

Curriculum and Instruction

At the center of Q2L is an approach to pedagogy that connects game design and systems thinking across a standards-based curriculum. This pedagogy includes a reforming of traditional disciplines into Integrated Domains, informed by a core set of learning practices.

Pedagogy

Q2L is a dynamic learning system composed of a set of inter-related parts, from key practices and learning strategies to core resources, personnel, and space. At the heart of the system is a curriculum that interweaves state standards with ways of knowing and doing. The curriculum is delivered and supported by an innovative instructional model that fosters student problem solving, interdisciplinary learning, collaborative student work, reflective practices, and high levels of student engagement and ownership in the learning process. Students are provided with multiple learning contexts for engaging in gamelike learning, contexts in which students receive immediate feedback on

progress, have access to tools for planning and reflection, and are given opportunities for mastery of specialist language and practices.

Here we present a set of key values and principles guiding Q2L's curriculum, instruction, and assessment plan.

Core Values

Pedagogy

1. A sustainable world requires that twenty-first-century learners have the capacity to design innovations.
2. The use of new media and social media technologies, including games, not only engages students but holds the potential for students to make changes to their own lives and communities.
3. Systemic reasoning, peer learning, creativity, and civic participation are vital twenty-first-century competencies.
4. Student identity as learner, mentor, and citizen should be recognized and supported as constantly evolving.
5. Provocative, essential questions guide student learning and provide students with the opportunity to ask more precise questions and thereby discover answers for themselves.
6. Design, inquiry, argumentation, and analysis play a central role in students' endeavors in developmentally appropriate ways.
7. Students respond to a need to know and are motivated to ask hard questions, to look for complex answers, and to take on the responsibility of imagining solutions with others.
8. Missions and Quests are tools for building bridges between bodies of knowledge and what a child learns in school, on the one hand, and his or her life outside the classroom, on the other.

9. The approach to learning and assessment is based on social-cultural principles (versus behaviorist or cognitivist principles) that see learning as a result of the interactions among people (novices and experts), technologies, knowledge, behaviors, beliefs, symbols, rules, culture, and space.

10. Spaces for play and experimentation are critical to the cultivation of creativity and innovation.

11. Students are given time, space, and purpose to tinker with systems.

12. Iteration and prototyping: students work through multiple versions of any idea or solution, integrating ongoing feedback into the learning process and developing debriefings that identify strengths and weaknesses of both process and solution.

13. Peer education is an important part of the curriculum; students share their own interests and expertise with each other.

14. Students act as sociotechnical engineers in the creation of playful systems—games, models, simulations, and stories. Through designing play, students learn to think analytically and holistically, to experiment and test out theories, and to consider other people as part of the systems they create and inhabit. Game design serves as the pedagogy underlying this work.

15. Writing occurs across the curriculum, with students engaging in reading and writing daily in a range of forms and contexts—some analytical, some expressive, some descriptive or creative.

Learning

1. Real learning is participatory and experiential. Students learn by proposing, testing, playing with, and validating theories about the world.

2. Learning takes place across a range of learning communities where student expertise and interests are valued.
3. School is a context to activate and create coherence across learning communities.
4. Learning begins with identification to the social norms and conventions of a domain. Learning is inert without this identification.
5. Students should have a variety of meaningful membership experiences in “pro-amateur” communities.
6. Students should be provided with multiple learning contexts for engaging in gamelike learning—contexts in which they receive immediate feedback on progress, have access to tools for planning and reflection, and are given opportunities for mastery of specialist language and practices.
7. Mathematical processes, methods, and strategies are integrated throughout the curriculum, supported through rigorous work with manipulatives, models, and simulations.

Assessment

1. Assessment is situated in learning—located in the discourse, actions, and transactions of individuals, peers, and groups (Salvia, J., and J. Ysseldyke. 2007).
2. The assessment program is designed to allow learners to assess themselves eventually.
3. Assessments measure the extent to which students can innovate within a domain.
4. Understanding students' learning and the school's effectiveness is best facilitated by data.
5. Smartools are a primary form of assessment: students use data provided by Smartools they themselves create to understand and meet their own learning goals.

