Clean Energy Career Awareness Curriculum Map
Massachusetts Climate Careers: Powering the Future

Course Key Essential Questions:

- How does climate change affect my life and community, and how can I actively participate in its solution?
- How do climate-critical careers support the energy transition and broader climate goals in my community, across Massachusetts, and beyond?
- Which climate-critical careers interest you the most, and what experiences, skills, and training would help you access these opportunities?

Course Key Learning Objectives:

Students will be able to:
• Explain the consequences of climate change and identify solutions to address climate change.
• Describe how climate-critical careers support each other and the success of the transition to clean energy.
• Compare and contrast climate-critical careers that interest you, and discuss your feelings and perspectives related to a career in clean energy.

Course Details:

18 50-minute lessons hosted by Mass Clean Energy Center: cleanenergyeducation.org

Relevant Standards:

Common Core:
SL.9-10.1 & SL.11-12.1 – Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly.
9-12.DTC.c.4 – Gather, organize, analyze, and synthesize information using a variety of digital tools-distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

MA CTE Strand 4:
4.A.01.01 - Develop and revise career plan annually based on workplace awareness and skill attainment.
4.A.01.02 – Assess personal strengths and interest areas to determine potential careers, career pathways and career ladders.
4.A.01.03 – Examine potential career field(s)/discipline(s) and identify criteria to select, secure and keep employment in chosen field(s).
4.A.01.04 – Research and evaluate a variety of careers utilizing multiple sources of information and resources to determine potential career(s) and alternatives.
4.A.01.05 - Identify training and education requirements that lead to employment in chosen field(s) and demonstrate skills related to evaluating employment opportunities.
4.A.01.06 - Explore and evaluate postsecondary educational opportunities including degrees and certifications available, traditional and nontraditional postsecondary pathways, technical school and apprenticeships, cost of education, financing methods including scholarships and loans and the cost of loan repayment.

Teacher guides for each lesson Student instructional materials Videos (3-6 minutes each) available on MassCEC YouTube Channel	
Module Sequence	
Title/Objectives/ Essential Questions	**Activities and videos in module**
Foundational Lessons	
Lesson 1: Understanding and Combating Climate Change Essential Question: How does climate change affect my life and community, and how can I actively participate in its solution? Learning Objectives: Students will be able to: 1. Identify and explain the consequences of climate change. 2. Identify at least three ways their community can address climate change. 3. Discuss how they can help combat climate change today and in the future. Climate-critical occupations referenced: none	**Activity**: Building climate resilience. Students learn about several of the strategies in Boston's Climate Action Plan to reduce emissions and improve climate resilience. This activity will foster collaboration, deepen understanding of real-world climate strategies, and show how local action contributes to climate goals. **Video**: Students are living in a time where climate change has already happened through no actions of theirs. But they have the power to slow and stop the changes to our planet. MA connections ● City of Boston Climate Action Plan. 2019 Update ● Massachusetts Sea Level Rise and Coastal Flooding Viewer ● Storm surge, flooding cause major home damage in North Shore town
Lesson 2: The Power of Climate Solutions Essential Question: How is Massachusetts working to be more efficient, transition to renewable energy, optimize energy transmission, protect natural lands, and prepare for climate challenges? Learning Objectives: Students will be able to: 1. Identify strategies to improve energy efficiency. 2. Identify examples of climate technology that advances the use of renewable energy sources.	**Activity**: Designing Our Community's Clean Energy Future. Students apply what they have learned about MA's strategies to decarbonize the state's grid to their own community by determining their top two ways to improve energy efficiency and/or renewable energy in their community. **Video**: Massachusetts has plans and funding to reduce greenhouse gas emissions, equip our cities and towns to be more resilient in the face of climate change, and prepare the next generation of workers for good paying, rewarding clean energy careers. Students in MA have access to world class training that prepares them for jobs right here.

