, and meet their goals for success in and beyond school.

Excellence in Teaching
We understand that passionate, knowledgeable, and skillful educators are the core strength of our schools. Understanding that excellent teaching begins with strong relationships with students, we actively create an environment in which students feel safe to take intellectual risks, are respected for their identity, and are motivated to challenge themselves. Educators share responsibility for all students and provide engaging instruction and assessments that accommodate differences in learning styles, interests, and readiness. We create and sustain a collaborative environment for educators that promotes an atmosphere of intellectual excitement, innovative instruction, and professional growth.

Collaboration
We commit to collaboration in all aspects of education to foster interaction among diverse viewpoints and broaden learning for our students, educators, and community. We emphasize collective problem solving in student learning. We promote professional collaboration by supporting educator teams working together across schools, disciplines, grades, and roles. We engage with parents, guardians, and the Brookline community to establish common goals and share the responsibility for educating our students. We seek and nurture partnerships with local, regional, and national organizations that add value to our collective enterprise.

Respect for Human Differences
We know that a diverse, inclusive atmosphere strengthens us as individuals, as a community, and as learners. We honor Brookline's diversity and value the varied perspectives and experiences that enrich our schools. We foster a safe environment for expressing and exploring human differences and commonalities, in an environment in which caring and authentic understanding promote a deep sense of belonging and respect for all.

Educational Equity
We identify, understand, and eliminate barriers to educational achievement in our schools. Educators in every school provide their students with the individual support needed to reach and exceed Brookline's high standards. While allowing for the expression of diverse perspectives, we establish policies and practices that are fair and just for all our schools and provide educational opportunities to ensure that every student can meet our standards for achievement, participation, and growth, regardless of race, ethnicity, religion, gender and gender identity, sexual orientation, age, language, national origin, disability/ability, socio-economic status, or other human differences.

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 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.

Appendix B:

K-8 Time Allocations, Expectations and Guidelines, 2014-2015

and

21st Century Interdisciplinary Themes

THE PUBLIC SCHOOLS OF BROOKLINE
BROOKLINE, MASSACHUSETTS 02445

OFFICE OF TEACHING AND LEARNING
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2014-2015

TIME ALLOCATIONS - EXPECTATIONS AND GUIDELINES

The time allocations that are described in this document provide a guide to the total minutes per day and per week that should be used to develop daily and weekly educational plans. The Time Allocations guide is divided by grade for easier reference.

It is expected that in grades K – 5, English Language Arts and Mathematics instruction occur every day (ELA 100 min., Math 60 min.), including days with interruptions in the schedule (for example, assemblies or Early Release Days).

Teachers' *daily classroom schedules* will not necessarily reflect the Time Allocations exactly as described because of the change in the length of the school day to create Collaborative Time for educators on Friday afternoons. In order to meet state requirements, and provide the necessary framework for teacher planning that maximizes learning in every subject area, it is most important to pay attention to the *minutes per week* for each of the subject areas.

Using the Guidelines

1 – Interdisciplinary Time

All too often, in a variety of circumstances, we feel there just isn't enough time for teaching and learning. It is a sentiment teachers relate to very strongly, especially as it seems more and more is expected in the classroom. We need to use the resource of time creatively and effectively. One strategy to enhance learning and maximize the use of time is through the integration of multiple subjects into lessons, projects, and/or units of study. While interdisciplinary strategies are not new, at this time their value is heightened.

The purpose of this message is to highlight the opportunity for interdisciplinary curriculum and planning for instruction. Here is an example:

In Grades K-5, the Time Allocations guidelines list Science instruction as 40 minutes/day and English Language Arts as 100 minutes/day. When you are teaching students about spiders and insects while teaching them strategies for reading nonfiction you can consider some time as "double counted." A 40-minute lesson that integrates the skills of reading nonfiction and the content of spiders and insects can fulfill 40 of ELA's 100 minutes and some Science time. However, reading nonfiction books about spiders and insects does not fulfill the entire Science time allocation requirement of 40 minutes. During Science instruction, students should investigate via inquiry-based hands-on experiences, record their questions and observations in their science notebooks, and talk about science concepts. Then, in the ELA block, their Science experiences can be enhanced by reading nonfiction books (after they have had a chance to explore and attempt to answer their questions on their own) and working on writing tasks that build upon and deepen their understanding of the Science observations and experiences. The Time Allocations guidelines are not a "plug and chug" formula. Teaching and learning is not a minute-by-minute documentable event, but planning daily and weekly instruction needs to begin with an understanding of how to maximize each precious minute of the school day as described in this document.

Interdisciplinary lessons consider the Learning Expectations of both disciplines. Throughout the system, teachers have developed a number of very effective interdisciplinary lessons and units. Your colleagues and Curriculum Coordinators are great resources – please call on them to help develop an integrated approach to meeting the Learning Expectations, and create manageable daily/weekly schedules that support all learners across the disciplines.

2 – Other Planned Instructional Activities

Massachusetts's law requires a minimum number of minutes spent on time and learning for every student, by grade span. *The Time Allocations indicate the minimum number of instructional hours needed in each discipline in order for students to have the required, and Brookline expected, time and learning.*

There is time in each day for other planned instructional activities. In order for these activities to qualify as minutes spent on "time and learning," the activities must be planned for and meet specific learning goals. A teacher monitoring a study hall for students does not constitute "other instructional activities." Instructional activities that do fall under this category include time spent extending and enriching instruction through collaboration with Librarians and Educational Technology Specialists. It may include instruction that is part of social competency programs that align with the Health Learning Expectations. Many of the activities that teachers, specialists and administrators plan in our schools do meet specific learning goals that enrich students' learning experiences.

Time is a precious resource in school. We must use it wisely. These time allocation expectations and guidelines can help you do that.

KINDERGARTEN

Elementary School Day:
Monday – Thursday, 8:00 AM – 2:30 PM; Friday 8:00 AM – 1:40 PM
1900 minutes/week

The Commonwealth of Massachusetts requires that all elementary students receive a minimum of 900 hours/year of instructional time. To meet the 900 hours, students must be engaged in planned instructional activity for at least 300 minutes each day. All Brookline Kindergarten classrooms should exceed this minimum requirement, and meet for 318 instructional minutes each day.

It is expected that in grades K – 6, English Language Arts and Mathematics will be taught every day (ELA 100 min., Math 60 min.), including days with interruptions in the schedule (for example, assemblies or Early Release Days).

Instructional Area	Minutes per day	Days per week	Minutes per week
Art	40	1	40
English Language Arts	100	5	500
Mathematics	60	5	300
Music	30	1	70
	40	1	
Physical Education	40	2	80
Social Studies	40	5	200
Science	40	5	200
World Language	20	3	60
Other Planned Instructional Activities	Varies	5	140
Sub-total			**1590**

Non-Instructional Activity (snack, lunch, recess, transitions, etc.)	62	5	310

Total			**1900**

GRADE 1

Elementary School Day:
Monday – Thursday, 8:00 AM – 2:30 PM; Friday 8:00 AM – 1:40 PM
1900 minutes/week

The Commonwealth of Massachusetts requires that elementary students receive a minimum of 900 hours/year of instructional time. To meet the 900 hours, students must be engaged in planned instructional activity for at least 300 minutes each day. All Brookline first grade classrooms should exceed this minimum requirement, and meet for 312 instructional minutes each day.

It is expected that in grades K – 6, English Language Arts and Mathematics will be taught every day (ELA 100 min., Math 60 min.), including days with interruptions in the schedule (for example, assemblies or Early Release Days).

Instructional Area	Minutes per day	Days per week	Minutes per week
Art	40	1	40
English Language Arts	100	5	500
Mathematics	60	5	300
Music	30	1	70
	40	1	
Physical Education	40	2	80
Social Studies	40	5	200
Science	40	5	200
World Language	20	3	60
Other Planned Instructional Activities	Varies	5	110
Sub-total			**1560**

Non-Instructional Activity (snack, lunch, recess, transitions, etc.)	68	5	340

Total			**1900**

GRADE 2

Elementary School Day:
Monday – Thursday, 8:00 AM – 2:30 PM; Friday 8:00 AM – 1:40 PM
1900 minutes/week

The Commonwealth of Massachusetts requires that all elementary students receive a minimum of 900 hours/year of instructional time. To meet the 900 hours, students must be engaged in planned instructional activity for at least 300 minutes each day. All Brookline second grade classrooms should exceed this minimum requirement, and meet for 312 instructional minutes each day.

It is expected that in grades K – 6, English Language Arts and Mathematics will be taught every day (ELA 100 min., Math 60 min.), including days with interruptions in the schedule (for example, assemblies or Early Release Days).

Instructional Area	Minutes per day	Days per week	Minutes per week
Art	40	1	40
English Language Arts	100	5	500
Mathematics	60	5	300
Music	30	1	70
	40	1	
Physical Education	40	2	80
Social Studies	40	5	200
Science	40	5	200
World Language	20	3	60
Other Planned Instructional Activities	Varies	5	110
Sub-total			**1560**

Non-Instructional Activity (snack, lunch, recess, transitions, etc.)	68	5	340

Total			**1900**

GRADE 3

Elementary School Day:
Monday – Thursday, 8:00 AM – 2:30 PM; Friday 8:00 AM – 1:40 PM
1900 minutes/week

The Commonwealth of Massachusetts requires that all elementary students receive a minimum of 900 hours/year of instructional time. To meet the 900 hours, students must be engaged in planned instructional activity for at least 300 minutes each day. All Brookline third grade classrooms should exceed this minimum requirement, and meet for 312 instructional minutes each day.

It is expected that in grades K – 6, English Language Arts and Mathematics will be taught every day (ELA 100 min., Math 60 min.), including days with interruptions in the schedule (for example, assemblies or Early Release Days).

Instructional Area	Minutes per day	Days per week	Minutes per week
Art	40	1	40
English Language Arts	100	5	500
Mathematics	60	5	300
Music	30	1	70
	40	1	
Physical Education	40	2	80
Social Studies	40	5	200
Science	40	5	200
World Language	30	3	90
Other Planned Instructional Activities	Varies	5	80
Sub-total			**1560**

Non-Instructional Activity (snack, lunch, recess, transitions, etc.)	68	5	340

Total			**1900**

GRADE 4

Elementary School Day:
Monday – Thursday, 8:00 AM – 2:30 PM; Friday 8:00 AM – 1:40 PM
1900 minutes/week

The Commonwealth of Massachusetts requires that all elementary students receive a minimum of 900 hours/year of instructional time. To meet the 900 hours, students must be engaged in planned instructional activity for at least 300 minutes each day. All Brookline fourth grade classrooms should exceed this minimum requirement, and meet for 330 instructional minutes each day.

It is expected that in grades K – 6, English Language Arts and Mathematics will be taught every day (ELA 100 min., Math 60 min.), including days with interruptions in the schedule (for example, assemblies or Early Release Days).

Instructional Area	Minutes per day	Days per week	Minutes per week
Art	45	1	45
English Language Arts	100	5	500
Mathematics	60	5	300
Music	45	2	90
Physical Education	45	2	90
Social Studies	40	5	200
Science	40	5	200
World Language	30	3	90
Other Planned Instructional Activities	Varies	5	135
Sub-total			**1650**

Non-Instructional Activity (lunch, recess, transitions, etc.)	50	5	250

Total			**1900**

GRADE 5

Elementary School Day:
Monday – Thursday, 8:00 AM – 2:30 PM; Friday 8:00 AM – 1:40 PM
1900 minutes/week

The Commonwealth of Massachusetts requires that all elementary students receive a minimum of 900 hours/year of instructional time. To meet the 900 hours, students must be engaged in planned instructional activity for at least 300 minutes each day. All Brookline fifth grade classrooms should exceed this minimum requirement, and meet for 330 instructional minutes each day.

It is expected that in grades K – 6, English Language Arts and Mathematics will be taught every day (ELA 100 min., Math 60 min.), including days with interruptions in the schedule (for example, assemblies or Early Release Days).

Instructional Area	Minutes per day	Days per week	Minutes per week
Art	45	1	45
English Language Arts	100	5	500
Mathematics	60	5	300
Music	45	2	90
Physical Education	45	2	90
Social Studies	40	5	200
Science	40	5	200
World Language	30	3	90
Other Planned Instructional Activities	Varies	5	135
Sub-total			**1650**

Non-Instructional Activity (lunch, recess, transitions, etc.)	50	5	250

Total			**1900**

GRADE 6 *

Elementary School Day:
Monday – Thursday, 8:00 AM – 2:30 PM; Friday 8:00 AM – 1:40 PM
1900 minutes/week

The Commonwealth of Massachusetts requires that all elementary students receive a minimum of 900 hours/year of instructional time. To meet the 900 hours, students must be engaged in planned instructional activity for at least 300 minutes each day. All Brookline sixth grade classrooms should exceed this minimum requirement, and meet for 330 instructional minutes each day.

It is expected that in grades K – 6, English Language Arts and Mathematics will be taught every day (ELA 100 min., Math 60 min.), including days with interruptions in the schedule (for example, assemblies or Early Release Days).

Instructional Area	Minimum minutes per day	Days per week	Minutes per week
Art	45	1	45
English Language Arts	100	5	500
Mathematics	60	5	300
Music	45	2	90
Physical Education	45	2	90
Social Studies	40	5	200
Science	40	5	200
World Language	45	3	135
Other Planned Instructional Activities	Varies	5	90
Sub-total			**1650**

Non-Instructional Activity (lunch, recess, transitions, etc.)	50	5	250

Total			**1900**

* ***The grade 6 instructional model varies across schools. For schools that include grade 6 in a middle school model with grades 7 & 8, the instructional time should follow that which is outlined for grades 7 & 8, found on page 10.***

GRADES (6)*, 7 & 8

Elementary School Day:
Monday – Thursday, 8:00 AM – 2:30 PM; Friday 8:00 AM – 1:40 PM
1900 minutes/week

The Commonwealth of Massachusetts requires that all elementary students receive a minimum of 900 hours/year of instructional time and that all middle school students receive a minimum of 990 hours/year of instructional time. To meet the 990 hour requirement, Brookline 7th and 8th grade students must be engaged in planned instructional activity for at least 330 minutes each day.

Instructional Area	Length of class period	Days per week	Minimum minutes per week
Art	45	1	45
English Language Arts	45	5	225
Health	45	2	90
Mathematics	45	5	225
Music	45	1	45
Physical Education	45	2	90
Social Studies	45	5	225
Science	45	5	225
World Language	45	5	225
Other Planned Instructional Activities	Varies	5	255
Sub-total			**1650**

Non-Instructional Activity (lunch, recess, transitions, etc.)	50	5	250

Total			**1900**

**** The grade 6 instructional model varies across schools. For schools that include grade 6 in a middle school model with grades 7 & 8, the instructional time should follow that which is outlined for grades 7 & 8, except for World Language instruction which will continue to follow the time allocation outlined for grade 6, found on page 9.***

21st CENTURY INTERDISCIPLINARY THEMES

What are 21st Century Interdisciplinary Themes?