6. Students are accountable to themselves, to their peer community, and to the school.
7. Success is mediated by continual reflection and evaluation of the school's goals and mission.
8. Knowledge to be assessed emerges from engaged participation, reasoning, and resolution of Missions and their Quests.
9. Assessment tools support valid inferences about learning. Assessment tools must facilitate answers to the question: "What does a particular performance reveal about how students know and about how they reason with and use their knowledge?"
10. Assessment is dynamic, equitable, and inclusive, meeting student needs before, during, after, and in between learning experiences.
11. Participatory assessment requires that expectations, co-constructed and delivered criteria, and documentation be "open source" for all participants.

School Culture

1. Attention to well-being and social-emotional learning is as important as attention to academic learning.
2. Equity and social justice drive all aspects of the school.
3. School governance systems are inclusive of all stakeholder voices.
4. All members of the Q2L community hold high expectations for all students.
5. School is a practice space where the life systems that students inhabit and share with others are modeled, designed, taken apart, and reengineered as a strategy for learning.
6. Students play games and reflect on their learning within them.

7. Games are not only models for helping students think about how the world works, but also a dynamic medium through which to engage socially and to develop a deeper understanding of their place in the world.

8. All members of the Q2L community are encouraged to take risks, make meaning, and act creatively and resourcefully.

Domains

1. Each domain is concerned with helping students develop a game design and systems perspective of the world, by which we mean students learn how to see and understand the world from the perspective of the dynamic relationships between parts of a whole.

2. Domains allow students to explore diverse modes of accumulating, creating, understanding, and using knowledge.

3. Domains foster the targeted assimilation and synthesis of data, theories, and hypotheses of traditional academic disciplines and develop habits of mind through which a student's thoughts and actions demonstrate progressive understanding and personal growth.

4. Domains are defined by a set of socially acceptable norms, values, knowledge, and ways of validating and creating knowledge.

5. Domains are also defined by clear trajectories toward mastery, although these trajectories are often varied.

6. Domains offer opportunities for students to consider and design structured, physical models of complex problems.

Systems and Design Core Mechanics (Competencies)

The systems and design core mechanics are recursive in nature in that they are continually reviewed throughout the academic year and are applied to all domains. They include

- Distinguishing what is important and salient.
- Identifying causal relationships among things and ideas.
- Sequencing causes and effects to act and think effectively over time.
- Establishing patterns and relationships over time and space.
- Clarifying disparate bits of information and reconciling them to a larger whole.
- Resolving tensions and discrepancies within existing structures.
- Explaining knowledge in terms relative to the individual whose discourse is the reference point.
- Providing relevant examples from other knowledge bases that help to demonstrate and exemplify the efficacy of primary knowledge.
- Applying knowledge to new circumstances and situations.
- Justifying a theory or idea by offering evidence in its defense or designing and conducting an experiment to test the idea.
- Comparing and contrasting current knowledge with other knowledge of a similar kind to establish constraints.
- Synthesizing information so that the sum of knowledge is greater than its parts.
- Iterating to solve problems.

Key Learning Practices

Five key practices are emphasized in all aspects of Q2L:

1. *Systems Thinking* Video games, early research suggests, are well suited to encouraging fluency in specialist language, literacy skills, and “meta-level reflection on the skills and processes that designer-players use in building . . . systems” (Gee 2007, 15). A principal intent of Q2L is to provide students with ways of

knowing related to the design and analysis of systems, be they games or civilizations. The development of *systemic-design thinking* is a core skill that Q2L students will continually develop throughout their tenure and will help them practice

- a. Understanding feedback dynamics (i.e., reinforcing and balancing feedback loops): that microlevel changes can affect macrolevel processes.
- b. Understanding system dynamics: that multiple (i.e., dynamic) relationships exist within a system.
- c. Understanding hidden dimensions of a system: that modifications to system elements can lead to changes that are not easily recognizable within a system.
- d. Understanding the quality of relationships within a system: that a system is working or not working at optimal levels.
- e. Understanding homologies: that similar system dynamics can exist in other systems that may appear to be entirely different.

