Visionmaker NYC Curriculum Map

The Visionmaker NYC curriculum is designed to meet New York State Content standards and Common Core Standards.

Visionmaker.nyc is an interactive website that allows users to imagine future sustainable New York City landscapes with reference to both the modern city (circa 2014) and the original pre-European condition (in 1609). Upon entering the site, students can explore other people's visions of the future or create their own. Visions can be made starting from the city today, the "city" in 1609, or visions submitted by others. Each vision is evaluated in terms of environmental performance indicators (EPIs). In version 1.0 of Visionmaker.nyc, these include biodiversity, water, carbon, population, and economics. EPIs are quantitative metrics within a vision extent, like the predicted number of species, gallons of stormwater, kilograms of greenhouse gases, or daytime density (number of people per square kilometer). Students can compare the performance of their vision with estimated values for 2014 and 1609.

This curriculum map outlines five modules. Each module has two lessons per module. The first four modules explore the first four EPIs, culminating in a final module where students use all the tools they've learned to design for a future changed climate. Suggested standard alignment is listed under each module as well as in the lesson documents.

Module 1, Lesson 1
What is an ecosystem: Introduction to Biodiversity EPI

Students go behind the scenes of the making of Visionmaker by identifying and mapping ecosystem types, including the living and nonliving components, in and around their school. The challenges inherent to distilling real-world information into a model allow them to understand both the power and limitations of maps and technology. After teams go through the decision making process of how to represent their sample areas, they present their hand-made maps to their class focusing on biodiversity, represented by number of species, found in their sampling area.

Suggested Standards:
NYS Content Standards:
NYS MST standard 4:
Living Environments Performance Indicator 1.1b:

Module 1, Lesson 2
Inhabitable: Species-Area Relationship and Creating More Hospitable Spaces

In Module 1, Lesson 1, students quantified the number of species in their sample areas. By looking at area and species numbers on Visionmaker, they create graphs of the species-area relationship in past and present New York City. Using a modifier tool on the site, they alter the modern landscape in order to create more livable spaces to increase biodiversity. In an extension activity students research currently extinct species from New York City and try to create landscapes that might facilitate the return of that species.

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Suggested Standards:
NYS Content Standards:
Living Environments Performance Indicator
1.1c; 1.1f; 7.2b; 7.2a
NYS MST Standard 1
NYS MST Standard 2
NYS MST Standard 4

Module 2, Lesson 1
The View from Above: Introduction to Water EPI

In Lesson 1, students will engage in a mapping activity that requires them to physically map 1mX1m sections of their local environment and then use graph paper to recreate scale versions. This activity is designed to increase spatial awareness and thinking and reinforce the relationship between mathematics and science. Students will then introduce water to their mapped area. This will allow them to make predictions and then use real world observations to notice patterns in water flow and water storage. Finally, students will translate this real-world application to the M2409 platform by working within groups to develop strategies for water management in their local context.

Suggested Standards:
NYS Content Standards:
Grade 6-8 Science Standards:
Standard 1—Analysis, Inquiry, and Design
M2.1; M3.1; S1.1; S1.2; S1.3; S1.4
Standard 4:
2.1j; 2.2i; 7.2d

Grades 9-12 Science Standards:
Standard 1:
1.1a; 1.3a; 1.3b; 1.4a
Standard 4:
1.1e; 2.1p; 2.1s; 2.1u; 7.1b

Common Core State Standards:
Writing Standards for Literacy in History/Social Studies, Science and Technical Subjects:
2; 4; 7; 10.

Grades 6-8 Mathematics Standards:
7.RP2

Grades 9-12 Mathematics Standards:
N-Q1; N-Q2; N-Q3

Module 2, Lesson 2
Water, Water Everywhere: Challenges of Water management in an Urban Environment

In Lesson 2, students will explore water absorption and the effects of urbanization on run-off. Students will begin by comparing historic and contemporary data on run-off within one area of Manhattan. They will work collaboratively to predict the relationship between urbanization and run-off patterns. They will then compare water absorption rates by running a first-hand experiment that looks at absorption rates as affected by soil compaction. Finally, students will be modifying visions in M2409 in order to reduce run-off in an urban setting through informed, purposeful decisions.