Apart from school, knowledge and skills from all disciplines are integrated as people encounter situations, problem solve and make decisions. What is learned separately in Social Studies, Math and Science must come together to effectively navigate in the real world. These themes have been identified by the *Partnership for 21st Century Skills* (www.p21.org), and recommended by the Massachusetts DESE (in their *School Reform in the New Millennium* report, November 2008) as areas where disciplines intersect to build content-based understandings that will prepare students for life in the 21st century.

Additional ways to think about these themes:

- They are themes that run throughout our work with students; each discipline has something important to offer in building student understanding.
- They provide a means for transferring knowledge from one domain to another, and to new situations.
- They describe broad categories of citizenship and stewardship that build understanding of our role in 21st century life.
- They promote an awareness of the interconnectedness of all living things and the impact of human actions on a larger scale.
- They carry with them the challenge and opportunity to transform the world, to make it more just and equitable

Why are they important?

The interdisciplinary themes help students make meaning of what they are learning and how it relates to them. Because real life is not divided into content areas, students need to build awareness of the importance of what they are learning by experiencing how it fits together. It prepares students for action, while promoting an understanding of differences as they learn how to preserve and share the resources of the planet.

What is the connection to lifelong learning skills/content?

The 21st Century lifelong learning skills and content provide the means for students to think across disciplines and to practice working collaboratively on ideas presented through interdisciplinary themes.

What are the 21st Century Interdisciplinary Themes?

A. Global Awareness

- Use 21st century skills to understand and address global issues
- Learn from and work collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue in personal, work and community contexts

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- Understand other nations and cultures, including the use of non-English languages

B. Financial, Economic, Business and Entrepreneurial Literacy

- Know how to make appropriate personal economic choices
- Understand the role of the economy in society
- Use entrepreneurial skills to enhance workplace productivity and career options

C. Civic Literacy

- Participate effectively in civic life through knowing how to stay informed and understanding governmental processes
- Understand democratic values and processes
- Exercise the rights and responsibilities of citizenship at local, state, national and global levels
- Understanding the local and global implications of civic decisions

D. Health and Wellness Literacy

- Obtain, interpret and understand basic health information and services and using such information and services in ways that enhance health
- Understand preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance and stress reduction
- Use available information to make appropriate health-related decisions
- Establish and monitor personal and family health goals
- Understand national and international public health and safety issues

E. Environmental Literacy

- Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water and ecosystems
- Demonstrating knowledge and understanding of society's impact on the natural world (e.g., population growth, population development, resource consumption rate, etc.)
- Investigating and analyzing environmental issues, and making accurate conclusions about effective solutions
- Taking individual and collective action towards addressing environmental challenges (e.g., participating in global actions, designing solutions that inspire action on environmental issues)

F. Humanities Literacy

- Recognize and respect fellow citizens as having equal rights, even though they may be different in race/religion/gender/sexual orientation
- Value the role of art, music, history and literature in understanding and appreciating human behavior and culture
- Have empathy for the lives of others; grasp what policies mean for the opportunities of all people
- Weigh the consequences of one's actions on others in making decisions; have the courage to raise a dissenting voice

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NEXT STEPS: Develop a 21st Century Interdisciplinary Themes document, arranged as follows:

Each theme is described with an explanation as to why it is an important theme for students.
Expectations are identified for the following grade spans: Kindergarten – Grade 2, Grades 3-4-5, Grades 6-7-8, and Grades 9-12.

A chart is presented for each area and category. The chart contains the following information:

INTERDISCIPLINARY THEMES (description – Partnership for 21st Century Skills)	**Why is this interdisciplinary theme important for students**	**Awareness / Beginning Articulation (Often, preK-Gr4)**	**Practicing / Applying / Demonstrating (Often, Gr2-8)**	**Mastering (often, Gr7-12)**
A description of the theme is provided.	*Information as to why this theme is important for students.*	Has an awareness and early understanding of the interdisciplinary theme; has had some exposure to the content of the theme through home and school experiences. Has a beginning ability to identify the theme across content areas.	Can define the core concepts of the interdisciplinary theme; has a grasp of the importance of the theme through personal experience and classroom activities; Uses this information to build a more robust understanding of the theme, and how it affects them as individuals and community members.	Identifies and tests understanding of the theme and its implications in variety of contexts. Is articulate about the content of the theme; understands the complexities, issues, and implications both individually and for others. Challenges assumptions in order to participate thoughtfully as a local, national, and global community member.

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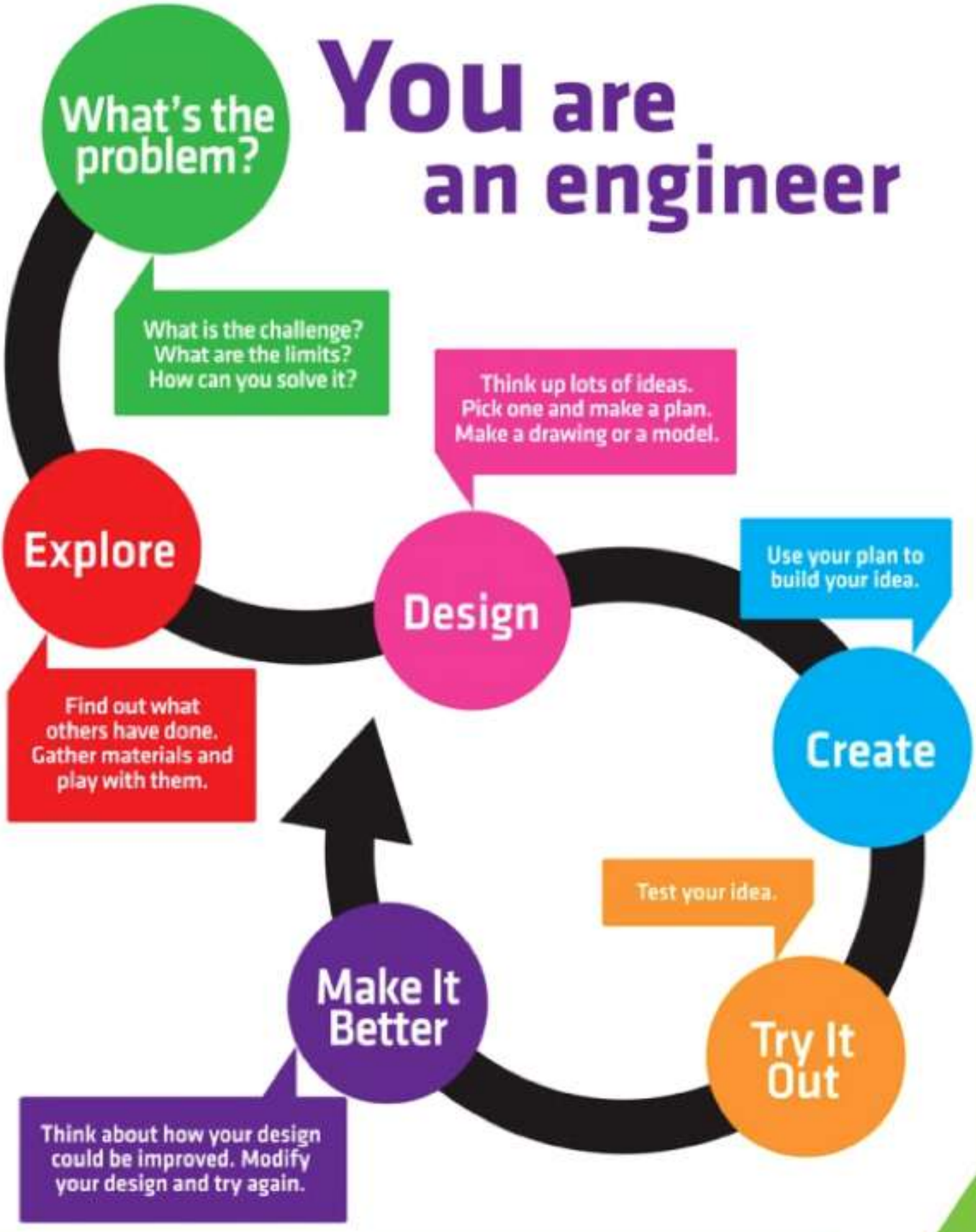
Appendix C:

Engineering Design Process

You are an engineer



Engineering Design Process

Appendix D:

Grade 3 Curriculum Overview

The Public Schools of Brookline
GRADE THREE CURRICULUM OVERVIEW

Dear Parents and Guardians,

High achievement for all has been a core value in the Public Schools of Brookline for nearly two decades. There are many variables that contribute to a student's academic achievement, one of the most important being a strong connection between the home and school. When families support their child's learning at home, express interest in their studies, and hold high expectations for achievement, a partnership between home and school is created. We hope that this Curriculum Overview will be a useful tool for you as you support and encourage your child's academic success.

Curriculum Coordinators created this overview to highlight the concepts, skills, and knowledge central to each subject area in every grade level. This document is not intended to represent the entire curriculum for this grade; rather it provides you with the key elements taught to all children across the Brookline schools in this grade. If you are interested in learning more about the curriculum, as outlined in our Learning Expectations, visit the Public Schools of Brookline website (www.brookline.k12.ma.us) and look in the *Latest News and Quick Links* section on the main page.

Each year brings new learning challenges and a world of possibilities. Your involvement and knowledge about your child's school experience will help to nurture his or her learning far beyond the four walls of the classroom. As your child begins a new year in the Public Schools of Brookline, please know that we welcome your involvement and value your support.

Respectfully,

Jennifer Fischer-Mueller, Ed.D.
Deputy Superintendent for Teaching and Learning

K-8 Curriculum and Program Coordinators and Directors

Educational Technology and Libraries – *Scott Moore*
English Language Arts - *Joanna Lieberman*
English Language Learner (ELL) Program – *Mindy Paulo*
Enrichment and Challenge Support (ECS) – *Mies Boet*
Mathematics - *Karen Wolfson*
METCO – *Suzie Talukdar*
Performing Arts - *Kenny Kozol*
Physical Education - *Teddi Jacobs*
Science & Health - *Janet MacNeil*
Social Studies - *Geoff Tegnell*
Special Education – *Emily Frank and Mark Nacht*
Visual Arts - *Alicia Mitchell*
World Language - *Dawn Carney*

The Public Schools of Brookline
GRADE THREE CURRICULUM OVERVIEW

Goals of the Public Schools of Brookline

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 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.

SOCIAL EMOTIONAL LEARNING & BULLYING PREVENTION/INTERVENTION

The Public Schools of Brookline has created a comprehensive social emotional learning and bullying prevention and intervention program to nurture school culture and provide the knowledge, skills, procedures, and processes required to foster positive student behavior in support of learning. With the effective implementation of the comprehensive program, we envision all Brookline schools reflecting a safe, welcoming, respectful, and nurturing school culture that supports the development of all children through their preK-12 experiences.

The PSB Comprehensive Social Emotional Learning and Bullying Prevention and Intervention Program is characterized by the following program elements in the specified grade(s):

Social Emotional Learning
Social Thinking (K-12)
Responsive Classroom (K-5)
Developmental Designs (6-8)
Facing History and Ourselves (8)
Brookline High School Advisory (9-12)

Bullying Prevention and Intervention
Olweus (K-12)
Understanding Disabilities (4)
Second Step (7-8)

The Public Schools of Brookline
GRADE THREE CURRICULUM OVERVIEW

EDUCATIONAL TECHNOLOGY AND LIBRARIES

The Public Schools of Brookline encourages a culture of inquiry that regularly investigates and experiments with promising new practices that engage students as 21st century learners and prepares them for the evolving global society. The Educational Technology and Library staff works in collaboration with the entire school community to help students become:

- Enthusiastic, independent readers for information and pleasure
- Independent, skillful information users who know how to access, analyze and produce information in a variety of formats using a variety of tools
- Responsible digital-age citizens
- Skillful learners and innovators who use digital tools to develop the "Four Cs:"
    - critical thinking
    - communication
    - collaboration
    - creativity

The integration of these skills is typically addressed through classroom projects within the major curriculum units of study in the core subjects. School libraries are complex hubs of student learning and engagement, with the ability to enhance all curriculum areas. Emerging technologies and near ubiquitous access creates new opportunities to deepen and extend learning, often connecting with people, resources, and perspectives beyond the walls of our classrooms.

In grades three and four students develop information literacy skills that correspond to their developing reading abilities and greater capacity for critical thinking. Students begin exploring features of non-fiction texts and developing search strategies to use with the library catalog and online sites. Students begin to organize found information in order to synthesize and produce new meaning. Students explore different genres in their independent reading and curricular study.

Technology skills are developed through daily tasks and special projects that provide students opportunities to develop intermediate skills with hardware and software. Students develop the ability to use the computer as a writing tool with basic word processing skills, create simple multimedia presentations, and use a variety of technology resources for problem solving, communication, and illustration of thoughts, ideas, and stories.

ENGLISH LANGUAGE ARTS

Brookline's Learning Expectations in ELA meet or exceed the standards outlined in the Massachusetts Frameworks. To reach these demanding standards, Brookline educators use the *Continuum of Literacy Learning PreK-8* (Heinemann, 2011) as their day-to-day guide when teaching specific behaviors in reading and writing. The description of the successful third grade reader and writer below comes primarily from the *Continuum*.

Reading
At the end of third grade, students can identify the characteristics of a full range of genres, including hybrid texts that blend more than one genre in a coherent whole. They read both chapter books and shorter informational texts, along with special forms such as mysteries, series books, books with

sequels, and short stories. Fiction narratives are straightforward but have elaborate plots and multiple characters that develop and change over time. Third grade readers are able to understand some abstract themes and to take on diverse perspectives and issues related to race, language, and culture. Some non-fiction texts provide information in categories on several unrelated topics, many of which are well beyond the reader's typical experience. Students will identify and use underlying structures (description, compare and contrast, temporal sequence, problem and solution, and cause and effect). By the end of the year, they can process complex sentences containing prepositional phrases, introductory clauses, and lists of nouns, verbs, or adjectives. Third grade students solve new vocabulary words, some defined in the text and others unexplained. They can read and understand descriptive words, some complex content-specific words, and certain technical words. Most reading is done silently; in oral reading, third grade students demonstrate all aspects of smooth, fluent processing with little overt problem solving. (*Continuum PreK-8*, pp. 312)

Writing

Third graders have a strong sense of writing fundamentals and are ready to produce longer, more organized pieces of writing. They comfortably compose several sentences on one topic, can spell many high frequency words correctly and use their strong phonics foundation to write new words. They may continue to use phonetic spelling to represent sounds in unknown words.

Students continue their use of the writing process in which they brainstorm ideas, plan their writing, draft, revise and produce a polished final draft.

Third graders learn how to construct a series of paragraphs that include engaging introductory sentences, three or more supporting sentences, and conclusions. They use a variety of sentence structures and write with expression and a personal voice, incorporating words learned through reading and content-area studies.

Third graders further expand their repertoire of writing genres, adding expository nonfiction and writing longer, more cohesive narrative pieces. Third graders produce opinion pieces about themselves and the world around them. They continue to write poetry in a variety of forms with even more figurative language and imagery. Their written responses to reading focus on more complicated character and plot development.