2. *Play Design* Students act as sociotechnical engineers in the creation of playful systems—games, models, simulations, and stories. Students learn about the way systems work and how they can be modified or changed. Through designing play, they learn to think analytically and holistically, to experiment and test out theories, and to consider other people as part of the systems they create and inhabit. Game design serves as the pedagogy underlying this work.

3. *Intelligent Resourcing* Students gain the ability to find and use resources on demand, with intelligence, judgment, and sophistication through immersion in challenging, collaborative

learning experiences. Peer education is an important part of the curriculum—students sharing their own interests and expertise with each other.

4. *Meaning Production* Students learn how to produce meaning—for themselves and for external audiences—within complex, multimodal contexts. Creativity, expression, and innovation underlies this learning as students practice producing meaning through the coding and decoding of linguistic, numeric, social, and cultural systems. This approach challenges traditional barriers between consumer and producer/viewer and designer, allowing students to gain the skills to act as full citizens within a networked, participatory landscape.

5. *Tinkering* Students are given time, space, and purpose to tinker with systems (games, simulations, small machines, social systems, ecologies, etc.). By making small-scale alterations in both experimental and directed ways, students reveal the system's underlying model. Breaking down systems in order to discover new ways of acting within them is a core component of this approach. Students tinker as a core method of discovery.

Key Learning Strategies

1. Creating a Need to Know

One of Q2L's learning goals is to create in students a *need to know*. This means creating learning environments that support situated inquiry and discovery so that students have rich contexts within which to integrate concepts and content. Creating a need to know encourages students to persist in solving a problem, to create theories, to test out those theories, evaluate

outcomes, ask “what if,” and try again. It creates conditions for an exchange of questions and expertise across a community of learners working on similar problems and leads to a natural engagement with learning about the issue at hand. Students learn to connect engagement and interest with the need to plan, a need to know exactly what they are trying to figure out. As a result, students learn how to ask good questions and seek out the resources (be they technological, social, or academic) that will lead them to answers.

2. Writing across the Curriculum

Rather than seeing writing as an activity related only to traditional domains of ELA and social studies, Q2L instead uses writing across the curriculum. Students engage in reading and writing daily in a range of forms and contexts, some analytical, some expressive, some descriptive or creative. Text and media-based platforms allow students to use writing to “think with,” and extra attention is paid to ensuring that students gain the reading and comprehension skills necessary for student achievement.

3. Foundations in Math

Because of the importance of numeracy and mathematical thinking, Q2L’s curriculum builds on a rigorous sequence in mathematics, which underlies work in each of the school’s six learning contexts. Mathematical processes, methods, and strategies are integrated throughout the curriculum, supported through rigorous work with manipulatives, models, and simulations.

4. Iteration and Prototyping

Curricular experiences within Q2L are based on a process of prototyping and iteration, based on a game design methodology: students work through multiple versions of any idea or solution, integrating ongoing feedback into the learning process and developing debriefings that identify strengths and weaknesses of both process and solution. In some cases, students may choose to build on other students' previous solutions or approaches, seeing themselves as contributors to a larger body of collaboratively generated knowledge. Participants in Q2L build both cultural and intellectual capital as a result. Students are encouraged to manage and reflect on their evolving identities as learners, producers, peers, researchers, and citizens.