Suggested Standards:
NYS Content Standards:
Grade 6-8 Science Standards:

S1.2; S1.3; S1.4; T1.5
Standard 1

1.2a; 1.2b; 3.1a
Standard 2
1.5
Standard 4
2.1j; 2.2r; 6.1c; 7.2b; 7.2d
Standard 6
2.2; 2.3
Standard 7
1.1; 1.3

Grades 9-12 Science Standards:
Standard 4 – 1.2g, 6.3a, 6.3c, 7.1c, 7.2b, 7.3a

Common Core State Standards:
Grades 6-8 Standards for Literacy in History/Social Studies, Science, and Technical Subjects
Text Types and Purposes
2.
Production and Distribution of Writing
4.

Grades 9-12 Standards for Literacy in History/Social Studies, Science, and Technical Subjects
Text Types and Purposes
2.
Production and Distribution of Writing
4.

Module 3, Lesson 1
What's Your Carbon Number: Introduction to Carbon EPI

In Lesson 1, students will work towards gaining an understanding of the scale of carbon usage during everyday activities (i.e. doing the laundry, driving a car, heating a home, etc.). They will rank activities in relation to assumed carbon output. This activity is designed to increase environmental awareness amongst students, empowering them to understand that their individual actions can lessen or worsen greenhouse gas emissions. Students will then explore the impact of collective lifestyle behaviors on carbon output through Visionmaker. Finally, students will create a model of a football field to visualize the scale and magnitude of CO_2 output that results from our lifestyle choices. They will convert units of measurement to give CO_2 a physical presence that students can see and grasp within a real-life context.

Suggested Standards:

NYS Content Standards:
Grade 6-8 Science Standards:
Standard 1—Analysis, Inquiry, and Design
M2.1; M3.1; S1.1; S1.3; S2.1
Standard 2—Information Systems: 1.5 .
Standard 6—Interconnectedness: Common Themes
2.1 ; 2.2
Standard 7—Interdisciplinary Problem Solving
1.1; 1.2; 2.1 .

6-8 Life Science Standards
Standard 4:
7.1e ; 7.2a; 7.2c; 7.2d

Grades 6-8 Physical Setting Standards
Standard 4: 2.1a

Grades 9-12 Science Standards:
Standard 1:
1.1c ; 1.2a; 1.2b; M1.1; M2.1
Information Systems Key Idea 1
Standard 6—Interconnectedness: Common Themes
2.1; 3.1
Standard 7—Interdisciplinary Problem Solving: 1.2
Grades 9-12 Living Environment Standards
Standard 4:
6.1c ; 6.3c; 7.1b; 7.1c; 7.2a

Grades 9-12 Earth Science Standards
Standard 4: 2.2d

Grades 6-12 Technology Standards:
Standard 5 – Technology
Computer Technology 3

Next Generation Science Standards:
Grades 6-8 Life Science Standards:
MS-LS2-4

Grades 6-8 Earth and Space Science Standards:
MS-ESS3-3; MS-ESS3-4; MS-ESS3-5

Grades 9-12 Life Science Standards:

HS-LS2-7

Grades 9-12 Earth and Space Science Standards:
HS-ESS2-4

Module 3, Lesson 2

How Low can You Go?: Reducing Carbon Output Challenge

In Lesson 2, students will explore the economics of carbon emissions. Using math skills such as creating algebraic equations and proportions, students will calculate the social carbon cost of CO2 emissions across different lifestyles within Visionmaker. Students will be able to use data to discuss environmental and societal tradeoffs as it relates to carbon and its potential impacts on urban residents. Utilizing the challenge function on Visionmaker, students will then modify visions on the website in attempts to reduce greenhouse gas emissions in an urban setting through informed, purposeful decisions that align with the OneNYC initiative. Lastly, students will engage in a whole-class formal debate about the best strategies of greenhouse gas reduction: prevention vs. sequestration.