3. Explore how different combinations of climate solutions can position us for a healthier future. Climate-critical occupations referenced ● Architect ● Energy Auditor ● Insulation Workers ● Heating, Ventilation, Air Conditioning, and Refrigeration Mechanics and Installers ● Electrician ● Engineer	MA connections ● Massachusetts Clean Energy and Climate Plan for 2025 and 2030
Climate Technology Deep Dive Lessons (3-9)	
Lesson 3: Climate Solutions for our Homes and Schools Essential Question: How can clean energy workers help make our homes and schools part of the climate solution? Learning Objectives: Students will be able to: 1. Explain how solutions like weatherization, heat pumps, solar, green appliances, smart controls, and battery storage can make homes and schools greener. 2. Identify examples of climate-critical professionals who can help make our homes and schools greener. 3. Discuss how your own home or school can be part of the solution. Climate-critical occupations referenced	**Activity**: Energy audit: students examine how their school uses energy and identify ways to save energy and make the school more energy efficient. This activity is intended to help students think critically about energy usage in their school and how simple changes can lead to significant energy savings. **Video**: Visit the large-scale rooftop solar system on the Marathon Elementary School in Hopkinton to learn how solar and energy storage reduce the annual utility budget while supporting the environmentally sustainable practices of the town. MA Connections: ● Massachusetts' Clean Energy Lives Here ● Solect Energy, Hopkinton, MA ● Fitchburg Public Schools Solar ● Hopkinton School District sustainable energy ● Green Schools MA School Building Authority
Lesson 4: **Buildings of the Future** Essential Question: How can we use different materials, designs, and processes to ensure that new buildings are part of our climate solutions?	**Activity**: Students apply what they have learned about high-performance buildings and the unique properties of green building materials to the needs of different climates. They will be introduced to some of the skills necessary for designing climate-appropriate high-performance buildings.

Learning Objectives: Students will be able to: 1. Explain the importance of energy-efficient building design, construction, and materials and their role in fighting climate change. 2. Identify examples of climate-critical professionals designing and implementing solutions for new buildings to be part of our net-zero goals. 3. Describe some characteristics of LEED-certified and Passive House buildings and how they differ from most current buildings. Climate-critical occupations referenced ● Architect ● Energy Analyst/ HERS Rater ● Insulation Workers ● Building operator ● Roofer ● Engineer	**Video**: Architects, engineers, and builders design buildings that are resilient to changing climate, energy efficient, comfortable, and healthy for the occupants. MA connections ● Winthrop Center- world's largest office building certified as Passive House design. Handel Architects ● Auburndale Builders, Newton, MA ● New Ecology Community-Based Sustainable Development, Boston, MA
Lesson 5: **Harnessing the Power of the Sun for our Communities** Essential Question: What is community solar, and what are its benefits? Learning Objectives: Students will be able to: 1. Explore examples of community solar projects in Massachusetts. 2. Identify examples of climate-critical professionals who work together to make community solar projects work from the design to the outreach to the installation and maintenance phases. 3. Discuss how individual solar and community solar projects can support different individual and community needs.	**Activity**: Students will create a persuasive pitch for a community solar project in their assigned fictitious town. They will apply what they have learned about community solar and think critically about how solar energy projects can be tailored to different communities with unique needs. **Video**: Distributed Generation Operator, Evaleah Diaz, describes her role at Nexamp, a Boston-based installer of community solar projects. MA Connections: ● Massachusetts Technical Potential of Solar: An analysis of solar potential and siting suitability in the Commonwealth ● Nexamp community solar developer

Climate-critical occupations referenced	
Lesson 6: Going Deep! Networked Geothermal Projects Essential Question: How can using geothermal energy make our communities cleaner and healthier? Learning Objectives: Students will be able to: 1. Explore the science behind networked geothermal systems and how it can contribute to clean heating. 2. Identify examples of climate-critical professionals who work together to design and implement networked geothermal systems. 3. Discuss the steps that communities take to explore a solution like networked geothermal. Climate-critical occupations referenced	**Activity**: Students will analyze a case study of how a networked geothermal system is being explored in Lowell and discuss the practicalities of community engagement for large-scale geothermal projects. **Video**: Framingham's Network Geothermal Pilot (HEET, Eversource, City of Framingham) MA Connections: Framingham's Network Geothermal Pilot HEET
Lesson 7: Offshore Wind and Massachusetts' Transition to Renewable Energy Sources Essential Question: How will large-scale Offshore Wind projects transform Massachusetts' energy sources? Learning Objectives: Students will be able to: 1. Describe how wind turbines capture energy and convert it into electricity 2. Identify examples of climate-critical professionals who work to design, build, and maintain offshore wind farms 3. Discuss how Massachusetts' ports and other infrastructure contribute to the offshore wind industry Climate-critical occupations referenced ● rope access technician ● millwright (carpenters union)	**Activity**: Students will analyze different ports in Massachusetts and determine its suitability for supporting offshore wind projects. This will reinforce students' understanding of key infrastructure needs and the role of strategic planning in renewable energy development. **Video**: A tour of the New Bedford Marine Commerce Terminal (NBMCT) Anticipated MA Connections: ● MassCEC's Wind Technology Testing Center ● New Bedford Marine Commerce Terminal (NBMCT) ● Salem Offshore Wind Terminal