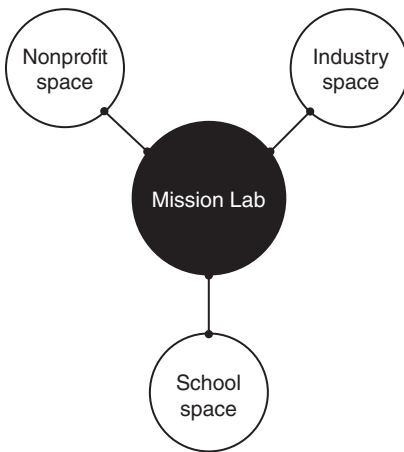
5. Special Learning Environments

Q2L students have the opportunity to work with several digitally based learning environments through the support offered by its founding partner, the Institute of Play. These environments are integrated into the overall Q2L curriculum and are used by students throughout the year in Home Base and domain classes.

SMALLab Students have a chance to work in a special learning space called SMALLab, run by the Institute of Play and Parsons. SMALLab is a mixed-reality environment that uses motion-capture cameras and top-down digital projection to create learning scenarios that students interact with around targeted content chosen by teachers. Students use wireless controllers to interact with digital objects projected on the floor. This form of

interaction with content and concepts supports a form of embodied learning in which kids learn in kinesthetic ways. Since its inception, SMALLab has been tested with kids and their teachers as they work with math, science, and ELA content. Support for SMALLab is provided through Intel Research (<http://smallab.parsons.edu>).

Mission Lab Mission Lab is Q2L's curriculum development studio located inside the school and staffed by the Institute of Play. It is a support space for teachers and contains resources that can be used by students as part of their curriculum work, including access to game designers with expertise in the design of learning environments. Mission Lab represents a new model of an institution that we feel is critical to supporting pedagogical models emerging from within MacArthur's Digital Media



and Learning initiative. This type of institution acts a bridging “node” within a broader learning network, connecting and synthesizing expertise and resources from school institutions, non-profit organizations and foundations, and industry.

Mission Lab has been built into the design of the school in such a way as to be integral to its learning model. The school has thus been freed to define itself as one node within a larger network of nodes supporting student learning. The lab has four primary responsibilities:

1. Support current and future curriculum development through collaboration with Quest teachers and content experts.
2. Offer professional development for current and incoming teachers.
3. Design learning tools and Toolkits for use in the school and within the DML network.
4. Undertake research and development around assessment and student development.

Being Me Being Me is a closed social-network platform that has been custom designed for the school and is to be used by students throughout the day. The platform allows students to post work, create a blog, form discussion groups, tag resources for use in their classes, track their mood, find collaborators, and much more. Only members of the Q2L learning community have access to the site, so it is a safe online space that students can be use to extend their own learning. The development of Being Me was funded by the Robert Wood Johnson Foundation pioneer portfolio and designed by the Institute of Play.

Essential Design Principles of Being Me

- Layering of access to work produced (friendlocking profiles and access to other forms of shared content)
- Specialization (in contrast to standardization): multiple forms of expertise exist across the network
- Competition and status
- Sharing and recommending
- Reviewing and sharing of feedback as a form of assessment
- Appreciation and validation (a celebration of what one knows and does)
- Production of collective, external artifacts
- Distribution of expertise and knowledge across the community of practice

Being Me as Student-Driven Wellness Program Unique in its emphasis on creating opportunities for learning within a game-inspired curriculum, the school is committed to linking students' physical, social, and emotional wellness within an overall ecology of learning. Being Me is a learning tool at the heart of Q2L's mission. Combining a game-based wellness curriculum with an online social-networking site that supports youth-led activity, Being Me supports the Q2L mission of student agency and identity formation, serving as a platform to engage students in connecting out-of-school and in-school experiences in ways that help them think about their health in multidimensional terms. What issues do students consider important, worrisome, private, or confusing? How do they choose to express their interests and concerns? What ecologies of resources do they create, share, and seek out?