Suggested Standards:

NYS Content Standards:
Grade 6-8 Science Standards:
Standard 1—Analysis, Inquiry, and Design
M1.1; M2.1; M3.1; S2.1d; S3.1; S3.2 ; T1.1; T1.3; T1.5
Standard 2—Information Systems
1.2; 1.3; 1.5; 3.2
Standard 6—Interconnectedness: Common Themes
1.1; 1.2; 1.4; 2.1; 2.2; 2.3; 5.1; 5.2; 6.1
Standard 7—Interdisciplinary Problem Solving
1.1; 1.3; 1.4; 2.1

6-8 Life Science Standards
Standard 4:
6.1c; 6.2b; 7.1e; 7.2c; 7.2d

Grades 6-8 Physical Setting Standards
Standard 4:
2.1a; 2.2r;4.1b

Grades 9-12 Science Standards:
Standard 1:
1.1a; 1.1c; 1.2a; 1.2b; 1.3b;3.1a; M1.1; M2.1; M3.1
Engineering Design Key Idea 1
Information Systems Key Idea 1
Information Systems Key Idea 2
Standard 6- Interconnectedness: Common Themes
2.1; 2.2; 2.3; 3.1
Standard 7—Interdisciplinary Problem Solving
1.1; 1.3
Strategies Key Idea 2

Grades 9-12 Living Environment Standards
Standard 4:
6.1c; 7.1a; 7.1b; 7.1c; 7.2a; 7.2c; 7.3a; 7.3b

Grades 9-12 Earth Science Standards
Standard 4:
2.2d

Grades 6-8 Social Studies Practice & Content Standards
6.A6; 6.B3; 6.B4; 6.B6; 6.B8; 6.F1; 6.F6
7.A1; 7.A6; 7.B3; 7.B4; 7.B6; 7.B8
8.A1; 8.A6; 8.B1; 8.B3; 8.B4; 8.B6; 8.2a; 8.2b

Grades 9-12 Social Studies Practice & Content Standards
A1; A4; A5; A6; B3; B4; B5; B7; D3; D4; D5;D6; F1; F2; F3; F4; F5; F6; F8; 10.9c; 11.5a; 11.5b; 11.11c; 12.G5c; 12.G5d

Grades 6-12 Technology Standards
Standard 5 – Technology
1,2,3,4,5

Common Core State Standards:
Grade 6-8 College and Career Readiness Anchor

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Standards for Reading for Informational Text
CCSS.ELA-LITERACY.RI.6.1
CCSS.ELA-LITERACY.RI.6.7
CCSS.ELA-LITERACY.RI.7.1
CCSS.ELA-LITERACY.RI.7.8
CCSS.ELA-LITERACY.RI.7.9
CCSS.ELA-LITERACY.RI.8.9

Grade 9-12 College and Career Readiness Anchor Standards for Reading for Informational Text
CCSS.ELA-LITERACY.RI.9-10.1
CCSS.ELA-LITERACY.RI.11-12.1

Grade 6-8 College and Career Readiness Anchor Standards for Writing
CCSS.ELA-LITERACY.W.6.1
CCSS.ELA-LITERACY.W.6.7
CCSS.ELA-LITERACY.W.6.8
CCSS.ELA-LITERACY.W.6.9
CCSS.ELA-LITERACY.W.7.1
CCSS.ELA-LITERACY.W.7.7
CCSS.ELA-LITERACY.W.7.8
CCSS.ELA-LITERACY.W.7.9
CCSS.ELA-LITERACY.W.8.1
CCSS.ELA-LITERACY.W.8.7
CCSS.ELA-LITERACY.W.8.8
CCSS.ELA-LITERACY.W.8.9

Grade 9-12 College and Career Readiness Anchor Standards for Writing
CCSS.ELA-LITERACY.W.9-10.1
CCSS.ELA-LITERACY.W.9-10.7
CCSS.ELA-LITERACY.W.9-10.8
CCSS.ELA-LITERACY.W.9-10.9
CCSS.ELA-LITERACY.W.11-12.1
CCSS.ELA-LITERACY.W.11-12.7
CCSS.ELA-LITERACY.W.11-12.8
CCSS.ELA-LITERACY.W.11-12.9