MATHEMATICS

Brookline's Mathematics Learning Expectations, built on the 2011 MA Curriculum Frameworks for Mathematics, are comprised of two main components: the Standards for Mathematical Practice and Standards for Mathematical Content. To achieve mathematical understanding, students are engaged in mathematical experiences which balance mathematical procedures and conceptual understanding.

Mathematical Practices

Two of the mathematical practices that we will be highlighting this year involve making sense of problems and constructing mathematical arguments. Third grade mathematicians are involved in solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Third graders may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make

sense?" They listen to the strategies of others and will try different approaches. They often will use another method to check their answers.

In third grade, students may construct arguments concretely (for example, by using objects, pictures, and drawings) or may begin to think abstractly. They refine their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" Students explain their thinking to others and respond to the thinking of their peers. They decide if the explanations make sense and ask clarifying and probing questions to help refine their thinking.

Mathematical Content

Building on a foundation of place value understanding and fluency with addition and subtraction, we focus on these four critical areas:

Whole Number Operations: Developing understanding of multiplication and division and strategies for multiplication and division within 100.

Fractions: Developing understanding of fractions, especially unit fractions (fractions with a numerator 1).

Area: Developing understanding of the structure of rectangular arrays and of area.

Geometry: Describing and analyzing two-dimensional shapes.

PERFORMING ARTS

Third grade students have music class twice a week in which they joyfully create music while developing the following skills:

Performing: Students will develop skills in singing, reading music, playing instruments, movement and dramatization of music.

Reading and Notating: Students will learn to interpret and apply visual representations for the sounds they hear (musical notation).

Listening and Appreciation: Students will learn to critically respond with understanding when they describe, analyze and interpret music. Students will study music from different periods and locations.

Creating: Students will improvise and compose original works of music.

Connecting: Students will develop understanding of artistic heritage through investigation of the historical and cultural contexts of music.

In third grade, students continue to develop the skills learned in prior years and advance their skills in the following areas:

- Ability to accompany melody using classroom instruments
- Ability to identify instruments and instrument families
- Proper singing posture and ability to match pitch in an expanded range
- Expanded singing repertoire to include rounds and partner songs
- Ability to compose simple rhythms, tonal passages and melodies for voices or instruments

- Ability to improvise short musical passages, vocally or instrumentally
- Ability to create movement in response to musical sound.
- Ability to play more advanced parts on Orff, the recorder, and other instruments, and read simple music notation on instruments
- Ability to use musical terms in analyzing performances and compositions

The **Performing Arts Learning Expectations** meet the **National Standards for Arts Education** music learning outcomes that are integral to the comprehensive K-12 education of every student.

PHYSICAL EDUCATION

During this period, children's thinking is becoming more orderly, more structured, and more logical. Therefore, students will be more realistic and more rule-oriented. Play will reflect a developing need for order. A challenge to the emerging self-concepts of these students is to demonstrate to themselves and others that they are competent, and that they have skills and abilities of which they can be proud. Physical education classes offer an environment of effective socializing. The physical education teacher helps children differentiate between acceptable and unacceptable ways of expressing feelings. Children need to internalize and understand the merits of participation, cooperation, and competition.

Cooperation precedes the development of competition and it is emphasized in the physical education class. The nature of competitive games demands cooperation, fair play, and sportsmanship, and when these are not present, the joy of participation is lost. Cooperative games teach children that all participants are needed.

The Tactical Games Approach is used when teaching sport skills, using student interest in the game itself to promote skill development and tactical knowledge. In essence, students are playing the game as they work on skills and tactics.

At this age, students begin to relate the value of movement and healthy nutrition practices to personal, long-term healthy lifestyles. Students develop a better understanding of the components of fitness and how these relate to their overall fitness status.

The Grades 3-5 Physical Education Curriculum was developed with the National Standards in mind. These standards describe the physically literate individual. (http://www.shapeamerica.org/standards/pe/index.cfm) In the *3-5* grade span, students work on the skill progressions within each of the following areas:

Motor Skills and Movement Patterns: Develop skills in dribbling with hands/feet, striking with varied implements, jumping rope with rhythm, overhand throwing, and catching. In these grade levels, skills are increasingly incorporated into game play. The Tactical Games Approach is employed when learning sport skills.

Physical Activity & Fitness: Participate for longer periods of time in a variety of vigorous activities. Throughout this grade level cluster, students begin to relate the fitness component s to overall personal fitness status.

Personal and Social Behavior: Demonstrate positive behaviors throughout cooperative activities. Students begin to learn skills in leadership and followership.

Value of Physical Activity and Social Interactions: Recognize the value of physical activity for health, enjoyment, challenge, self-expression and social interaction.

SCIENCE

In third grade science, students explore natural and human-made structures. Science and engineering practices are woven throughout all of the science content, as well as the use of science notebooks and integration with the other curriculum areas.

Structures (Engineering): In this unit, student engineers are introduced to the concepts of structures (natural and human-made) and form and function. They build different types of structures with a variety of materials to discover what makes structures strong and stable. In the culminating activity, they design and build a famous structure, revising their design as needed to make it strong and stable.

Living Structures: The Skeletal System: In this unit, students will have multiple opportunities to gather evidence on how the shape of bones and skeletons match their function. They begin by studying individual unlabeled bones, and then study the groups of bones in the human skeletal system (why are my bones shaped they way they are?). All the while, they are also gathering evidence on the importance of the skeletal system and how its parts all work together as a system. Next, students apply their learning to dissection of a Mysterious Object—studying the form and function of bones they gather and ultimately using them to reconstruct an animal skeleton. This experience leads into a comparison of animal skeletons and investigations of how their bodies may look different, but they have similar types of bones with the same function. Student understanding is then deepened by asking them to make claims about how animal skeletons are adapted to help the animals survive in their habitat. Finally, students read about scientists who use what they know about living animals and their skeletons, along with fossil evidence, to make claims about animals that lived long ago.

Mammal Detectives: Building on their experiences with the skeletal system, students become mammal detectives who use inquiry to identify the features of five mystery mammals. As they receive additional pieces of evidence about their mystery mammal (skulls, teeth, fur, feet, tracks and scat), students observe the evidence and make claims about what their mammal eats, how it moves, how it sees and where it lives, revising their thinking as needed based on new evidence. Ultimately, they make their final claims (supported by evidence) and present them to the class.

SOCIAL STUDIES

In the third grade social studies course of study, Massachusetts Geography and History, students are introduced to the concepts of physical and human geography by examining the geography of New England and the history of Massachusetts. Students will begin by investigating the physical features of Massachusetts within the context of the landforms, climate, and vegetation/animal life biome of the New England region. They will then explore the adaptation of Native Americans and English colonists to the Massachusetts environment. Students will also investigate how English Puritan ideas shaped the development of Massachusetts from colony to state. Students will examine the outbreak of the American Revolution in Massachusetts and trace significant events in the development of Brookline and Boston. Students will read about the lives of noted Massachusetts historical figures.

New England/Massachusetts Geography: In this unit students will locate and label Massachusetts' physical and political features. They will also employ thematic maps to learn how agriculture, industry, and resources shaped contemporary Massachusetts and research and write reports about other New England states.

Wampanoag: In this unit students will investigate how the Southeastern Massachusetts environment influenced traditional Wampanoag culture. They will trace the seasonal cultural practices of the 17th century Wampanoags and become acquainted with Wampanoag oral traditions and values.

The Pilgrims Build Plymouth Plantation: Students begin this unit by exploring why the Pilgrims left Europe for the New World. Next, students will investigate the Pilgrims' journey across the Atlantic, creation of the Mayflower Compact, and first encounter with the Wampanoags. Students will then critically analyze an account of the First Thanksgiving and conclude by collecting and sharing data on the everyday lives of Pilgrim boys and girls.

Puritan Colonial Massachusetts: In this unit students compare the Pilgrims and Puritans in terms of their reasons for leaving England, beliefs, leadership, and settlement area. Next, they locate different geographical features and settlements of Colonial Massachusetts. Students will compare their lives to those of colonial children and investigate the Massachusetts Bay Colony trades and economy.

Pre-Revolutionary Massachusetts: Students explore the growing tensions between England and the Colonies in this unit. Students will learn about important people like King George III and Samuel Adams and will trace how events like the Boston Tea Party led up to the War for Independence. They will also deepen their understanding of such civic concepts as citizenship and the "common good".

Massachusetts Biography: Students will conclude their study of Massachusetts geography and history with this unit. Students begin by reviewing the elements of a biography and browsing through biographies of significant Massachusetts citizens. They will then read multiple biographies about a person of interest to collect notes and prepare a speech, poster, or booklet depicting their person's life history and contributions to society.

VISUAL ARTS

Students in third grade work with intention to communicate their ideas. They are naturally inquisitive and develop skills of observation, perseverance and reflection. The visual arts instruction asks questions of the young artists: What are we thinking about? What are we able to do with materials to communicate ideas through art? What are learning as we make art? This builds strong artistic habits of mind as the students create work with various tools, processes, and media, and make choices that improve their ability to communicate their ideas, feelings and understandings.

Art lessons are developed to engage students in rich tasks that develop their critical and creative thinking skills, and allow them to develop artistry through deliberate practice. Students develop their artistic skills in the following areas:

Drawing: Creating compositions, using multiple tools, through mark making, lines and forms that communicate the artists' intention.

Painting: Creating a composition using paint that tells a story, expresses an emotion, suggests a feeling, develops a pattern or illustrates the relationship of colors.

Collage: Creating a cohesive composition that communicates the artists' intention by gluing multiple pieces of paper/found materials together in one image.

Printmaking: Creating a composition that transfers images to other surfaces multiple times using printmaking tools, stamps, stencils and plates.

3D Construction: Building a form that has multiple sides, has structural integrity, and embodies the artists' vision.

Lessons have an array of beginning points: interdisciplinary work connected to grade specific themes in other curriculum studies, art history, contemporary art, and student generated curiosities. The work focuses on developing strong artistic habits of mind that develop skill and craftsmanship. The Visual Arts classes meet once a week throughout the year.

WORLD LANGUAGE

Students in grade three continue their journey as language learners, developing a deeper understanding of culture and becoming conversation partners. Our K-5 elementary world language program focuses on developing oral proficiency, with lessons conducted almost exclusively in either Spanish or Chinese. This provides students with many opportunities to hear words in context and make meaning out of them without direct translation. This repetition, coupled with visual supports, first develops comprehension, followed by oral production.

Students continue to comprehend more than they can produce in the target language. Lessons are built around interactive activities and tasks that develop students' conversation skills. They use sentences and start to create with the language; participate in simple, direct conversations, asking and answering questions; and learn to describe and narrate the topics they are learning about. The themes in third grade are community, leisure time, climate and food, with the cultural focus on Mexico. Lessons increase to thirty minutes, three times a week.

Appendix E:

Grade 3 Science/Engineering Learning Expectations

3rd Grade Science & Engineering Learning Expectations
Public Schools of Brookline
July 16, 2012

Overview

The Science & Engineering Learning Expectations (LEs) outline the content that students will learn and skills (practices) that students will be able to do from preK through Grade 8. They have been designed with careful consideration to how students will build their knowledge from grade to grade (learning progressions). As they progress through the grades, students will reinforce what they have learned before, continually learning certain overarching concepts in new ways and with increased sophistication.

Organization of the Learning Expectations

The Learning Expectations are organized into three strands: 1) Earth Science, 2) Life Science, and 3) Physical Science.

While the traditional Physical Science, Life Science, and Earth Science strands are referenced, it is important to be aware that none of these strands are totally separate. In fact, scientists often work in inter-disciplinary teams, across disciplines and/or alongside engineers to answer their questions and solve problems.

In addition, Science Practices (Inquiry and Nature of Science), Engineering and Environmental Education content has been woven throughout the Learning Expectations, illustrating the vital interconnections between these topics. This approach allows students to learn about these disciplines in the context of the science concepts they are learning, instead of as stand-alone, disconnected units.

Guide to This Document

This document shows the progression of Science concepts in the form of Big Ideas (left column) and Learning Expectations (right column). The Big Ideas identify the content that students will learn and the Learning Expectations illustrate what students will know and be able to do in order demonstrate that they have acquired this knowledge.

3rd Grade Earth Science Learning Expectations [Mammal Detectives Unit]

EARTH SYSTEMS	
Big Ideas	**Learning Expectations**
Changing Earth: Earth's History • Fossils provide evidence about the types of living things, including dinosaurs, that lived long ago and also about the nature of their environments. Fossils can be compared with one another and to living organisms according to their similarities and differences.	• Evaluate claims that fossils provide evidence of the types of living things that have lived on Earth and their environments, citing their similarities and differences to currently living species.
Weather & Climate • Weather is the minute-by-minute to day-by-day variation of the atmosphere's condition on a local scale. Scientists record the patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. Climate describes the ranges of an area's typical weather conditions and the extent to which those conditions vary over years to centuries. • Weather and climate data collected by meteorologists includes: temperature, wind direction and speed, and precipitation.	• Gather information about different climatic areas to compare habitat conditions with mammal adaptations. Explain the effect of climate on mammal adaptations.
Human Interactions with Earth [Social Studies Connection] Extension • Human activities in agriculture, industry, and everyday life have had major effects on living things, the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. • Some types of animals and plants are diminishing in numbers due to loss of habitat and/or other factors. But there are things that humans can do prevent this from happening.	• Use informational sources to identify endangered mammals. For one endangered mammal, explain where they live and why they have become endangered. • Explain what is being done to help endangered mammals survive. Brainstorm a list of things we can do to help.