Being Me as Healthy Identity Development Being Me takes its mission of a unified approach seriously: to build on the digitally diverse lives of young people to create learners like no others—self-aware, healthful, engaged, powerful citizens of a sustainable world. Being Me’s online presence—a social-network site where students can document, discover, explore, “take on,” and play with a broad range of ideas related to health and wellness, create and share media, post comments, create groups, share and find expertise, seek mentorship in issues they need help with—is a central social and data hub in the school. Its physical presence—a series of “wellness Quests” integrated across the curriculum that respond to this online activity—forms one of the school’s cultural cores.

Being Me supports the belief that students must practice and play to be able to enact sustainable and healthful identities. The more spaces, communities, and contexts that they gain experience in as practitioners of reflective learning about their own lives, the healthier they and their communities grow. Within the spaces of Being Me, students “learn to be,” taking on identities as mathematicians, scientists, medical detectives, diplomats, healers, writers, historians, and teenagers as they work through a challenge-based wellness curriculum that has questing to learn at its core. Two key literacies of the twenty-first century—game design and systems thinking—support students in this work, giving rise to new understandings and strategies for approaching health and wellness concerns.

Being Me as Multifaceted Tool As a learning tool, Being Me provides opportunities for students to increase their understanding of issues they identify as important within an environment that

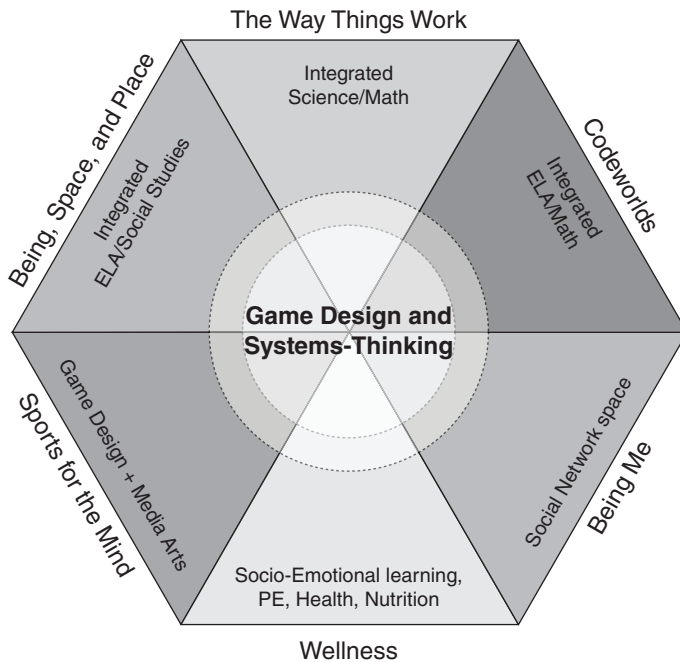
supports opportunities for interaction and feedback. (Eighty-one percent of those who drop out of school claim that “opportunities for real world learning” would have improved their chances of staying in school [Bridgeland, DiIulio, and Morison 2006, 9].) As a curricular tool, Being Me includes attention to situating the students’ personal health and wellness within larger systems of influence, including peer groups, family, community, and society more generally. As a data repository, Being Me captures the interests and concerns of youth via the materials they make and share, the conversations and debates they engage in, the people they reach out to, and the communities they create. Data generated by students in both the online network and wellness Quests can be used as powerful tools to support future decision making and to adapt academic and support systems to individual needs. Finally, as a networking space, Being Me offers students a chance to participate within a range of peer groups in public and private settings, defined and managed by the students themselves. Through Being Me, Q2L youth are virtually able to invent their own wellness curriculum, forged by their own need to express themselves, communicate, and share what they are living with among peers and others in their learning community.

Being Me for Adults In order for Being Me to be perceived and used by students as a trusted space for sharing and personal expression, teachers must develop and support this capacity. To facilitate this result, we have created a professional development program that trains teachers in all aspects of Being Me. Unlike in typical professional development, which supports teachers in the implementation of pedagogical techniques or curricular tools, in this program teachers are participants in Being Me. They learn experientially while they use the site for their own

wellness development. This approach is informed by the ideas of parallel process and family systems theory, both of which illuminate how the student community's wellness is dependent on the adult community's wellness. At Q2L, we know that our adults need to actively foster their own wellness in order to be effective mentors, teachers, and role models.

