

Sustainability Curriculum Map

How to Use:

This tool can be used in a number of different ways as you implement IBM SkillsBuild for Students in your organization.

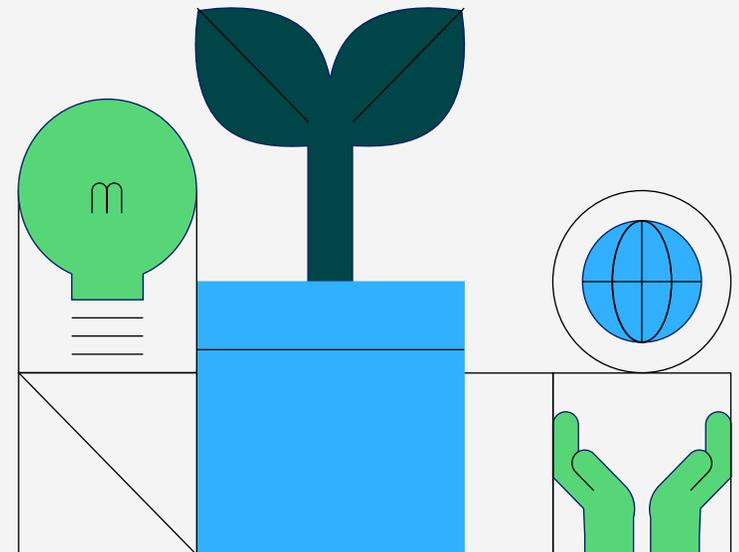
1. You can use this curriculum map as a way to compare it to the curriculum at your organization by finding common student goals and then having students complete those activities. The “local standards” column is left blank for you to write in any standards that are covered by that IBM SkillsBuild for Students activity.
2. Use this map as you build out learning plans using IBM SkillsBuild for Students’s Learning Builder.
3. Utilize this map in your daily lesson planning.
4. Sessions can be taken in sequential order or out of order based on the goals you have for your students.
5. Sessions are broken down into smaller, teachable time chunks. Sessions could easily be combined based on your needs.
6. Use this to easily find supporting teacher lesson plans and additional resources for learning activities.
7. Scan the student goals or student objectives with a specific skill or outcome in mind to determine which aligning activities to have them complete.

Implementation ideas

Do it in a day: Introduce the problem of Climate Change via the Understanding Climate Change video, then assign students an activity related to a solution they can apply in their own lives, like the reducing their own plastic footprint activity

Do it in a week: Do a short unit on Sustainability that covers a variety of topics: Supply Chain, Water Quality, Biomimicry and Sustainable Design, and examples of careers in Sustainability

Do it over a unit/summer: Lead a design thinking experience where students earn the Enterprise Design Thinking Practitioner badge, learn about climate change and sustainability with resources from the Sustainability channel, and do a Design Thinking Challenge related to solving climate change.



IBM SkillsBuild
for Students

Session	Student Goals	Local Standards Addressed	IBM SkillsBuild for Students course	Student Objectives	Learning Activities	Estimated Time	Assessment	Teacher Resources
1	Students will understand the relationship between climate and weather and nature’s role in creating resilience.	Varies	Sustainability Teacher Resource Channel	<p>Students will explore the relationship between weather and climate using local data to derive their own definitions.</p> <p>Students will examine the ways that humans have impacted Earth by analyzing real data, including from Weather Underground, and online interactives to discover why scientists are calling this the “Anthropocene.”</p>	Understanding Climate Change Video	20 mins	—	Teacher Guide
2	Students will be able to teach others about their plastic footprint and how blockchain technology and Design Thinking principles can help solve environmental and social issues.	—	Sustainability Teacher Resource Channel	<p>Students will learn about the ocean plastic crisis.</p> <p>Students will more about the Plastic Bank and its collaboration with IBM.</p> <p>Students will review IBM’s Design Thinking toolkit.</p> <p>Students will learn about key Blockchain concepts.</p>	Reduce Your Plastic Footprint- IBM Activity Kit	1-3 hours	—	Reduce Your Plastic Footprint Powerpoint