Lesson 8: Transforming Transportation Essential Question: How can electric vehicles support our transition away from fossil fuels? Learning Objectives: Students will be able to: 1. Describe the benefits of electrifying transportation and explore solutions to some of the most significant barriers. 2. Identify climate-critical professionals who work on electric vehicles and charging infrastructure. 3. Discuss what communities need to electrify transportation fully. Climate-critical occupations referenced ● EV Technicians ● EV Charging Equipment Technicians ● Engineers (Automotive and Chemical) ● Car Salespeople	**Activity**: Students will design EV charging networks to maximize accessibility and efficiency. They must consider public opinion, budget constraints, and the best places to install charging stations. **Video**: Day at Work: EV Technician, ConnectEd *Mass-specific video coming soon* Anticipated MA Connection(s): ● Electric Vehicle Discovery Center (opening in Sturbridge) ● Electric Busses in MA
Lesson 9: Innovation and the Future of Climate-Tech Essential Question: How does innovation and creative thinking help us reach our climate goals in Massachusetts? Learning Objectives: Students will be able to: 1. Identify examples of how innovation has advanced Massachusetts' climate solutions. 2. Identify and describe innovations that will accelerate the creation of new solutions to climate change. 3. Describe how research and design contribute to innovation in climate solutions. Climate-critical occupations referenced	**Activity**: Students will create an "Innovation Impact Map" for one climate-critical challenge. The roots represent a climate challenge. The trunk is the innovation that addresses that challenge. The leaves and branches hold the many ways this innovation could affect the community when implemented. **Videos**: Meet young engineers that help two Massachusetts companies reduce emissions and improve occupant health and comfort. Anticipated MA Connection(s): 1. Adept Materials 2. Sublime Systems

• engineer (material science)	
Focused Climate-Critical Career Exploration (Teachers should have students complete lesson 10 and then cover four to seven of lessons 11 through 17 based on student needs and interests before concluding with Lesson 18.)	
Lesson 10: Evaluating a Career in Clean Energy and Climate Tech Essential Question: How do I evaluate which climate-critical roles would best fit me? Learning Objectives: Students will be able to: 1. Identify career categories and specific occupations in clean energy and climate technology. 2. Describe how your interests, skills, desired training, career goals, and work environment preferences affect determining the right career fit. 3. Recognize the growing demand and opportunity of climate-critical careers. Climate-critical occupations referenced	Activity: In anticipation of exploring several climate-critical occupations, students will individually develop a career interest profile. Students answer six reflective questions to explore their skills, interests, and values, helping them pinpoint potential climate-critical career paths. Video: Hear about one young professional's career exploration that eventually led them to join a climate-critical career. MA Connections MassCEC's www.cleanenergyeducation.org
Lesson 11: Climate Hero Spotlight: Electricians Essential Question: How do electricians play a critical role in implementing climate solutions? Learning Objectives: Students will be able to: 1. Explore the range of clean energy projects that electricians work on. 2. Identify the skills, training, and experiences needed to become an electrician.	**Activity**: Students will experience what electricians must consider when planning real-world planning clean energy projects. Students will better understand the essential role electricians play in making sustainable energy projects safe and effective. **Video**: Visit Local 103 to learn how the International Brotherhood of Electrical Workers (IBEW) trains the next generation of electricians.

3. Discuss what aspects of a career as an electrician are aligned with your skills, interests, and desired work environment. Climate-critical occupations referenced	MA Connection: Meet apprentices who study at the International Brotherhood of Electrical Workers Local 103 in Boston. MA Connections ● IBEW Local 103
Lesson 12: Climate Hero Spotlight: Engineers Essential Question: How do engineers play a critical role in designing climate solutions? Learning Objectives: Students will be able to: 1. Describe how engineers contribute to climate-critical projects, 2. Identify skills and training needed for engineering careers. 3. Describe the aspects of an engineering career that align with your skills and interests. Climate-critical occupations referenced ● Chemical, mechanical, civil, marine, and materials engineers who work on solar, wind, and building projects	**Activity**: Students will use the engineering design process to develop a solution to improve solar efficiency in a fictional town. Students will also practice evaluating their plan against criteria (cost-effectiveness, durability, power output) and constraints to select the most viable solution. **Video**: Meet a young mechanical engineer who tries to 'break' giant wind turbine blades at the Massachusetts Wind Technology Testing Center. MA Connections ● Massachusetts Wind Technology Testing Center
Lesson 13: Climate Hero Spotlight: Lineworkers Essential Question: How do lineworkers and other electric utility workers contribute to climate solutions? Learning Objectives: Students will be able to: 1. Examine the role of lineworkers and how they contribute to climate resiliency and public safety. 2. Discuss the relationship between lineworkers and the state's climate goals. 3. Identify the skills and training needed to become an electrical lineworker. 4. Determine what aspects of a lineworker's career align with their skills, interests, and desired work environment.	**Activity**: Critical Response. Students will play the role of lineman in one of three real MA emergency situations to gain an understanding the critical role of lineworkers during climate-related emergencies, highlighting their essential role in maintaining public safety and contributing to climate resilience. **Video**: *coming soon* MA Connections