Grade 6-8 College and Career Readiness Anchor Standards for Speaking and Listening
CCSS.ELA-LITERACY.SL.6.1
CCSS.ELA-LITERACY.SL.6.2
CCSS.ELA-LITERACY.SL.6.3
CCSS.ELA-LITERACY.SL.6.4
CCSS.ELA-LITERACY.SL.6.5
CCSS.ELA-LITERACY.SL.6.6
CCSS.ELA-LITERACY.SL.7.1
CCSS.ELA-LITERACY.SL.7.2
CCSS.ELA-LITERACY.SL.7.3
CCSS.ELA-LITERACY.SL.7.4
CCSS.ELA-LITERACY.SL.8.1
CCSS.ELA-LITERACY.SL.8.2
CCSS.ELA-LITERACY.SL.8.3
CCSS.ELA-LITERACY.SL.8.4

Grade 9-12 College and Career Readiness Anchor Standards for Speaking and Listening
CCSS.ELA-LITERACY.SL.9-10.1
CCSS.ELA-LITERACY.SL.9-10.2
CCSS.ELA-LITERACY.SL.9-10.3
CCSS.ELA-LITERACY.SL.9-10.4
CCSS.ELA-LITERACY.SL.11-12.1
CCSS.ELA-LITERACY.SL.11-12.2
CCSS.ELA-LITERACY.SL.11-12.3
CCSS.ELA-LITERACY.SL.11-12.4

Grades 6-8 Mathematics Standards:
CCSS.MATH.CONTENT.6.EE.A.2
CCSS.MATH.CONTENT.7.EE.A.1
CCSS.MATH.CONTENT.7.EE.B.4

Next Generation Science Standards
Grades 6-8 Life Science Standards:
MS-LS2-3; MS-LS2-4; MS-LS2-5

Grades 9-12 Life Science Standards:
HS-LS2-7; HS-LS4-6

Grades 6-8 Earth and Space Science Standards:
MS-ESS2-1; MS-ESS3-3; MS-ESS3-5

Grades 9-12 Earth and Space Science Standards:
HS-ESS2-4; HS-ESS3-1; HS-ESS3-3; HS-ESS3-4; HS-ESS3-5; HS-ESS3-6

Grades 6-8 Engineering, Technology, and Applications of Science Standards
MS-ETS1-1; MS-ETS1-2; MS-ETS1-3; MS-ETS1-4

Grades 9-12 Engineering, Technology, and Applications of Science Standards
HS-ETS1-1; HS-ETS1-3; HS-ETS1-4

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Module 4, Lesson 1
8.5 Million and Counting: Introduction to Population EPI

In Lesson 1, students will engage in discussions and a variety of activities to help make concrete the concept of population density. They will then compare 6 cities across the US, matching the population density to a variety of data for that city including percent of commuters who drive to work and amount of solid waste produced, with the goal of discovering some of the impacts of higher and lower population density. Next, students will investigate the spread of urbanization, by examining satellite imagery; the benefits and drawbacks of urbanization, by collecting data in Visionmaker; and the possible modifications to an urban environment to balance the pros and cons of urbanization, with a challenge to modify a Visionmaker vision.

Suggested Standards:

NYS Content Standards:

Grades 6-8 General Science Standards
Standard 1—Analysis, Inquiry, and Design
M2.1; S1.3; S1.4; S3.2; T1.3
Standard 2—Information Systems
1.2; 3.1; 3.2
Standard 6—Interconnectedness: Common Themes
2.2; 6.1
Standard 7—Interdisciplinary Problem Solving
1.3

Grades 6-8 Life Science Standards
Standard 4:
7.1a; 7.1b; 7.2c

Grade 8: Social Studies Practices
C.1.; 8.2a; 8.2b

Grades 6-8 Technology Standards
Standard 5 – Technology
3; 4.