3rd Grade Life Science Learning Expectations [Mammal Detectives Unit, Skeletal System Unit and Structures Unit]

Big Ideas	Learning Expectations
Characteristics of Living Things • Scientists sort (classify) living things based on features they share in order to learn more about them. • Living things (plants and animals) share certain characteristics (e.g., they grow and reproduce) • All mammals share certain features [They have a backbone, hair or fur, are warm-blooded, breathe air using lungs, and nurse their young. Most mammals give birth to live young]	• Gather evidence to show that animals can be classified based on their features (e.g., vertebrates have backbones, mammals have hair, insects have six legs). • Explain the difference between vertebrates and invertebrates. Give examples of each. • Describe the common features of mammals and sort animal photos into mammals and not mammals.
Structure & Function of Living Things • Animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. • Animal structures (e.g., feet, tails, etc.) can look similar or different depending on the living thing and where it lives.	• Use models to analyze how internal and external structures and systems in mammals allow them to grow, survive and reproduce. • Describe the basic structures of mammals and explain their function (e.g., what they do to help the mammal survive in its environment).
Needs of Living Things • Like most other animals, mammals need food, water, air, a space to live in and raise young (shelter), and the right temperature in order to live and grow. • Food provides animals with the materials they need for body repair and growth and is digested to release the energy they need to maintain body warmth and for motion.	• Describe the basic needs of mammals and give examples.
Ecosystems • Mammals live in places that can provide the things they need to live and grow (habitats). • Mammals, like other animals, depend on plants or other animals for food. They use their senses to find food and water, and they use their body parts to gather, catch, eat and chew the food. • When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. • Changes in an organism's habitat are sometimes beneficial to it and sometimes harmful. For any particular environment, some kinds of organisms survive	• Make claims based on evidence to show that living things can survive only in environments in which their particular needs are met (e.g., mammals that live in the desert, mammals that live in the ocean, etc.). • Explain how a specific mammal's needs are met within its habitat. • Provide evidence that environmental change in a system (e.g., extra water in a normally dry area, pollution or fire) can affect the number and types of living things that live there as some remain, move and/or die. • Show (model) and describe how mammals depend on other living things in their habitat. (ELE) • Compare a human habitat with a beaver's habitat • Give examples to show how changes in a mammal's habitat can affect its survival.

well, some survive less well, and some cannot survive at all. • Populations of organisms live in a variety of habitats, and change in those habitats affects the organisms living there.	• For a certain type of environment (e.g., forest, grassland, desert, etc.), describe the relationship between characteristics of the environment and the mammals that live there.
Adaptations • Mammals have features that help them survive in their environment. [These features include physical adaptations (e.g., feet, teeth, fur, camouflage, etc.) and behavioral adaptations (e.g., migration, behaviors to protect their young, hibernation, communication, etc.). • Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. • Groups can be collections of equal individuals, hierarchies with dominant members, small families, groups of single or mixed gender, or groups composed of individuals similar in age. Some groups are stable over long periods of time; others are fluid, with members moving in and out. Some groups assign specialized tasks to each member; in others, all members perform the same or a similar range of functions.	• Evaluate and communicate information that the characteristics of a group of animals help individual animals survive. • Illustrate how mammals are adapted to live in their environment (desert, tropical forest, temperate forest, grassland, arctic tundra, wetlands, rivers, oceans, mountains). Describe the features of mammals that allow them to live in places others cannot (e.g., polar bear, harbor seal, desert animal, etc.). (ELE) • Compare the adaptations of a snowshoe hare and an antelope jackrabbit. Explain how these features allow the mammal to live in its environment. • Make claims based on evidence to explain why animals may form groups to help them meet their needs and survive (e.g., family groups, pairs, herds).
Growth & Development • Reproduction is essential to the continued existence of every kind of living thing (organism). Plants and animals have unique and diverse life cycles that include a beginning (birth for animals, germination for plants), growing, developing into adults, reproduction, and eventually dying.	• Gather information on the life cycles of a variety of mammals, communicating similarities, differences and patterns in their development. • Compare the life cycle of a mammal and a pillbug.
Biodiversity & Evolution • Fossils provide evidence about the types of organisms (both visible and microscopic) that lived long ago and also about the nature of their environments. Fossils can be compared with one another and to living organisms according to their similarities and differences. • There are many different types of plants and animals on Earth, but only certain types are found naturally at a certain place. • Populations of living things live in a variety of habitats, and change in those habitats affects the organisms living there. Humans, like all other organisms, obtain living and nonliving resources from their environments.	• Gather evidence that some kinds of animals and plants that once lived on Earth (e.g., saber-toothed tigers and wooly mammoths) are no longer found anywhere, although others living now may resemble them. • Compare mammal fossils to one another and to living mammals (scat too). Explain how they are alike and how they are different. • Observe photos of fossils to make claims about the nature of the organisms and the type of environment where they lived, and their similarities to organisms that are alive today. • Give examples of how scientists have used fossils as evidence to make claims about mammals that lived long ago.

3rd Grade Physical Science Learning Expectations

MATTER [Future Mixtures Unit]	
Big Ideas	**Learning Expectations**
Properties of Matter • Objects can be described in terms of the materials they are made of and their physical properties. • Characteristic properties (e.g., hardness, weight) can be used to identify substances. • Some materials are better than others for a particular purpose because of their properties. • A great variety of objects and technologies can be built up from a small set of pieces (e.g., blocks, construction sets).	• Explain how the properties of different natural or manufactured objects suit their purpose (e.g., pillows are made of soft materials, windows are made of clear glass, etc.). • Measure and compare the physical properties (e.g., weight, length) of objects using non-standard and standard units, and explaining the benefits of using standard units.
Chemical Reactions & Mixtures • Scientists investigate to find out about the properties of substances. They use their knowledge of the properties of substances to design mixtures. • When two or more different substances are mixed, a new substance with different properties may be formed; such occurrences depend on the substances and the temperature. When other substances are mixed, the form or appearance may change, but no new substance is formed (the composition of the substances stay the same). • No matter what reaction or change in properties occurs, the total weight of the substances does not change (e.g., sugar in solution). • Dissolving is when a solid mixes with a liquid and breaks apart into tiny pieces too little to see with our eyes.	• Plan and carry out investigations to support the claim that the total weight of a substance does not change when it undergoes physical changes (e.g., change of shape, change from solid to liquid, being dissolved in a liquid). Record data in science notebooks and compile to share with others. • Investigate and gather data to support the claim that the total weight of matter does not change when substances react chemically to form new substances. • Investigate and provide evidence to support the claim that when two or more different substances are mixed, one or more new substances with different properties may be formed (e.g., baking soda and water does not create new substances, but mixing baking soda and vinegar does). • Describe the properties of materials before and after they are mixed. • Research and explain chemical reactions that occur in everyday products (e.g., bread and other foods, epoxy and other reactive adhesives).
FORCE & MOTION (Force & Motion in Structures & Systems) [Structures Unit]	
Big Ideas	**Learning Expectations**
• Objects in contact exert forces on each other (friction, pressure, pushes and pulls). • Each force acts on one particular object and has both strength and a direction.	• Use a model to predict the future motion of an object (e.g., pendulum) based on its regular pattern of motion. • Carry out investigations on objects at rest subject to balanced forces and

An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. • The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. • A system can change as it moves in one direction (e.g., a ball rolling down a hill), shift back and forth (e.g., a swinging pendulum), or go through cyclical patterns (e.g., day and night). • Examining how the forces on and within the system change as it moves can help explain a system's patterns of change. • A system can appear to be unchanging when processes within the system are going on at opposite but equal rates (e.g., water behind a dam is at a constant height because water is flowing in at the same rate that water is flowing out). • Changes can happen very quickly or very slowly and are sometimes hard to see (e.g., plant growth). Conditions and properties of the objects within a system affect how fast or slowly a process occurs (e.g., heat conduction rates). • The materials used (and their characteristics) and the way materials are put together affect the stability of a structure.	measure the relative sizes and directions of these forces (e.g., two horizontal spring scales pulling on a stationary object sitting on a table). • Construct a model of a system in which the forces on an object are balanced to explain how quickly or slowly the system changes when the forces become unbalanced (e.g., heavier and lighter weights on a see saw, pushing or pulling an object with varying force). • Give examples of and demonstrate different ways that parts of structures exert force on one another (including friction, pressure, pushes and pulls). • Demonstrate how the properties and shape of materials used, as well as the way materials are put together, affect the strength of structures.
ENGINEERING [Structures Unit]	
Big Ideas	**Learning Expectations**
• The materials used (and their characteristics) and the way materials are put together affect the strength and stability of a structure. • Structures are systems	• Demonstrate how the properties and shape of materials used, as well as the way materials are put together, affect the strength of structures. • Collaborate with others to design a device built from components to solve a technological problem (e.g., transporting or supporting an object). [Engineering Connection]

Appendix F:

Essential Learning Expectations, Grade 3

The Public Schools of Brookline
Grade 3 – Essential Learning Expectations

Learning Expectations are the K-8 curriculum guidelines for all content areas. They answer these questions for parents, teachers, and students:

- What will students know and be able to do?
- How will students demonstrate their learning?

The Brookline Learning Expectations have been developed by teams of teachers, led by curriculum coordinators, and meet or exceed the Massachusetts Curriculum Frameworks.

The Progress Reports (formerly called Conference Forms) that teachers share with parents list the **Essential Learning Expectations** (or ELEs) for English Language Arts, Math, Science and Social Studies. The ELEs are a subset or synthesis of the Learning Expectations that describe the key skills and understandings for students at a particular grade that are essential for them to master in order to be prepared for the next grade.

It is important to remember that while the ELEs are a shorthand version of the Learning Expectations to share with parents, our curriculum is designed to cover *the entire set of Learning Expectations*, which describe the full understanding of content and acquisition of skills that is expected of students. While the LEs are listed by subject area, it is our instructional practice and goal to integrate across curriculum areas as much as possible. The complete set of K-8 Learning Expectations is available to teachers by subject area in the FirstClass Teacher Portal. They are available to the public through the PSB website - http://brooklinek12-public.rubiconatlas.org/Atlas/Public/View/Default. (This site is being updated to reflect recent revisions.)

The ELEs for English Language Arts, Mathematics, Science and Social Studies are listed below. These ELEs are listed on the Grade 3 Progress Report

ENGLISH LANGUAGE ARTS

READING OVERVIEW

Brookline's Learning Expectations in ELA meet or exceed the standards outlined in the Massachusetts Frameworks. To reach these demanding standards, Brookline educators use the *Continuum of Literacy Learning PreK-8* (Heinemann, 2011) as their day-to-day guide when teaching specific behaviors in reading and writing. The description of the successful first grade reader below comes directly, with a very few changes, from the *Continuum*.

At the end of third grade, students can identify the characteristics of a full range of genres, including hybrid texts that blend more than one genre in a coherent whole. They read both chapter books and shorter informational texts, along with special forms such as mysteries, series books, books with sequels, and short stories. Fiction narratives are straightforward but have elaborate plots and multiple characters who develop and change over time. Third grade readers are able to understand some abstract themes and are able to take on diverse perspectives and issues related to race, language, and culture. Some non-fiction texts provide information in categories on several unrelated topics, many of which are well beyond the reader's typical experience. Students will identify and use underlying structures (description, compare and contrast, temporal sequence, problem and solution, and cause and effect). By the end of the year, they can process sentences that are complex and contain prepositional phrases, introductory clauses, lists of nouns, verbs, or adjectives. Third grade students solve new vocabulary words, some defined in the text and others unexplained. They can read and understand descriptive words, some complex content-specific words, and some

technical words. Most reading is done silently; in oral reading, third grade students demonstrate all aspects of smooth, fluent processing with little overt problem solving. (*Continuum PreK-8*, pp. 312)

WRITING ELEs

Structure/Craft:

Organization

- Introduce, develop, and conclude topics in nonfiction writing, including texts produced for Science, Social Studies, and Math.
- Construct narratives with a clear sequence of events, including texts produced for Science, Social Studies, and Math.
- Use a variety of text structures (including graphics) appropriate to both purpose and genre in ELA and all content areas.

Idea development

- Provide accurate and relevant evidence to support all claims.
- Gather and use information from a variety of reliable sources when writing texts, including those produced for Science, Social Studies, and Math.

Word Choice

- Incorporate words learned through reading and content-area studies into writing.

Language Use

- Use a variety of sentence structures; write with expression and personal voice.

Conventions:

Grammar and Punctuation

- Write in complete sentences with accurate verb tense, along with appropriate punctuation.

Handwriting

- Write fluently in manuscript (printed) handwriting with appropriate spacing.

Spelling

- Correctly spell familiar high-frequency words and words that follow patterns that have been studied in class; use phonetic spelling to represent most sounds in unknown words.

Process:

Planning and Drafting

- Identify purpose, select genre, and produce initial drafts.

Revising

- Revise drafts, using feedback from peers and teachers, as well as new learning from instruction.

Production

- Produce a quantity of writing appropriate to task and time available.

ORAL COMMUNICATION ELEs

- Participate actively in small and large group conversations; listen to and look at speaker and build upon comments of others.
- Share relevant information and ask questions that further the discussion.
- Speak at a volume and rate appropriate to setting.

MATHEMATICS ELEs

Mathematical Practices
- Makes sense of problems and perseveres in solving them.
- Communicates mathematical reasoning and ideas using words, numbers, and/or pictures.

Operations and Algebraic Thinking
- Represents and solves problems involving multiplication and division.
- Understand properties of multiplication and the relationship between multiplication and division.
- Multiply and divide within 100.

Numbers and Operations in Base Ten
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Numbers and Operations – Fractions
- Develop understanding of fractions as numbers. (Fraction as a quantity; fraction on a number line; reasoning about equivalence and comparison of fractions).

Measurement and Data
- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- Represents and interpret data.
- Geometric measurement: Understand concepts of area and perimeter and relate concepts to multiplication and addition.

Geometry
- Reasons with shapes and their attributes.

SCIENCE ELEs

Science Practices and Nature of Science
- Ask questions and show curiosity.
- Observe closely and record observations.
- Develop and use models.
- Plan and carry out simple investigations.
- Analyze and interpret data.
- Make reasonable claims based on evidence.
- Share ideas and critique the ideas of other scientists.
- Recognize the importance of science and the skills/characteristics of scientists.

Structures
- Describe and compare structures.
- Demonstrate how the properties and shape of materials and how they are used affect the strength and stability of structures.
- Provide examples and evidence of different ways that parts of structures exert force on one another.

Living Structures: The Skeletal System
- Provide evidence to support the claim that skeletal systems are structures made up of parts that work together to allow the animal to survive.
- Make claims based on evidence on how the forms bones take depend on their function and provide evidence on where and how an animal lives.
- Explain the purpose and function of the skeletal system and what we can do to keep it healthy.

Mammal Detectives and Habitats
- Compare and construct claims based on evidence to show how the features of mammals help them adapt to their habitat.
- Provide evidence to support the claim that living things depend on each other and the environment.
- Explain how changes in the habitat of a living thing may affect its survival.

SOCIAL STUDIES ELEs

Historical Thinking

- Make ethical (fair and principled) judgments about actions of people in the past.
- Use evidence and understanding of the historical context to take an historical perspective.

Geography

- Represent the important political and physical features of Massachusetts on a map.
- Demonstrate understanding of the regional geography of New England by describing the landforms, vegetation, animal life, and climate of a New England state.

History

- Analyze the way the physical geography of southeastern Massachusetts influenced the culture of the Wampanoags.
- Assess the culture of the Pilgrims and assess how they adapted to life in Massachusetts.
- Investigate Puritan culture in New England, including the reasons why the Puritans left England, daily life in the colony, education, work, and early leaders in MA such as John Winthrop.

Civics

- Infer the necessity for communities have government by comparing and contrasting the Mayflower Compact and classroom/school rules, etc.
- Provide examples of different ways people in a community can influence their local government.

Economics

- Define and differentiate money and barter economy and represent examples of each.
- Explains the purpose of taxes and support this explanation with historical and modern examples. (EX: Sugar Tax, Olmsted, DPW, etc.).

Research and Writing Skills

- Gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
- Writes opinion pieces on topics, supporting a point of view with reasons.