Integrated Domains: Situated Ways of Knowing

Q2L is made up of five "Integrated Domains": The Way Things Work; Being, Space, and Place; Codeworlds; Wellness; and a



media literacy/design course called Sports for the Mind. These Integrated Domains are interdisciplinary and integrate the traditional domains of math, science, history, and literature to form practice spaces for students to gain experience in different ways of knowing. Each learning context is concerned with helping students develop a game design and systems perspective of the world, by which we mean students learn how to see and understand the world from the perspective of the dynamic relationships between parts of a whole.

This approach to understanding resists customary methods of isolated analytic problem solving, which ask learners to break down problems into component parts for discrete examination outside of consideration of the whole—a skill that is no longer sufficient in today's complex global society. By examining the interrelationships of elements within whole systems via a game design pedagogy, learners are better equipped to recognize patterns that offer critical insights into the nature and complexity of systems (social, technological, natural, and imaginary) shaping their world. Q2L teachers consider what students bring *to* any experience of learning, what they take *from* it, what they do to engage in and progress within their quest *during* the experience itself, and what happens *between* experiences. Curriculum development thus attends equally to the design of phases, passages, and transitions between concepts, framing all curricular development within systemic terms.

The Integrated Domains support work in the master context, *game design and systems*, which organizes all experiences and ways of knowing within the school. The next few sections show the relationships between the domains.

The Way Things Work

Students practice taking different kinds of systems apart and modifying, remixing, and inventing systems of their own. Students learn about system structure and dynamics through hands-on work with concrete applications, such as breaking down small machines in science. Students design systems and make measurements that are relevant to improving the quality of their lives. Through the use of different systems such as games, models, digital simulations, and stories, students learn to engage with their world holistically in order to discover strategies for participating in the world and creating change.

Domain Core Values

- All systems can be taken apart.
- Students gain a particular perspective of the world when they are given opportunities to take apart, modify, and invent systems.
- Twenty-first-century inventions are necessary to a sustainable world.
- Emphasis is on helping students to recognize patterns, identify structure, and formulate general principles.
- Work in this domain should reflect current needs in innovation (e.g., green technologies).
- The Way Things Work supports connective thinking and creativity across physical, social, technological, and cultural systems. Connective thinking and creativity are key literacies of the twenty-first century.
- Creating models of systems is a concrete way to give physical description to complex phenomenon.

Being, Space, and Place

Students consider time, space, and human geographies as forces that shape the development of ideas, expression, and values. In Being, Space, and Place, students are challenged to see themselves in relation to the spatial and social world around them, focusing on the interaction between the individual and the web of systems they influence and inhabit. Students explore personal, sociocultural, physical, living, and imaginary systems as contexts for learning—in the process seeking to understand the nature of the individual and how the identity of that individual shapes their world. Point of view and perspective taking are core tools in this domain; by responding to viewpoints, debating, and taking a stand, students become aware of systems of relationships embodied through empathy, cooperation, reciprocity, ethics, tolerance, and citizenry in a global world.

Domain Core Values

- We travel within multiple cultural systems.
- Humans are agents who can influence the world around them.
- Students mindfully take apart, create, and analyze personal, sociocultural, physical, living, and imaginary systems.
- A person's identity informs the way he or she interacts with the world.
- Understanding and taking on diverse perspectives leads to deeper levels of complex thinking.
- The design of the curriculum offers students opportunities to take a stand on issues they care about while exhibiting empathy, cooperation, reciprocity, ethical standards, and tolerance for diverse points of view.
- Agency is developed out of membership and influenceability within and across communities.

- Learning is anchored within a framework and understanding of what it means to be an active global citizen.
- Students understand and appreciate multiple perspectives when using strategies such as dramatic role play, literature response, and debate.
- The continuous interplay of contextual factors—such as being, space, and place—influences how we experience and make meaning of the web of systems we study and inhabit in our daily lives.