Grades 9-12 General Science Standards:
Standard 1:
1.1a; 1.2a; 1.2b; 3.1a; M1.1; M2.1
Information Systems Key Idea 1
Standard 6—Interconnectedness: Common Themes
Systems Thinking Key Idea 1
2.2
Standard 7—Interdisciplinary Problem Solving
1.1; 1.3
Strategies Key Idea 2

Grades 9-12 Earth Science Standards
Standard 4
2.2c

Grades 9-12 Living Environment Standards
Standard 4:
6.1f; 7.1c; 7.2a; 7.2c; 7.3a

Social Studies Practices Grades 9-12
4; 5; 6; D.2. ; D.3.; 10.8a; 10.9c

Grades 9-12 Technology Standards
Standard 5 – Technology
3; 4.

Common Core State Standards:

College and Career Readiness Anchor Standards for Writing
2; 4.
College and Career Readiness Anchor Standards for Speaking and Listening
1; 3.
College and Career Readiness Anchor Standards for Language
1; 2; 6.
Reading standards for literacy in Science and Technical Subjects
3; 4; 7.
Writing standards for literacy in History/Social Studies, Science and Technical Subjects
2; 4.
Mathematics Standards
6.SP3; 6.SP5; 7.SP4; G-MG2

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Module 4, Lesson 2

Waste Not, Want Not: Reducing Carbon by Reducing Population or Their Needs

In Lesson 2, students will create photo essays to depict the lifestyles of people living around the world to increase their familiarity with the concept of lifestyle and the diversity of lifestyles that exist globally. Next, students will use Visionmaker to analyze data in order to understand the impacts that differing lifestyle can have on the environment. Then, students will engage with an activity in which they must distribute resources among a population to highlight the relationship between lifestyle and population. Finally, students will complete an ecological footprint calculator to gain awareness of the environmental impact of their lifestyle, and choose one way that they could reduce this impact.

Suggested Standards:

NYS Content Standards:

Grade 6-8 Science Standards:
Standard 1—Analysis, Inquiry, and Design
M2.1; M3.1; S1.1; S1.2; S1.3; S1.4
Standard 2—Information Systems
1.2; 1.3
Standard 6—Interconnectedness: Common Themes
2.2
Standard 7—Interdisciplinary Problem Solving
1.1; 1.2
Standard 4:
4.1b; 6.1c; 7.1a; 7.1b; 7.2c; 7.2d

Grade 6-12: Social Studies Practices
A.2.

Grades 9-12 Science Standards:
Standard 1:
3.1a; M1.1
Information Systems Key Idea 1
Standard 6—Interconnectedness: Common Themes
2.4
Standard 4:
6.1d; 6.1f; 7.1a; 7.1c; 7.2c; 7.3a; 7.3b

Common Core State Standards:

College and Career Readiness Anchor Standards in Reading:
7.
College and Career Readiness Anchor Standards in Writing:
7; 8.
College and Career Readiness Anchor Standards for Speaking and Listening:
1.
Mathematics Standards:
6.RP1; 6.NS2; 6.NS3; 6.SP5; 7.RP2; 7.RP2; N-Q2; N-Q3

Module 5, Lesson 1

Adapting to the Future: Looking at Designs for a Different Climate

In Lesson 1, students will work to first understand the scientific phenomena of climate change and how climate differs from weather. They will analyze data from the World Bank Climate Change Knowledge Portal to see temperature trends over a 112 year time span. This activity is designed to increase environmental awareness amongst students, informing them that our average global temperatures are rising over time, which can have a great many consequences in the future. Students will then explore spatial reasoning concepts to investigate how geography contributes to the effects of climate change. They will analyze topographic/elevation maps at multiple scales to examine the potential ramifications climate change has on NYC in relation to rising sea levels. Finally, they will explore Battery Park City in a case study format on Visionmaker. They will investigate how urban planning contributes to coastal resiliency from the viewpoint of event-based and gradual hazards such as storm surges and sea level rise.