Appendix G:

Work Habits and Skills

Work Habits and Thinking Skills Rubric

PSB Progress Reports (formerly Conference Forms) for Grades K-5) have long contained a section on Work Habits and Attitudes. This section varied by grade, without elaboration on the skills. The revised version is now called **Work Habits and Thinking Skills**, and is accompanied by this rubric, which provides information on each skill about why it is important and what it looks like when students are applying these skills in Grades K-8. Currently, there is no section on the 6-8 progress reports for Work Habits and Thinking Skills, but this rubric is useful for teachers and students in these grades to increase awareness and understanding of these essential skills.

What are Work Habits and Thinking Skills?

The skills identified are foundational abilities and understandings that students can learn and develop that will prepare them to work effectively within and across disciplines, independently and with others, through deliberate practice. As students practice these skills, they form habits of thinking, of approaching tasks in a productive way. While the skills themselves are not new, organizing them and assembling them together is new, as is linking proficiency in these skills to success in the 21st Century workplace.* Students do not develop these skills in isolation, but in combination and in the presence of content. Opportunities to become aware of and practice these skills are present in all curriculum areas, for all students, K-12.

It's important to note that everyone is on a life-long journey to develop his/her thinking through application of skills. This is an area of continuous growth. Students have varying degrees of proficiency in applying these skills for their age, but everyone is somewhere on the continuum. Teachers help students understand why these skills are important, and create opportunities for students to practice them.

Organization of the Rubric

This rubric was developed to help us gain shared understanding of what it looks like when students are practicing these skills in the classroom. The descriptors are observable behaviors that indicate that the student is employing a particular skill. Talking to all students about these skills and why they are important is critically important. It helps students understand what they can do to become better thinkers and learners. The rubric is organized in this way:

- Skills Area - There are 6 areas: Productive and Responsible, Collaborative, Creative and Flexible, Critical Thinking, Reflective, and Responsible Community Member
- List of specific skills (as listed on the conference form)
  - Why is it important?
  - What might it look like in Kindergarten – Grade 2?
  - What might it look like in Grades 3-5?
  - What might it look like in Grades 6-8?

This is a teacher document, intended to provide you with language about these skills and habits for use with students and parents. It can assist you in learning more about when your students use these skills, and guide you in creating explicit opportunities for students to practice and

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apply them. A parent version (with just the first two columns) is available in the PSB Portal. Suggestions for improving the rubric by adding examples or clarifying the language are always welcome.

*More information on the sources used in identifying the skills and developing the rubric is on the last page of this document.

Work Habits and Thinking Skills Reporting Key

The reporting key for this section in the progress report has always been a frequency scale. On this new rubric, a number of observable behaviors are listed for each skill. (This is by no means complete - these are examples.) In general, think about your students and how frequently you observe them employing the skill. The continuum starts with rarely and moves to consistently, as the student develops the habit of being "productive and responsible" or "thinking critically". The student is moving towards routinely, instinctively and habitually applying the skills. Given these are skills we all work on throughout our lifetimes, we expect students to be practicing different skills at different times. It is not a problem if students are only demonstrating a skill occasionally. Even adults are continuing to practice these skills every day.

Three different ways of thinking about frequency are provided. No one is expected to keep a tally on each student. It is about your general sense of the student's approach to working. We welcome additional examples of students applying these skills in the grade spans.

Reporting Key			
Consistently	**Often**	**Sometimes**	**Rarely**
This is an established habit; it is how the student consistently approaches situations and tasks across disciplines.	This is starting to become a habit; this is how the student often approaches situations and tasks. S/he may apply the skill more regularly in some disciplines than others.	The student sometimes approaches situations and tasks in this way, with growing frequency. Not consistently or across disciplines.	Student is just beginning to show evidence of the habit/disposition in specific situations.
Almost all of the time	More than half of the time	Less than half of the time	Limited demonstration of skill/disposition
90%+ of the time	50-90% of the time	20-50% of the time	20% of the time or less

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RUBRIC: Productive and Responsible

Skill	Why is it important?	What might it look like in KINDERGARTEN – GR2?	What might it look like in GR 3-5?	What might it look like in GR 6-8?
Persevere at tasks to reach a satisfactory outcome	Some tasks are harder than others. Perseverance is the opposite of giving up when things get hard. In order to persevere, students need strategies and ideas of how to approach a problem in a new way. When one perseveres at a task and accomplishes it, a growth mindset is reinforced.	Grade K-2 students: • Talk about tasks that are easy and tasks that take more time and effort. • Try more than one strategy when working through a complex problem or task. • Seek help and/or ask questions before giving up. • Stay with a task until it is complete.	Grade 3-5 students: • Identify situations where perseverance led to a solution, or improvement. • Talk about obstacles and challenges as part of the problem solving process. • Sees the need for different strategies to solve a complex problem. • Continue working on a task despite distractions or obstacles. • Recognize what a fully completed task looks like.	Grade 6-8 students: • Understand that making mistakes is part of the learning process and continue to try strategies to work around the obstacle. • Work hard and do not give up when presented with a challenging task. • Delay immediate gratification in order to make progress toward a longer-term goal (hard work feels good). • Try different strategies when solving a complex problem. • Continue to work on a task until a quality solution is achieved.
Plan, organize and follow through on tasks	Most tasks involve a series of steps. Organizing the steps into a logical, manageable sequence is necessary for efficient work. A good plan takes resources, including time, into consideration.	Grade K-2 students: • Follow the simple steps outlined for completion of a task. • Describe what is needed to complete a task. • Assemble materials needed for a task. • Make a simple plan to complete a task.	Grade 3-5 students: • Imagine and describe the sequence of steps needed to complete a task. • Follow the steps in a plan in an efficient sequential order. • Describe the resources needed to complete the steps of a simple task (materials, space, time). • Estimate how long it may take to complete the steps of a simple task.	Grade 6-8 Students: • Develop and carry out the sequence of steps needed to complete a task. • Obtain the resources needed to complete a task. • Make use of existing organizational supports, trackers, rubrics, etc.

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Complete work in an appropriate time frame	Tasks take time. Getting a sense of what is realistic in terms of the time it takes to complete the steps in a task helps one to manage a project and ensure completion. This includes a level of self-awareness of how long it takes you to do things, and that some things take longer than others.	Grade K-2 students: • Describe how much time it should take to work on a task based on the teacher's instructions. • Set to work on tasks with the goal of completing them within the given time frame. • Seek help in adjusting time frame for a task when encountering difficulties or falling behind.	Grade 3-5 students: • Describe how long a task should take. • Rethink and adjust the time needed for a task when difficulties occur. • Work toward completion while maintaining high standards for quality. • Manage the multiple tasks they have to work on and complete over the course of a day or week.	Grade 6-8 students: • Identify and prioritize components necessary to complete a long-term task; make a plan to complete all components in a timely manner.
Work independently when appropriate	Many tasks involve working independently. Learning to work on your own when you are called upon to do so is necessary in order to accomplish the array of tasks we are given. It requires a good understanding of the task, and believing that you have the skills to accomplish the work.	Grade K-2 students: • Explain the task they are working on. • Get started working, following teacher directions. • Use the time provided for independent work.	Grade 3-5 students: • Articulate specific clarifying questions that will enable then to work independently. • Start on tasks without teacher assistance, following written or oral directions. • Use work time provided to accomplish tasks that are to be completed independently. • Are able to be productive independently while other students are engaged in work	Grade 6-8 students: • Believe they can do the work independently and attempt the work without prodding. • Are able to be productive independently. • Recognize when they are not able to work independently and advocate for a solution that will help them proceed.
Manage transitions	Adults move from situation to situation all day, and have to successfully transition from one mode of thinking and working to another. In a full school day, students must stop doing one thing in order to begin doing another. They learn that there is a rhythm to a day, and can move to the next part of the day as an individual who is functioning as a member of a larger	Grade K-2 students: • Describe the different parts of the school day, and that you end one part before starting the next part. • Put down a task when directed, and pick it up at a later time. • Move from an individual activity to a group activity, or vice versa. • May help their classmates move along to the next activity. • Describe what his/her tasks are in transition (ex: put away journals; clean up choice area, etc.)	Grade 3-5 students: • Describe the schedule/cycle of the day and have a sense of how long each activity lasts. • Anticipate and prepare for the next move in the day. • Stop work on one activity in order to start the next activity. • Describe the behavior that is appropriate for the different activities of the day. • Move to the next activity as an individual and as a classroom	Grade 6-8 students: • Follow through on classroom expectations for managing transitions as described in Grades 3-5. • Adapt to different expectations and routines of different teachers.

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	Group.		member.	

RUBRIC: Collaborative

Skill	Why is it important?	What might it look like in KINDERGARTEN – GR2?	What might it look like in GR 3-5?	What might it look like in GR 6-8?
Communicate about ideas with others	Good communicators are good listeners. This is essential in order to engage in respectful and productive dialogue. Listeners who are receptive to the ideas and input of others know that it may increase their understanding or lead to an improved idea or product. Good communicators are able to articulate their ideas, and seek help from others. They know that other people may have additional information and are able to help one see a problem or situation from another angle.	Grade K-2 students: • Listen, respond, and affirm the ideas of others, and offer personal perspective when appropriate. • Practice waiting to share their own thoughts until the other person is finished speaking. • Paraphrase the ideas of others with some understanding and accuracy. • Use facial, vocal, and body language that shows attentiveness when listening to others. • Talk about what they have done so far and ask questions about what they don't understand. • Explain to a classmate how they solved a problem.	Grade 3-5 students: • Hold their own thought while listening to others. • Respectfully offer ideas that show they have listened. • Acknowledge what others say. • Anticipate learning something by listening to what others have to say. • Use facial, vocal, and body language that shows attentiveness when listening to others. • Describe the process they have used to work on a problem, and at what point they became stuck. • Describe/share the steps they went through to successfully solve a problem.	Grade 6-8 students: • Actively listen to the ideas of others and try to understand them. • Ask clarifying questions to fully understand the ideas of others. • Incorporate others' perspectives to broaden their thinking. • Explain their ideas and processes so that others understand. • Give specific and constructive feedback. • Incorporate feedback appropriately.
Participate in group discussions and group work	Most work is done by groups of people. It's important for students to know that each group member is necessary and contributes, for better or worse, to the outcome or success of the work. Individuals need to understand the purpose of the work and feel confident in	Grade K-2 students: • Follow a group conversation and contribute voluntarily or if called upon. • Share tasks and resources when engaged in group work. • Share ideas with group members. • Incorporate ideas of others when appropriate. • Assert his/her ideas appropriately.	Grade 3-5 students: • Pay attention to group conversations and contribute task-related questions and ideas. • Discuss the goal of the group work and how to work together to get the task done. • Come prepared to do their part. • Individually feel responsible for the success of the group's work.	Grade 6-8 students: • Monitor airtime and share comments that will advance the thinking of the group. • Support group members in completing the group task. • Are willing to allocate and reallocate tasks as needed in order to ensure group success. • Acknowledge and utilize strengths

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	their ideas and skills in order to feel that their participation makes a difference.			of individual group members.
Follow classroom routines	The classroom is a community, set up so people can get along and learn together. Routines help build community by making the classroom a safe, helpful and orderly place. Knowing and following classroom routines help a student to be personally productive and contribute to the productivity and well-being of others.	Grade K-2 students: • Describe or help create classroom routines/expectations and explain the purpose they serve. • Anticipate the routines, and prepare themselves to follow them. • Are patient with others, yet encourage them to follow routines. • Adapt to changes when necessary.	Grade 3-8 students: • Participate in the creation of classroom norms, and articulate the rationale for them. • Describe the fair and logical consequences of not following classroom routines. • Suggest new routines or norms as a way of creating order or organizing their classroom. • Follow classroom routines. • Recognize that some of the time the needs of the group supersede the needs of the individual students.	

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RUBRIC: Creative and Flexible

Skill	Why is it important?	What might it look like in KINDERGARTEN – GR2?	What might it look like in GR 3-5?	What might it look like in GR 6-8?
Show eagerness and curiosity as a learner	People who are curious wonder and puzzle about things. They want to know more about the world. They follow their intuition to see what happens. They often respond with "wonderment and awe." Curiosity is a basis for enjoying learning and wanting to learn throughout one's life. It leads to investigation, creative reflection, and new understandings.	Grade K-2 students: • Seek out information or asks questions on topics of interest or experiences that are new to them. • Ask questions that show a desire for bigger understanding – Why? How come? What if? • Explore materials and objects in an imaginative way. • Share their discoveries with others through conversation or artifacts.	Grade 3-8 students: • Seek out information on topics of interest to them by reading, researching, experimenting. • Ask clarifying and probing questions about content. • Spend extra time and effort "digging for answers." • Play with and explore tools and materials to understand how they work, and what they can and cannot do. • Share their discoveries and passions with others; describe what they have found out.	Grade 6-8 students: • Notice phenomena, wonder about them and ponder them over time. • Ask questions that can be investigated. • Generate many ideas. • Are willing to explore open-ended questions with no clear right answers.

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Approach tasks with flexibility and inventiveness	Flexible thinkers are able to take a variety of approaches to thinking about a problem, and are able to view a problem or topic from different directions or perspectives. They are able to change their minds when presented with additional data or new information. Flexible thinkers can see new uses for objects, and are able to combine ideas together in new ways. Flexible thinking is needed for inventing and improving new products and processes.	Grade K-2 students: • Try out different approaches to solving a problem; they can show how problems can be approached in different ways. • Use suggestions and ideas from others to change and improve their work. • Suggest different uses for ordinary objects, or combine objects to make something new. • Improvise to solve a problem.	Grade 3-5 students: • Imagine and suggest how things could be changed – made bigger, smaller, backwards, re-purposed, etc., or how things look from different perspectives. • Talk or show how a change might impact an outcome. (Ex.: If I change this, this would happen.) • Revise their viewpoint or idea based on new information or feedback; will go back and rework something to reflect the newer understanding. • Combine multiple ideas when developing a product or project. • Use ordinary objects in surprising ways, as new components or tools.	Grade 6-8 students: • Create relationships between ideas *in order* to better understand them.
Elaborate on ideas	Elaboration is adding to an idea to make it more interesting or complete. You build upon an existing piece of work, add to it and make it your own. Elaboration allows one to tailor work to suit an audience, make a point, develop the point, or produce a desired effect. By making choices through the process of elaboration, we share our perspective and invite others to notice them and react.	Grade K-2 students: • Add imaginative details to a story or picture. • Make up an ending to a story stem. • Add to an existing object, making it personal and unique. • In collaboration with a partner, can work with a material or set of objects to develop an elaborated idea or project. (Ex: village made of blocks, dramatic play, set of characters, etc.)	Grade 3-5 students: • Take an open-ended prompt and develop an idea. • Build a more complete picture for the audience by including more information and detail. • Add details and information to make something unique and original. • In a group, build on and add to each others' ideas when developing a project.	Grade 6-8 students: • Use feedback to elaborate on an idea and make it more complete.