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3	Students will learn about supply chains from raw materials to consumers.	<p>National Geographic Standards</p> <p>Standard 11: The patterns and networks of economic interdependence on Earth's surface.</p> <p>Voluntary National Content Standards in Economics</p> <p>Standard 3: Allocation of Goods and Services: Different methods can be used to allocate goods and services. People acting individually or collectively through government, must choose which methods to use to allocate different kinds of goods and services.</p>	Sustainability Teacher Resource Channel	<p>Students will be able to describe and sketch a real-world supply chain example.</p> <p>Students will be able to explain how supply chains can grow in complexity.</p>	A Supply Chain National Geographic Activity Kit	60 mins	—	—
4	Students learn about the importance of water quality and the tools and techniques used to analyze related data.	—	Sustainability Teacher Resource Channel	<p>Student will learn what water quality is.</p> <p>Students will learn what impacts water quality.</p> <p>Students will understand how water quality can be measured.</p> <p>Students will understand how water quality data can be used to save Chesapeake Bay.</p>	What is Water Quality? Why is it Important? How do you Test it?	30 mins	—	Connect the Bay to the Classroom

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5	Students will understand and be able to define biomimicry.	<p>Common Core State Standards- Math:</p> <p>1.) Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. (Grades 9 - 12)</p> <p>2.) For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. (Grades 9 - 12)</p> <p>3.)Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). (Grades 9 - 12)</p>	<p>Sustainability Teacher Resource Channel</p>	<p>Students will be able to define biomimicry and provide examples from the natural world that have been copied for human gain.</p> <p>Students will be able to explain how biomimicry supports sustainable design and why humans cannot simply replace natural systems with human designs.</p> <p>Students will be able to explain how aeronautical design has benefited from biomimicry.</p> <p>Students will be able to explain “Nature’s Nine Laws” as stated by Janine Benyus. Defend why these laws should or should not be widely implemented.</p> <p>Students will demonstrate a grasp of how the function of natural systems is dependent upon its endemic species and their unique adaptations.</p> <p>Students will be able to provide a solution for approaching and improving the ways in which we design products, systems and cities by incorporating biomimicry in their individual designs.</p>	<p>Biomimicry and Sustainable Design: Nature as Engineering Marvel</p>	60 mins	—	—

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5	Students will understand and be able to define biomimicry.	<p>International Technology and Engineering Educators Association - Technology</p> <p>1.) Most technological development has been evolutionary, the result of a series of refinements to a basic invention. (Grades 9 - 12)</p> <p>2.) Not all problems are technological, and not every problem can be solved using technology. (Grades 9 - 12)</p>	<p>Sustainability Teacher Resource Channel</p>	<p>Students will be able to define biomimicry and provide examples from the natural world that have been copied for human gain.</p> <p>Students will be able to explain how biomimicry supports sustainable design and why humans cannot simply replace natural systems with human designs.</p> <p>Students will be able to explain how aeronautical design has benefited from biomimicry.</p> <p>Students will be able to explain “Nature’s Nine Laws” as stated by Janine Benyus. Defend why these laws should or should not be widely implemented.</p> <p>Students will demonstrate a grasp of how the function of natural systems is dependent upon its endemic species and their unique adaptations.</p> <p>Students will be able to provide a solution for approaching and improving the ways in which we design products, systems and cities by incorporating biomimicry in their individual designs.</p>	<p>Biomimicry and Sustainable Design: Nature as Engineering Marvel</p>	60 mins	—	—

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6	Students will learn more about careers in STEM.	—	Sustainability Teacher Resource Channel	Students will learn about STEM careers such as studying American black bears in the Western Great Basin, advocating for the benefits nature provides to people in cities, or acting as a test engineer on airplane engines.	Virtual STEM Career Fair - YouTube Video and Activity Kit	60 mins	—	Virtual Career Fair Teacher Guide
7	Students will gain a foundational knowledge on Enterprise Design Thinking. Students will also get access to the tools they need to practice human-centered design every day.	—	Enterprise Design Thinking Practitioner (Course and Badge)	<p>Students will learn what design thinking is and why creating experiences matters.</p> <p>Students will learn the framework of Enterprise Design Thinking and why it's necessary for modern enterprise work.</p> <p>Students will see examples of teams successfully using Enterprise Design Thinking to solve complex problems and gear up for the rest of the course.</p>	Enterprise Design Thinking Practitioner (Earn the badge) Introduction Lesson 1: Design thinking is for everyone Lesson 2: Put the “enterprise” in Enterprise Design Thinking Lesson 3: Prepare yourself	40 mins	—	Students will need to create a free IBMid to login

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8	Students will gain a foundational knowledge on Enterprise Design Thinking. Students will also get access to the tools they need to practice human-centered design every day.	—	Enterprise Design Thinking Practitioner (Earn the badge)	<p>Students will implement the process of determining a unique human-centered problem.</p> <p>Students will understand the value of building empathy to discover deeper needs.</p> <p>Students will understand the power of collaboration in generating ideas.</p> <p>Students will value brainstorming rules: building on other’s ideas, respecting other’s ideas, deferring judgment on ideas.</p> <p>Students will interview users to better understand specific challenges of a target audience and develop a solution.</p> <p>Students will organize and develop presentations tailored to purpose and audience.</p>	<p>Enterprise Design Thinking Practitioner (Earn the badge)</p> <p>A focus on user outcomes</p> <p>Lesson 4: Identify your users and their problems</p> <p>Lesson 5: Recognize your assumptions</p> <p>Lesson 6: Observe to learn more</p>	90 mins	—	Designer Thinking Practitioner Lesson 2: Focus on User Outcome