Suggested Standards

NYS Content Standards:

Grade 6-8 Science Standards:
Standard 1—Analysis, Inquiry, and Design
M2.1; M3.1; S1.1; S1.4
Standard 2—Information Systems
1.2
Standard 6—Interconnectedness: Common Themes
2.2; 5.2

6-8 Life Science Standards
Standard 4:
7.2d

Grades 6-8 Physical Setting Standards
Standard 4:
2.2i; 2.2j; 2.2r

Grades 9-12 Science Standards:
Standard 1**:**
1.1a; 1.2a; M2.1
Standard 6—Interconnectedness: Common Themes
Patterns of Change Key Idea 5

Grades 9-12 Living Environment Standards
Standard 4:
6.3c; 7.1b; 7.1c; 7.3b

Grades 9-12 Earth Science Standards
Standard 4:
2.1q; 2.2d

Grades 6-8 Social Studies Practice & Content Standards
6.A2; 6.B5; 6.E6
7.A2; 7.B5;7.B6; 7.C4
8.A2; 8B5; 8.C4

Grades 9-12 Social Studies Practice & Content Standards
A2; A5; B4; D1; D2; D3

Next Generation Science Standards:

Grades 6-8 Earth and Space Science Standards:
MS-ESS3-4; MS-ESS3-5
Grades 9-12 Earth and Space Science Standards:
HS-ESS3-1; HS-ESS3-5

Common Core State Standards:

Grade 6-8
CCSS.ELA-LITERACY.RST.6-8.1
CCSS.ELA-LITERACY.RI.6.1
CCSS.ELA-LITERACY.RI.6.7
CCSS.ELA-LITERACY.RI.7.1

Grade 9-12
CCSS.ELA-LITERACY.RI.9-10.1
CCSS.ELA-LITERACY.RI.11-12.7
CCSS.ELA-LITERACY.RH.9-10.7
CCSS.ELA-LITERACY.RH.11-12.7

Module 5, Lesson 2

Designing for the Future: Climate Change Challenge

In Lesson 2, students will explore climate change through an environmental justice lens. Often times it is poorer communities that suffer disproportionate amounts of harm when it comes to environmental hazards such as flooding from events like Hurricane Sandy and sea level rise. Students will draw conclusions from census data and maps to demonstrate this phenomenon. Using climate change adaptation strategies, students will have the opportunity to design visions with the goal of creating a more sustainable and just neighborhood for low-income residents in mind. Lastly, students will share out their visions with their classmates and larger school, neighborhood, and city communities to give them a voice through which to be active participants in the discussion on environmental issues.

Suggested Standards:

NYS Content Standards:

Grade 6-8 Science Standards:
Standard 1—Analysis, Inquiry, and Design
M2.1; M3.1; S1.1; S1.3; S2.1
Standard 2—Information Systems: 1.5 .
Standard 6—Interconnectedness: Common Themes

2.1 ; 2.2
Standard 7—Interdisciplinary Problem Solving
1.1; 1.2; 2.1 .

6-8 Life Science Standards
Standard 4:
7.1e ; 7.2a; 7.2c; 7.2d

Grades 6-8 Physical Setting Standards
Standard 4: 2.1a

Grades 9-12 Science Standards:
Standard 1:
1.1c ; 1.2a; 1.2b; M1.1; M2.1
Information Systems Key Idea 1
Standard 6—Interconnectedness: Common Themes
2.1; 3.1
Standard 7—Interdisciplinary Problem Solving: 1.2

Grades 9-12 Living Environment Standards
Standard 4:
6.1c ; 6.3c; 7.1b; 7.1c; 7.2a

Grades 9-12 Earth Science Standards
Standard 4: 2.2d

Grades 6-12 Technology Standards:
Standard 5 – Technology
Computer Technology 3

Next Generation Science Standards:
Grades 6-8 Life Science Standards:
MS-LS2-4

Grades 6-8 Earth and Space Science Standards:
MS-ESS3-3; MS-ESS3-4; MS-ESS3-5

Grades 9-12 Life Science Standards:
HS-LS2-7

Grades 9-12 Earth and Space Science Standards:
HS-ESS2-4