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RUBRIC: Critical Thinking

Skill	Why is it important?	What might it look like in KINDERGARTEN – GR2?	What might it look like in GR 3-5?	What might it look like in GR 6-8?
Connect new information to prior knowledge and experience	By thinking about one's prior experience, you can connect your experience to a new situation, and recognize what can be learned from what you already know. It allows one to see what you don't know and develop a plan to get information.	Grade K-2 students: • When prompted or independently, can identify past experiences or learning that is similar to a new situation. • Remember and share relevant prior learning experiences that provide information that might be helpful now (Have I seen a problem like this before?) • Demonstrate this through conversation, illustration, or answering questions.	Grade 3-8 students: • Identify and share relevant experiences. • Apply content, strategies or learning from one discipline to a problem or concept in another. Ask questions about the connections they see. • Acknowledge the connections that others make. • Begin to make analogies to describe the connection between two or more experiences.	
Consider whether information is reasonable, reliable, and relevant	Given the amount of information available, one must be able to determine which sources/information are reasonable and reliable, and most relevant for one's work.	Grade K-2 students: • Talk about the differences between what is real and what is imaginary, or not real. • Question information that seems absurd or fantastic. • Know where to look up information to check out whether something is reasonable.	Grade 3-5 students: • Explain or give examples of information that is reliable and useful, and information that is not. • Question information that does not seem reasonable or useful. • Seek to verify the accuracy of information using reliable sources.	Grade 6-8 students: • Gather evidence to support a claim. • Evaluate evidence and claims with healthy skepticism. • Consider whether evidence is sufficient to support a claim.
Look for differences and similarities (K-5)	Finding similarities and differences, or comparing and contrasting, is the basis for understanding relationships and classification. It allows one to organize and make sense of our environment. It helps one to understand the nature of a group. Finding	Grade K-2 students: • Identify attributes/properties of things, what it is, and what its opposite might be. • Say how things are alike and different. • Sort and re-sort by multiple attributes, and name categories. • Show how things can be alike in	Grade 3-5 students: • Compare and contrast events, ideas, and perspectives. • Explain or show how things are alike and different, and how the design of something is suited to its purpose. • Identify significant attributes of things that qualify them to be	

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	similarities and differences is the first step in being able to make analogies and metaphors.	some ways and different in other ways. • Draw similarities and differences in text.	classified as part of a particular group.	
Identify patterns, trends and discrepancies (6-8)	Identifying patterns, trends, and discrepancies allows you to make sense of your surroundings and experiences.			Grade 6-8 students: • Infer by making claims based on evidence. • Analyze a situation by thinking about the parts and the whole and how they fit together as a system. • Synthesize information into a new coherent whole. • Identify significant patterns and trends in information.

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RUBRIC: Reflective

Skill	Why is it important?	What might it look like in KINDERGARTEN – GR2?	What might it look like in GR 3-5?	What might it look like in GR 6-8?
Understands that improvement comes with effort; Believe all people can improve with effort	*In a growth mindset, people believe that their most basic abilities can be developed through dedication and hard work – brains and talent are just the starting point. This view creates a love of learning and a resilience that is essential for great accomplishment.* (Source: mindset.online.com) Students with a growth mindset know that they can improve. They recognize that everyone starts at different places, and that hard work and effort are required to learn new things. This motivates both teachers and students to try new things.	Grade K-2 students: • Talk about what they do or don't know. • Articulate the belief that if a person doesn't have a skill, they can still learn and succeed. • Are willing to try things (even things that are hard for them) knowing that it is how they can get better at it.	Grade 3-5 students: • Talk about what they are good at, and things that they need to work harder on. • Explain how making a mistake is part of how you learn and how one can get better. • Push themselves to do more, even when they feel they are already good at something, acknowledging there is always more to learn and challenging themselves to become even better. • Encourage others to try new things. • Identify what they don't understand and/or what they need to know. • Look for examples of how similar problems have been solved; will try out the suggestions of others.	Grade 6-8 students: • Push their thinking by accepting and seeking challenges. • Are willing to make mistakes and analyze mistakes to help improve. • Recognize what their personal strengths and challenges are.
Reflect on one's work and behavior	The ability to step back and review one's thinking and behavior helps a learner to recognize how decisions made along the way led to the outcomes. As learners become self-aware, they become more efficient and able to learn from their experiences.	Grade K-2 students: • Explain or show how one action impacts other actions. • Talk about what helped and what was not helpful when reviewing the steps in a task. • Ask questions of classmates about what they did and why. • Explain how they learned from past experiences.	Grade 3-8 students: • Articulate the impact of a decision made during the problem solving process. • Retrace their steps and figure out when a problem started. • Talk about what went well and what they might do differently next time. • Compare how they worked through a task with how others did, asking questions in order to learn about their process. • Monitor understanding and step back to assess how well a plan or strategy is working. • Realize when a plan is not working and they need outside help.	

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RUBRIC: Responsible Community Member

Skill	Why is it important?	What might it look like in KINDERGARTEN – GR2?	What might it look like in GR 3-5?	What might it look like in GR 6-8?
Treat fellow students with kindness (Be kind)	Being kind enables one to better understand the perspectives and needs of others, thus nurturing empathy. When one is kind to others, an atmosphere of trust is fostered which promotes openness and collaboration.	Grade K-2 students: • Consider that individuals have different feelings. • Help out when asked. • Adapt behavior based on feedback from peers.	Grade 3-5 students: • Acknowledge that individuals have different emotional responses to the same words. • Assist without being asked.	Grade 6-8 students: • Are willing to work with a variety of people. • Help community members without being asked.
Consider how a situation can be fair or unfair (Be fair)	Fairness results in people receiving what they are due and deserve. Being fair, that is, treating others equitably and justly, helps create stronger reciprocal relationships and a more caring community.	Grade K-2 students: • Share materials and space. • Take turns. • Listen to the other side of a story.	Grade 3-5 students: • Allocate resources fairly. • Identify an unfair situation, and question it.	Grade 6-8 students: • Understand "fairness" means people's needs are met in different ways. • Devise and advocate solutions to problems involving unfairness and injustices.

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Take responsibility for his/her role in creating a successful group (Be responsible)	Students who are responsible have an awareness of their impact on the larger community of learners. They follow established agreements/class rules, demonstrate appropriate behavior without prompting and place value in the importance of their role in the larger group's overall performance.	Grade K-2 students: • Explain classroom rules, and why they are needed. • Behave according to the class rules. • Encourage classmates to participate, and reminds them of classroom norms. • Come ready to work with the required materials.	Grade 3-8 students: • Are in the habit of following classroom rules; model for other students. • Approach a peer and respectfully remind them of the classroom rules/norms. • Come prepared to work (pre-work done, necessary materials). • Recognize when they have made a mistake or a poor choice and work to make amends.	
Respect the rights and feelings of others (Be respectful)	Respectful students are aware of the social and cross cultural differences within their peers. They accept and respect these human differences, working with consideration and cooperation, kindness, empathy, and tolerance so that all students feel safe when learning together.	Grade K-2 students: • Describe how people may feel differently about a situation. • Talk about how families differ, have different important holidays and traditions. • Are friendly with classmates who are different from them and have different ideas and traditions. • Consider the feelings of others before speaking.	Grade 3-5 students: • Listen and tolerate varying points of view, including those different from their own. • Articulate that there are different ways of doing things, not better or worse. • Choose words intentionally (and carefully) when addressing others; are aware of the perspective of their audience.	Grade 6-8 students: • Accept that people have many points of view and recognize the value in having a number of points of view present in a conversation. • Seek common ground with community members.
Look after his/her safety and that of others (Be safe)	A safe learning environment is essential for students of all ages. Without it they are unable to focus on learning the skills needed for a successful education and future. According to Maslow's hierarchy of needs, one's physiological and safety needs must be addressed in order for a person to be able to self-actualize.	Grade K-2 students: • Follow safety rules. • Respect shared spaces and personal space. • Practice self-control, and are able to verbally express disappointment, anger or frustration.	Grade 3-5 students: • Follow safety rules without needing supervision. • Act appropriately in shared spaces. • Practice self-control. • Communicates concern about unsafe situations (for themselves or others).	Grade 6-8 students: • Advocate and seek help from others when they place themselves *or witness others* in unsafe situations.

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Accept and provide honest input and feedback (Be honest)	Accepting and providing honest feedback is a way to observe someone's understanding of what it means to "be honest." Honesty provides the foundation for a vibrant, collaborative academic environment and prepares students for responsible citizenship.	Grade K-2 students: • Find appropriate things to say about other students' work that are helpful. • Respectfully give straightforward answers to questions.	Grade 3-8 students: • Accept suggestions (constructive criticism) about their work. • Provide critique/ideas to the work of others based on standards.	Grade 6-8 students: • Do their own work, which represent their own thoughts and efforts. • Do not cheat or plagiarize.

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Development of the Rubric

The K-5 rubric was developed over several years by a Teaching and Learning work group, comprised of the coordinators for K-8 Science, K-8 Social Studies, K-12 Art, and Enrichment and Challenge Support, and the Director of Program Review. The section for Grades 6-8 was developed by a work group of middle school educators from Pierce School, who have been working in this area for a number of years. Along the way, many groups of educators provided input and gave feedback. This current document is the result of many people, thinking together, applying 21st Century thinking skills. It is considered a work in progress, and comment and suggestions to improve the rubric are welcomed.

The work groups synthesized information from many sources, including the various lists of skills and habits currently in use in Brookline and other places, in order to determine a framework of categories of skills/habits, and then to identify fundamental skills within each category so as to keep the list manageable yet comprehensive.

An important source for this work was the *Partnership for Twenty-first Century Skills,* a national organization that advocates for 21st century readiness for every student (www.p21.org). Other sources include the recommendations from the *Massachusetts Task Force on 21st Century Skills,* the *ISTE.nets (International Society for Technology in Education Performance Indicators for Students),* the *Massachusetts Library Association skills framework, the Center for Media Literacy Process Skills framework,* and the work on *Habits of Mind,* by Art Costa and colleagues. For those who want to learn more about thinking skills and habits of mind in the 21st century context, a listing of resources is provided:

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September 2014

Appendix H:

Devotion Technology Snapshot

Classroom Models:

Grade	Classroom Model	Notes
K	1 iMac Desktop, 1 Faculty Laptop	
1	1 iMac Desktop, 1 Faculty Laptop, 4 iPads	
2	1 iMac Desktop, 1 Faculty Laptop,	3 out of 5 classrooms have SmartBoards
3	1 iMac Desktop, 1 Faculty Laptop, SmartBoards	3 out of 4 classrooms will have SmartBoards (‘14-’15)
4	1 iMac Desktop, 1 Faculty Laptop, SmartBoard	3 out of 4 classrooms have Document Cameras
5	1 iMac Desktop, 4 iPads, 1 Faculty Laptop, SmartBoard	
6	1 iMac Desktop, 1 Faculty Laptop, SmartBoard/Projector	
7	1 iMac Desktop, 1 Faculty Laptop, SmartBoard/Projector	
8	1 iMac Desktop, 1 Faculty Laptop, SmartBoard	

Learning Centers

LC	Equipment Model	Notes
K-2	1 iMac Desktop, 1 Faculty MBPro Laptop	
3-4	1 iMac Desktop, 1 Faculty MBPro Laptop	
5-6	2 iMac Desktops, 1 Faculty MBPro Laptop	
7-8	2 iMac Desktops, 1 Faculty MBPro Laptop	
K-3 CLC	1 iMac Desktop, 1 Faculty MBPro Laptop	
4-5 CLC	1 iMac Desktop, 1 Faculty MBPro Laptop	

6-8 CLC	2 iMac Desktops, 1 Faculty MBPro Laptop, Projector	
K-3 TLC	1 iMac Desktop, 1 Faculty MBPro Laptop	
4-6 TLC	1 iMac Desktop, 1 Faculty MBPro Laptop	
7-8 TLC	3 iMac Desktops	