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9	Students will gain a foundational knowledge on Enterprise Design Thinking. Students will also get access to the tools they need to practice human-centered design every day.	—	Enterprise Design Thinking Practitioner (Earn the badge)	<p>Students will learn how viewing everything as a prototype is the key to breaking out of the status quo.</p> <p>Students will practice coming up with creative ideas and learn how absurdity can accelerate team brainstorming.</p> <p>Students will learn how incremental changes mitigate risk.</p>	<p>Enterprise Design Thinking Practitioner (Earn the badge)</p> <p>Restless Reinvention</p> <p>Lesson 7: Bias toward action</p> <p>Lesson 8: Actively seek great ideas</p> <p>Lesson 9: Take risks</p>	45 mins	—	Design Thinking Practitioner Lesson 3: Restless Reinvention

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10	Students will gain a foundational knowledge on Enterprise Design Thinking. Students will also get access to the tools they need to practice human-centered design every day.	—	Enterprise Design Thinking Practitioner (Earn the badge)	<p>Students will implement the process of determining a unique human-centered problem.</p> <p>Students will understand the value of building empathy to discover deeper needs.</p> <p>Students will understand the power of collaboration in generating ideas.</p> <p>Students will value brainstorming rules: building on other's ideas, respecting other's ideas, deferring judgment on ideas.</p> <p>Students will interview users to better understand specific challenges of a target audience and develop a solution.</p> <p>Students will organize and develop presentations tailored to purpose and audience.</p>	<p>Design Thinking Ideation Worksheet</p> <p>Design Thinking Video Learning Worksheet</p>	45 mins	—	Design Thinking Practitioner Lesson 3: Restless Reinvention
11	Students will gain a foundational knowledge on Enterprise Design Thinking. Students will also get access to the tools they need to practice human-centered design every day.	—	Enterprise Design Thinking Practitioner (Earn the badge)	<p>Students will learn how diverse perspectives can elevate the quality of their work.</p> <p>Students will understand the value of alignment.</p> <p>Students will learn how to share their work in progress.</p>	<p>Enterprise Design Thinking Practitioner (Earn the badge)</p> <p>Diverse Empowered Teams</p> <p>Lesson 10: Include a variety of voices</p> <p>Lesson 11: Build alignment across your team</p> <p>Lesson 12: Start sharing stories</p>	60 mins	—	Design Thinking Practitioner Lesson 4: Diverse empowered teams

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12	Students will gain a foundational knowledge on Enterprise Design Thinking. Students will also get access to the tools they need to practice human-centered design every day.	—	Enterprise Design Thinking Practitioner (Earn the badge)	The learner will understand the importance of diversity in teams.	Diverse Empowered Teams	60 mins	—	Design Thinking Practitioner Lesson 4: Diverse empowered teams
13	Students will gain a foundational knowledge on Enterprise Design Thinking. Students will also get access to the tools they need to practice human-centered design every day.	—	Enterprise Design Thinking Practitioner (Earn the badge)	Students will learn about problem statements and craft one to frame their own work in terms of user outcomes. Students will learn how to evaluate a problem. Students will begin to build a problem statement.	Enterprise Design Thinking Practitioner (Earn the badge) Make a Plan Lesson 13: What about tomorrow? Lesson 14: Put it all together	60 mins	—	Design Thinking Practitioner Lesson 5: Make a Plan
14	Students will gain a foundational knowledge on Enterprise Design Thinking. Students will also get access to the tools they need to practice human-centered design every day.	—	Enterprise Design Thinking Practitioner (Earn the badge)	Students will learn how to evaluate a problem. Students will begin to build a problem statement.	Enterprise Design Thinking Practitioner (Earn the badge) Make a Plan Lesson 13: What about tomorrow? Lesson 14: Put it all together	60 mins	—	Design Thinking Practitioner Lesson 5: Make a Plan
15	Students will work as a team to solve a problem.	—	—	Students will identify a human that they think exists. Students will solve the problem for the specific needs of a user.	Design Thinking Project	30 mins	—	Design Thinking Research Project Lesson Plan Design Thinking Project Rubric