Codeworlds

Students practice decoding, authoring, manipulating, and unlocking meaning in coded worlds in order to meet shared needs or for their own purposes. Work in this learning context requires students to practice with the concept of language and literacy across disciplines, from math to ELA to computer programming. Codeworlds draws on games as learning environments that produce meaning through the interpretation of symbolic codes ordering our world. As students reflect on how the underlying rules of a system shape expression and communication, they gain experience in comprehending the world as a metasystem made up of multiple systems, each containing a set of values, assumptions, and perspectives.

Domain Core Values

- All codes convey meaning.
- Literacy across systems is necessary: code is key to that literacy.
- Math is a language that describes the world.
- Students gain literacy in multiple languages.
- Code is a symbolic system that is predictable, repeatable, and interpretable.

- Code is a material for the representation of ideas.
- Code is a common way of making meaning between people (i.e., it is shared).
- Code is a foundation for innovation.
- Code is organized by rule sets.
- Code is a dynamic system.
- All language is constructed and can evolve and change.
- Ordering, sequencing, patterning are ways of organizing content.
- By manipulating language, one can create worlds.
- Meaning can be translated across code.
- Students reimagine worlds through code.
- Code demonstrates the power of language.

Wellness

At Q2L, Wellness is a domain and schoolwide practice where students appreciate and know what it means to be healthy. Wellness situates personal, social, emotional, and physical health within larger systems, including peer groups, family, community, and society. In sixth-grade Wellness, for example, students learn to see the body as a complex, dynamic system affected and changed by systems that are both internal and external to it. Through practice in the Wellness domain, students develop strategies for keeping their bodies running at optimal physical, social, and emotional levels while learning to make healthy choices. Wellness expertise is distributed across disciplines such as exercise science, human sexuality, personal health, nutrition, youth development, expressive arts, mindfulness, interpersonal and group dynamics, life coaching, conflict

mediation, and movement. Q2L students cultivate ownership of wellness practices that have an impact on all interactions in their daily lives and the communities of which they are part.

Domain Core Values

- Integrative health exists across physical, social, and emotional systems.
 - Wellness is a strategy by which students can learn to recognize and manage emotions, care about others, make good decisions, behave ethically and responsibly, develop positive relationships, and maintain their community's well-being.
 - Students understand and respect self, self and others, and self in community. Q2L values a culture of kindness.
 - Wellness is dynamic, emergent, and changing over time.
 - With responsibility for and ownership of wellness practice, students gain and sustain lived, “true to you” health.
- √Health reflects energy and balance—equipoised states of being.
- √Mindfulness and reflection support well-being.
- Wellness happens with active, engaged, “can do” participation.
 - Wellness philosophy informs the Q2L model of being in a community of learners.
 - The Wellness domain supports learning well and learning to be well in mind, feelings, and body.

Sports for the Mind

The fluent use of new media across networks has become an essential prerequisite for a productive career, prosperous life, and civic engagement in the twenty-first century. Sports for the Mind is a primary space of practice attuned to new media

literacies, which are multimodal and multicultural, operating as they do within specific contexts for specific purposes. Work in this domain introduces students to tools that are foundational to the curriculum: game design platforms in the sixth grade; programming tools in the seventh grade; tools for working with virtual worlds in the eighth grade; and data-visualization and knowledge-management tools in the ninth. The selection of tool sets is made in coordination with the rest of the curriculum.

Domain Core Values

- Productive and prosperous citizens in the twenty-first century need to possess a fundamental understanding of the various modes of new media communication.
- Students learn and exhibit new media literacies most powerfully when they take on multiple tasks in the creation of new media artifacts.
- Tool sets organize and support specific forms of literacy.
- Game design, media arts, computer programming, and urban design are applied contexts for the acquisition of new media literacies.