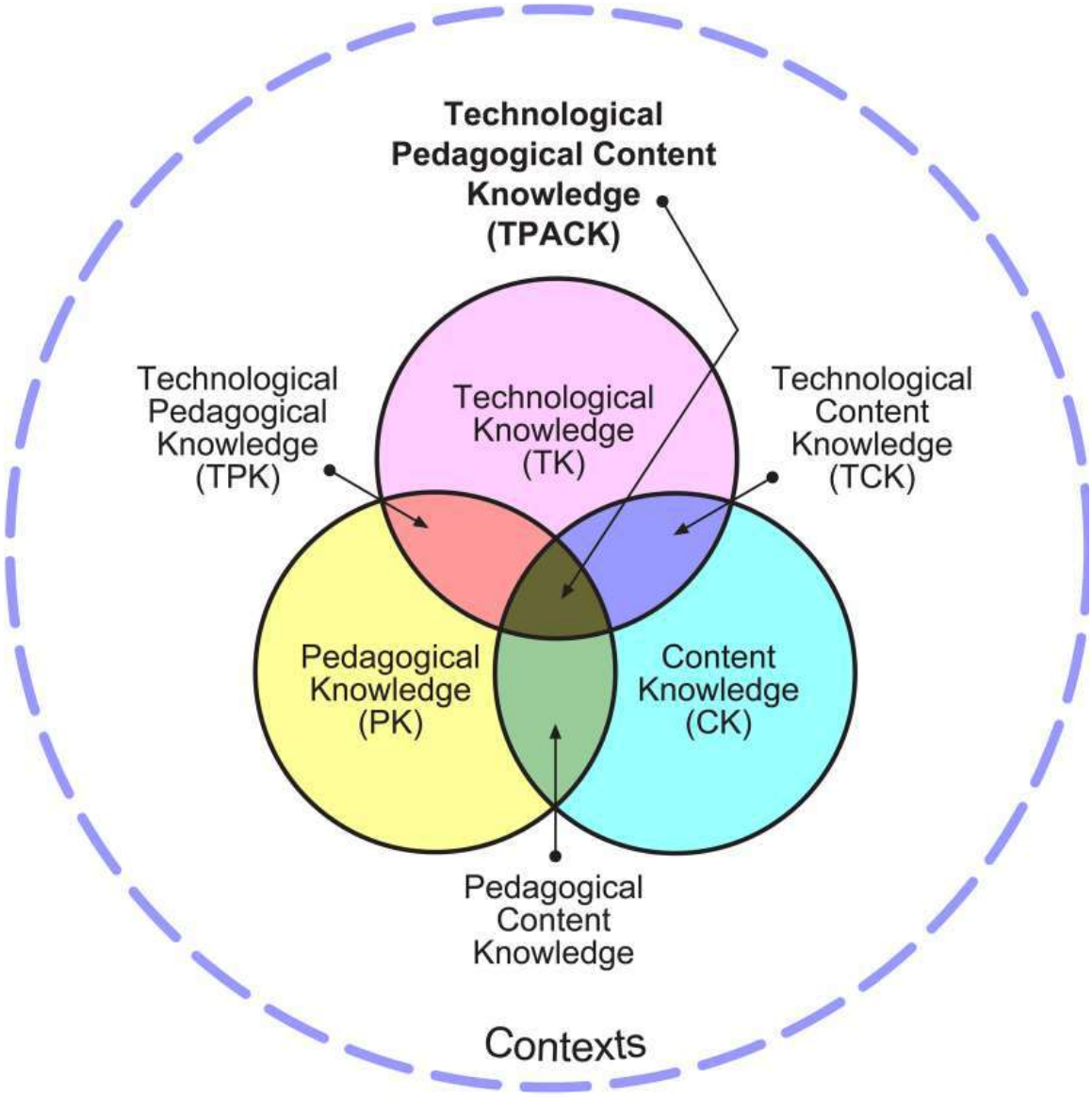
Labs and Mobile Carts

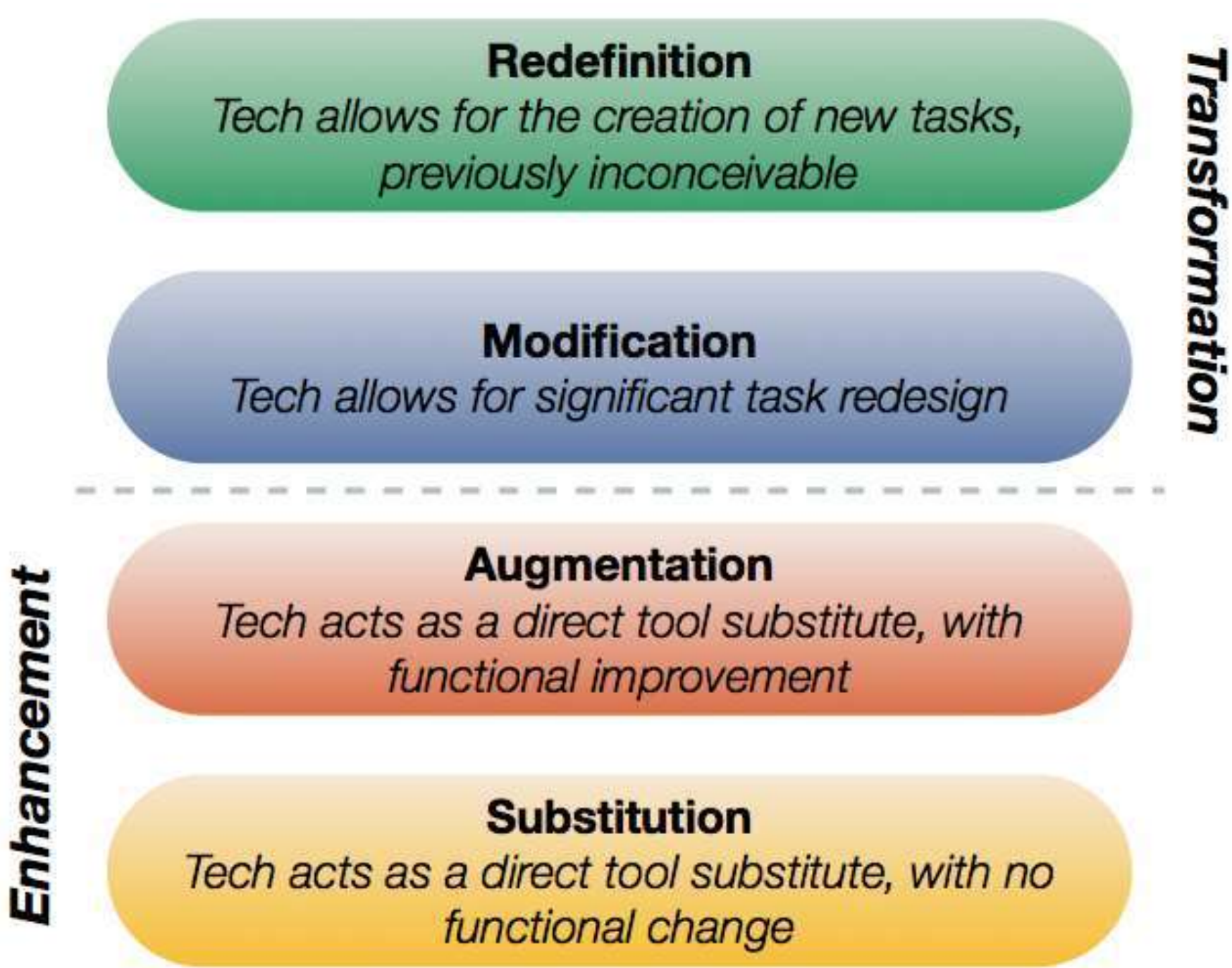
LC	#	Equipment Model	Location	Signup	Notes
Lab	25	iMacs	Lab	Y	
MiniLab1	9	iMacs	5-6 Open Area	N	
MiniLab2	9	iMacs	7-8 Open Area	N	
Library	11	iMacs	Library	N	
ChromeCart	25	Chromebooks	Library	N	
Cart1	14	MB Airs	Lab	Y	
Cart2	14	MB Airs	Lab	Y	
Cart3	24	MB Airs	Lab	Y	
Cart4	8	MB	RM 242	N	
Cart5	26	MB Airs	Lab	Y	
Cart6	26	MB Airs	Lab	Y	

Appendix I:

TPACK and SAMR

TPACK Model
Technological Pedagogical Content Knowledge
http://tpack.org




Redefinition
Tech allows for the creation of new tasks, previously inconceivable
Modification
Tech allows for significant task redesign
Augmentation
Tech acts as a direct tool substitute, with functional improvement
Substitution
Tech acts as a direct tool substitute, with no functional change
Transformation
Enhancement

Appendix J:

Rigor and Relevance Framework

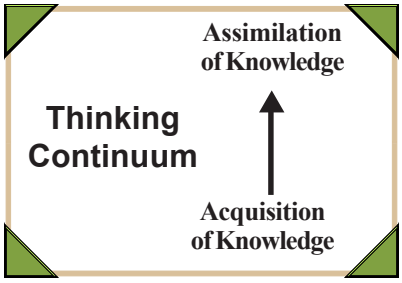
and

Rigor and Relevance Framework + SAMR Morel + P21.org

Rigor/Relevance Framework™

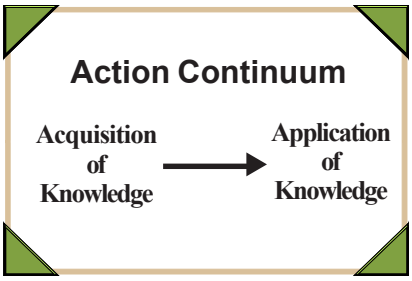
The Rigor/Relevance Framework is a tool developed by staff of the International Center for Leadership in Education to examine curriculum, instruction, and assessment. The Rigor/Relevance Framework is based on two dimensions of higher standards and student achievement.

First, there is a continuum of knowledge that describes the increasingly complex ways in which we think. The Knowledge Taxonomy is based on the six levels of Bloom's Taxonomy:
(1) awareness
(2) comprehension
(3) application
(4) analysis
(5) synthesis
(6) evaluation.



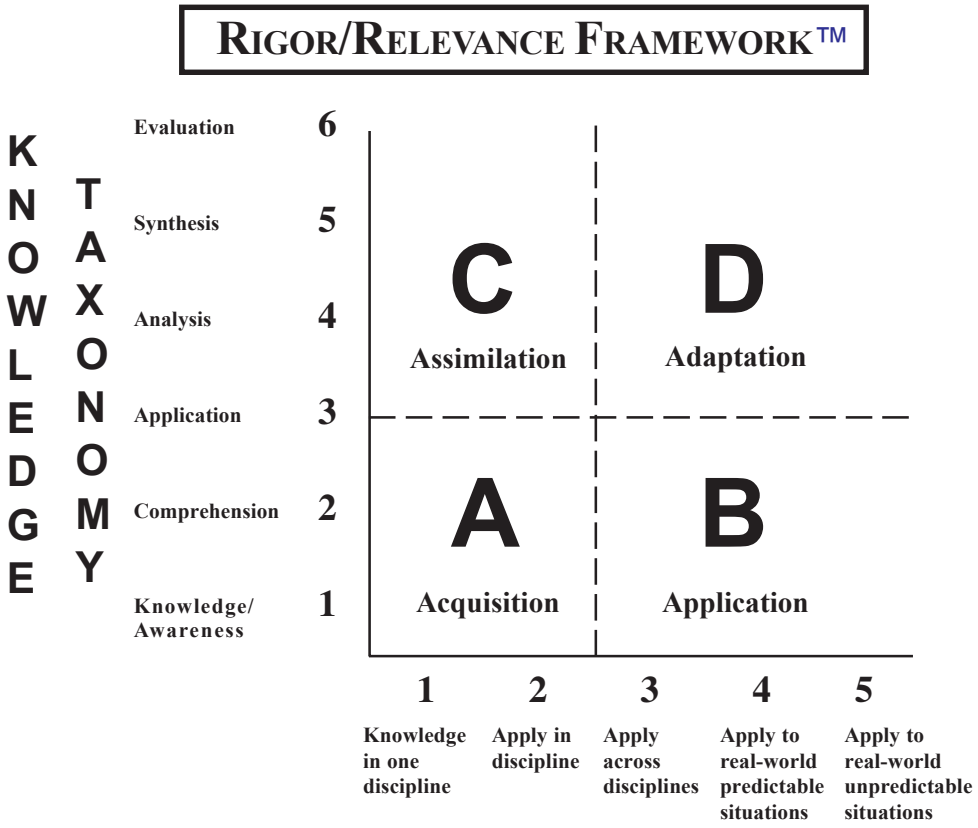
The low end of this continuum involves acquiring knowledge and being able to recall or locate that knowledge in a simple manner. Just as a computer completes a word search in a word processing program, a competent person at this level can scan through thousands of bits of information in the brain to locate that desired knowledge.

The high end of the Knowledge Taxonomy labels more complex ways in which individuals use knowledge. At this level, knowledge is fully integrated into one's mind, and individuals can do much more than locate information. They can take several pieces of knowledge and combine them in both logical and creative ways. Assimilation of knowledge is a good way to describe this high level of the thinking continuum. Assimilation is often referred to as a higher-order thinking skill: at this level, the student can solve multistep problems and create unique work and solutions.



The second continuum, created by Dr. Willard R. Daggett, is known as the Application Model. The five levels of this action continuum are:
(1) knowledge in one discipline
(2) apply in discipline
(3) apply across disciplines
(4) apply to real-world predictable situations
(5) apply to real-world unpredictable situations

The Application Model describes putting knowledge to use. While the low end is knowledge acquired for its own sake, the high end signifies action — use of that knowledge to solve complex real-world problems and to create projects, designs, and other works for use in real-world situations.



The Rigor/Relevance Framework has four quadrants.

Quadrant A represents simple recall and basic understanding of knowledge for its own sake. Quadrant C represents more complex thinking but still knowledge for its own sake. Examples of quadrant A knowledge are knowing that the world is round and that Shakespeare wrote *Hamlet*.

Quadrant C embraces higher levels of knowledge, such as knowing how the U.S. political system works and analyzing the benefits and challenges of the cultural diversity of this nation versus other nations.

Quadrants B and D represent action or high degrees of application. Quadrant B would include knowing how to use math skills to make purchases and count change. The ability to access information in wide-area network systems and the ability to gather knowledge from a variety of sources to solve a complex problem in the workplace are types of quadrant D knowledge.

Each of these four quadrants can also be labeled with a term that characterizes the learning or student performance.

Quadrant A — Acquisition

Students gather and store bits of knowledge and information. Students are primarily expected to remember or understand this acquired knowledge.

Quadrant B — Application

Students use acquired knowledge to solve problems, design solutions, and complete work. The highest level of application is to apply appropriate knowledge to new and unpredictable situations.

Quadrant C — Assimilation

Students extend and refine their acquired knowledge to be able to use that knowledge automatically and routinely to analyze and solve problems and create unique solutions.

Quadrant D — Adaptation

Students have the competence to think in complex ways and also apply knowledge and skills they have acquired. Even when confronted with perplexing unknowns, students are able to use extensive knowledge and skill to create solutions and take action that further develops their skills and knowledge.

A Fresh Approach

The Rigor/Relevance Framework is a fresh approach to looking at curriculum standards and assessment. It is based on traditional elements of education yet encourages movement to application of knowledge instead of maintaining an exclusive focus on acquisition of knowledge.

The Framework is easy to understand. With its simple, straightforward structure, it can serve as a bridge between school and the community. It offers a common language with which to express the notion of a more rigorous and relevant curriculum and encompasses much of what parents, business leaders, and community members want students to learn. The Framework is versatile; it can be used in the development of instruction and assessment. Likewise, teachers can use it to measure their progress in adding rigor and relevance to instruction and to select appropriate instructional strategies to meet learner needs and higher achievement goals.

Here is an example involving technical reading and writing.

Quadrant A
Recall definitions of various technical terms.

Quadrant B
Follow written directions to install new software on a computer.

Quadrant C
Compare and contrast several technical documents to evaluate purpose, audience, and clarity.

Quadrant D
Write procedures for installing and troubleshooting new software.

Defining Rigor

Rigor refers to academic rigor — learning in which students demonstrate a thorough, in-depth mastery of challenging tasks to develop cognitive skills through reflective thought, analysis, problem-solving, evaluation, or creativity. Rigorous learning can occur at any school grade and in any subject. The Knowledge Taxonomy describes levels of rigor.

A versatile way to define the level of rigor of curriculum objectives, instructional activities, or assessments is the Knowledge Taxonomy Verb List (see page 6). The Verb List can be used either to create a desired level of expected student performance or to evaluate the level of existing curriculum, instruction or assessment.

An example of student performance at various levels follows. Notice each statement starts with a verb that comes from the appropriate section of the Knowledge Taxonomy Verb List. The expected achievement level for teaching about nutrition can vary depending on the purpose of the instruction. If a teacher only wants students to acquire basic nutritional knowledge, a student performance set at level one of two is adequate. If the instruction is intended to have a more significant impact on nutritional habits then some of the objectives need to be similar to levels four through six.

Basic Nutrition

Level	Performance
Level 1 – Knowledge	Label foods by nutritional groups
Level 2 – Comprehension	Explain nutritional value of individual foods
Level 3 – Application	Make use of nutrition guidelines in planning meals
Level 4 – Analysis	Examine success in achieving nutrition goals
Level 5 – Synthesis	Develop personal nutrition goals
Level 6 – Evaluation	Appraise results of personal eating habits over time

Note that each of the levels requires students to think differently. Levels four through six require more complex thinking than levels one through three.

When creating lesson plans and student objectives, selecting the proper word from the Knowledge Taxonomy Verb List can help to describe the appropriate performance. Simply start with a verb from the desired level and finish the statement with a specific description of that skill or knowledge area.

The Verb List can also be used to evaluate existing lesson plans, assessments, and instructional experiences. Looking for verbs and identifying their level will give a good indication of the level of student performance in that instruction.

Defining Relevance

Relevance refers to learning in which students apply core knowledge, concepts, or skills to solve real-world problems. Relevant learning is interdisciplinary and contextual. Student work can range from routine to complex at any school grade and in any subject. Relevant learning is created, for example, through authentic problems or tasks, simulation, service learning, connecting concepts to current issues, and teaching others. The Application Model describes the levels of relevance.

Identifying the level of relevance of curriculum objectives and instructional activities is a little more difficult than determining the Knowledge Taxonomy level because there is no verb list. However, just as the Knowledge Taxonomy categorizes increasing levels of thinking, the Application Model described increasingly complex applications of knowledge. Any student performance can be expressed as one of five levels of the Application Model. The Application Model Decision Tree can assist in setting the desired level of expected student performance in application (see pages 7-8) by asking the questions: Is it application? Is it real world? Is it unpredictable?

The Basic Nutrition example below is similar to the one in the Defining Rigor section in that it uses nutrition to describe student performance at various levels. Each level requires students to apply knowledge differently.

Similarly, the expected achievement level for teaching about nutrition can vary depending on the purpose of the instruction. If a teacher wants students only to acquire basic nutritional knowledge, a student performance set at level one is adequate. If the instruction is intended to have a significant impact on nutritional habits, then some of the objectives need to be at levels four and five.

Use of the Application Model Decision Tree can help to describe desired performance. Start by writing draft statements of student objectives and then use the Decision Tree to reflect on and revise these statements. The Decision Tree focuses on the three key characteristics that distinguish levels of the Application Model: application, real world, and unpredictability. The second page of the Decision Tree offers additional criteria to determine whether an objective meets the test of application, real world, and unpredictability.

The Application Model Decision Tree can also be used to evaluate existing lesson plans, assessments, and instructional experiences. Answer the questions to identify at which level of student performance that instruction or assessment is.

Basic Nutrition

Level	Performance
Level 1 – Knowledge in One Discipline	Label foods by nutritional groups
Level 2 – Application in One Discipline	Rank foods by nutritional value
Level 3 – Interdisciplinary Application	Make cost comparisons of different foods considering nutritional value
Level 4 – Real-world Predictable Situations	Develop a nutritional plan for a person with a health problem affected by food intake
Level 5 – Real-world Unpredictable Situations	Devise a sound nutritional plan for a group of 3-year-olds who are picky eaters

Knowledge Taxonomy Verb List

1 Knowledge

arrange
check
choose
find
group
identify
label
list
locate
match
name
point to
recall
recite
repeat
say
select
write

2 Comprehension

advance
calculate
change
contemplate
convert
define
explain
extrapolate
infer
interpret
outline
project
propose
reword
submit
transform
translate
vary

3 Application

adopt
capitalize on
consume
devote
employ
exercise
handle
maintain
make use of
manipulate
mobilize
operate
put to use
relate
solve
start
take up
utilize

4 Analysis

assay
audit
break down
canvass
check out
deduce
dissect
divide
examine
include
inspect
look at
scrutinize
sift
study
survey
test for
uncover

5 Synthesis

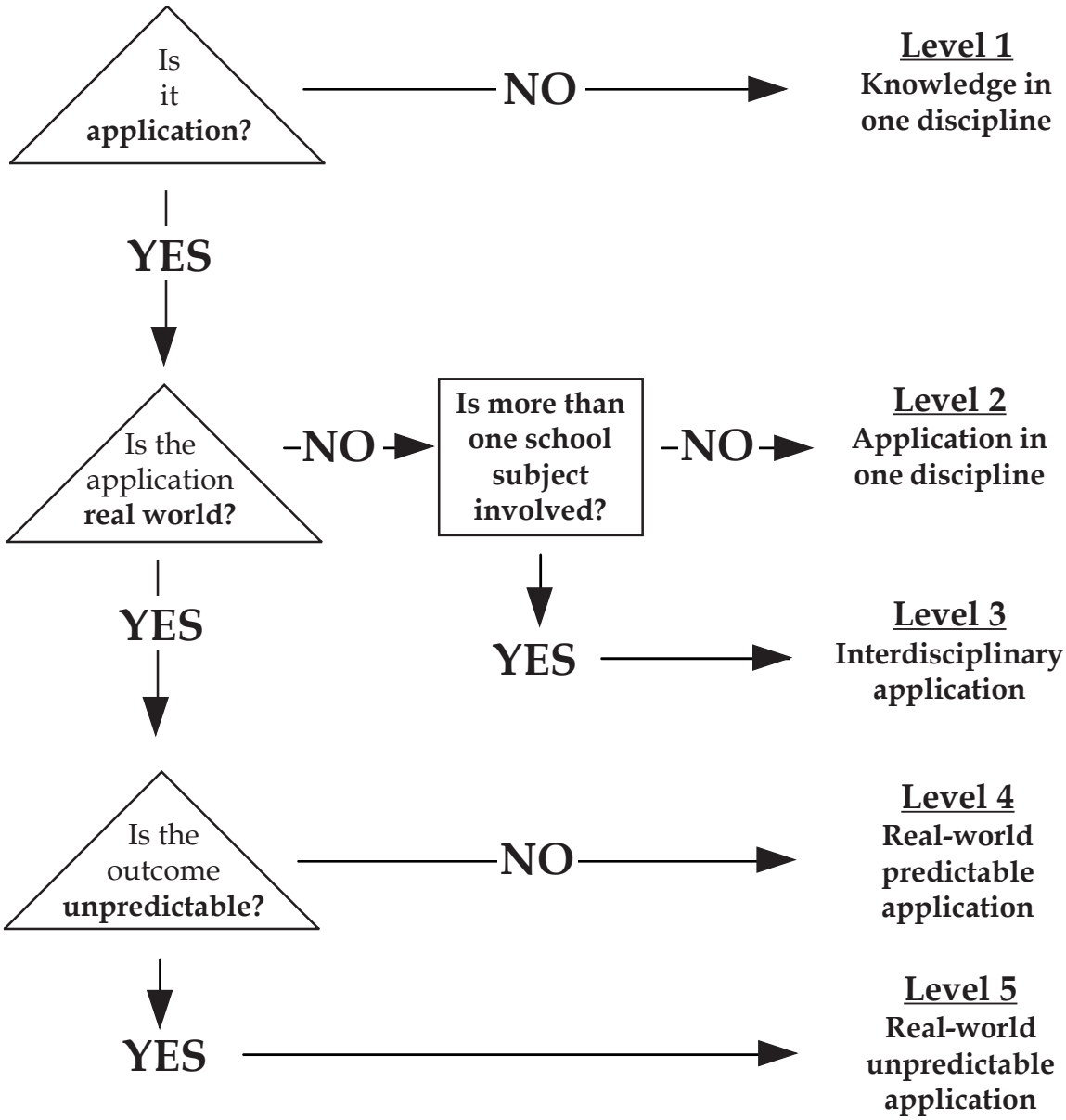
blend
build
cause
combine
compile
compose
conceive
construct
create
develop
evolve
form
generate
make up
originate
produce
reorder
structure

6 Evaluation

accept
appraise
arbitrate
assess
award
classify
criticize
decide
determine
grade
judge
prioritize
rank
rate
reject
rule on
settle
weigh

Application Model Decision Tree

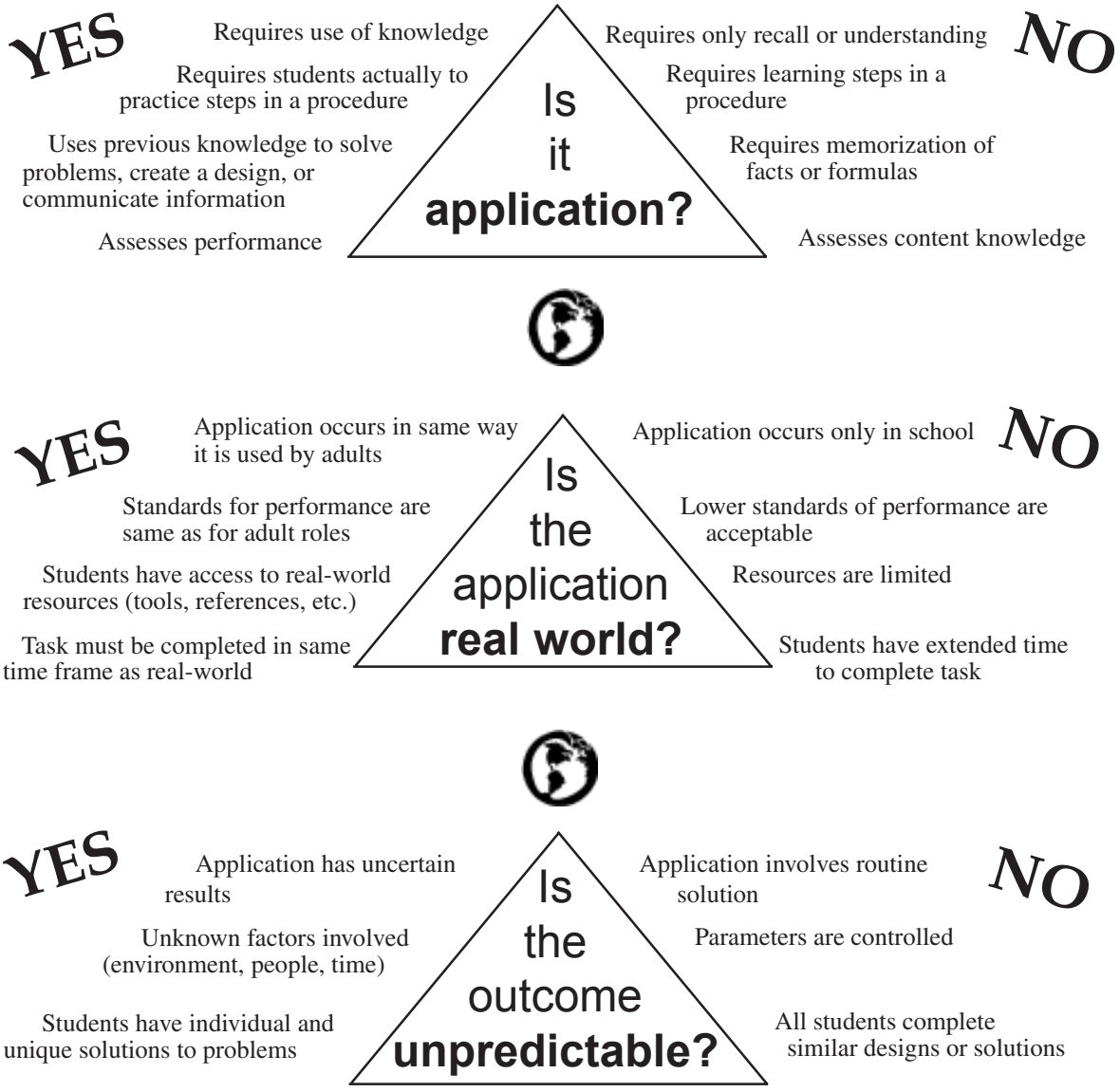
Directions: Select a task, application, or activity and then answer the following questions. See next page for clarification of the questions.



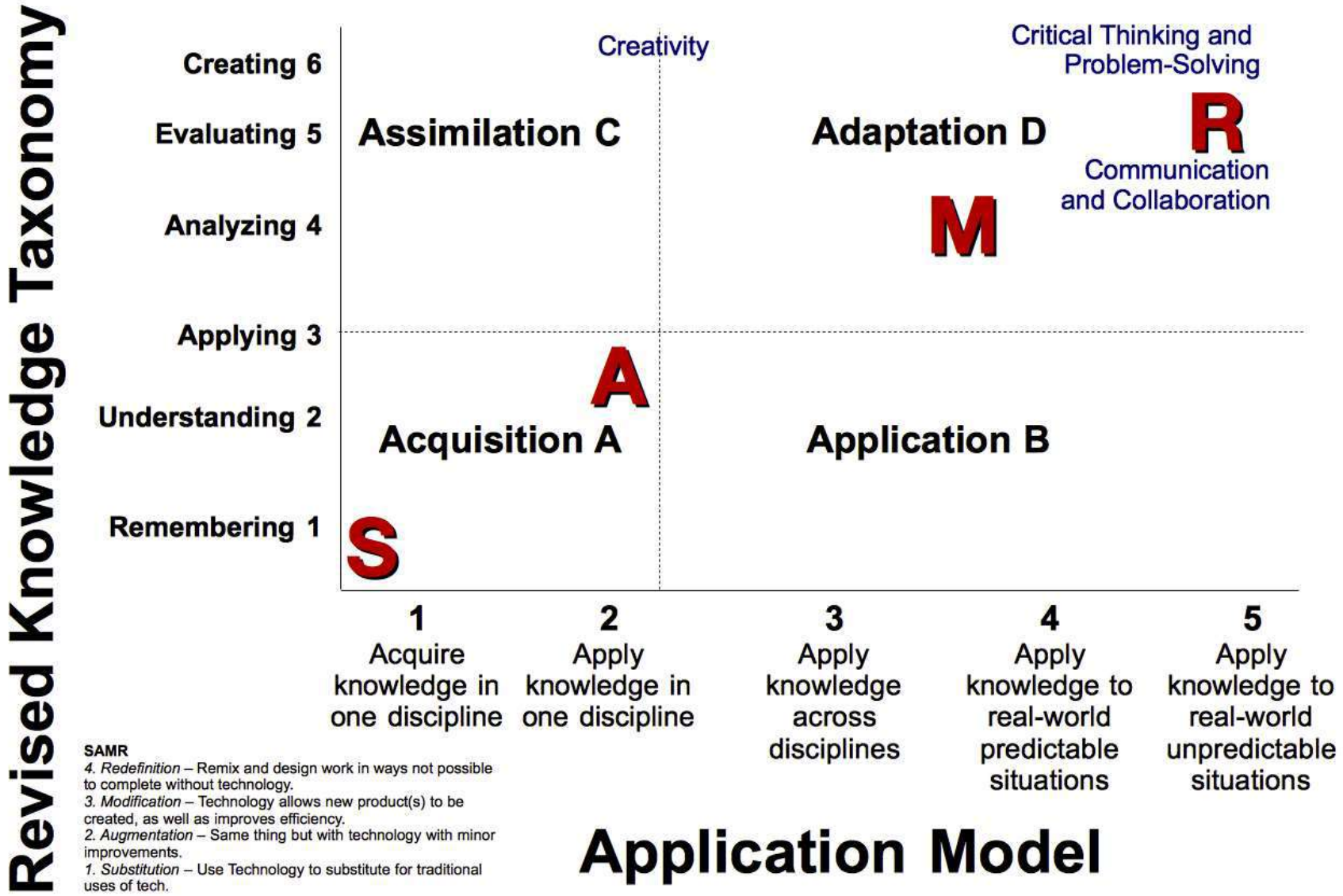
continued on page 8

Application Model Decision Tree

Directions: Use the following statements to clarify where a task, application, or assessment belongs on the Application Model.



Rigor/Relevance Framework + SAMR Model + P21.org



SAMR

4. Redefinition – Remix and design work in ways not possible to complete without technology.

3. Modification – Technology allows new product(s) to be created, as well as improves efficiency.

2. Augmentation – Same thing but with technology with minor improvements.

1. Substitution – Use Technology to substitute for traditional uses of tech.