Climate-critical occupations referenced: ● line worker	
Lesson 14: Climate Hero Spotlight: Managers and Analysts Essential Question: How do analysts and managers contribute to designing and implementing climate solutions? Learning Objectives: Students will be able to: 1. Explore examples of how analysts and managers contribute to climate-critical solutions across key technology solutions, including solar, wind, high-performance buildings, electric transportation, and net-zero grid. 2. Identify the skills, training, experiences, and needed to work in analyst and management roles across climate tech solutions. 3. Discuss what aspects of a career as an analyst or manager are aligned with their skills, interests, and desired work environment.	**Activity**: Project: Back on Track. Students practice data analysis and critical thinking by assessing the status of a clean energy project and creating a plan to address challenges. They will develop a communication and resource-planning strategy necessary for success. **Video**: Meet a sustainability manager at Chapman Construction. Chapman Construction provides high end environmentally friendly sustainable commercial construction management, general contracting and consulting services. MA Connection ● Chapman Construction Newton, MA
Lesson 15: Climate Hero Spotlight: Construction, Installation, and Maintenance Workers Essential Question: How do construction, installation, and maintenance workers contribute to climate solutions? Learning Objectives: Students will be able to: 1. Identify various construction and maintenance careers in climate solutions. 2. Understand the growing demand for these roles due to state climate goals. 3. Explore skills and training needed for these careers. 4. Discuss how these careers align with personal interests and skills.	Activity: Recruit your project dream team. Students will decide what construction or installation workers are needed to complete a clean energy project. 1. Solar panel installation on a school building 2. Weatherization of an apartment building to improve energy efficiency 3. Installation of EV charging stations in a downtown community parking lot 4. Installation of heat pumps in a community of residential homes to replace oil or gas heating Video: *coming soon*

Climate-critical occupations referenced: ● Construction Workers ● HVAC Technicians ● Weatherization Technicians ● Plumbers and Pipefitters ● Sheet Metal Workers	MA Connection ● Greenfield Community College ○ Entry-level HVAC training program - FREE! ● Roxbury Community College Center for Smart Building Technology ● Athena Building Performance. Insulation and weatherization services, Worcester, MA
Lesson 16: Climate Hero Spotlight: Wind Turbine Technicians Essential Question: How are wind turbine technicians essential to the offshore wind industry and our energy goals in Massachusetts? Learning Objectives: Students will be able to: 1. Understand wind turbine technician roles and contributions to clean energy. 2. Recognize the link between climate goals and the need for wind turbine technicians. 3. Explore skills, training, and pathways for wind turbine technician careers. 4. Connect personal interests to possible roles in wind turbine technology. Climate-critical careers referenced: ● Wind turbine technician	Activity: Turbine troubleshoot challenge. Students will analyze common scenarios wind turbine technicians face (Power Drop, Blade Imbalance, Control System Error, Weather-related Shutdown). They will identify the problem and outline the safety considerations, skills, and knowledge necessary to diagnose and fix the problem Video: *coming soon* MA Connection(s): none
Lesson 17: Climate Hero Spotlight: Sales and Customer Services Workers Essential Question: How do sales and customer service workers contribute to individuals and companies participating in climate solutions? Learning Objectives: Students will be able to:	Activity. Students will develop a solution to a customer's interest in clean energy and 1-minute educational pitch for how your solution could benefit the customer. Video: *coming soon* MA connections: none

1. Understand the role of sales and customer service workers in promoting clean energy. 2. Recognize barriers to change and how these workers help overcome them. 3. Identify skills, training, and experiences needed for these careers. 4. Discuss which aspects of these careers align with personal interests and skills.	
Capstone	
Lesson 18: My Future in Clean Energy and Climate Tech Big Question: What role can I play in climate solutions? Learning Objectives 1. Reflect on climate-critical careers and climate solutions discussed in the course. 2. Evaluate different career paths based on your skills, interests, and values. 3. Connect personal strengths with potential career paths in clean energy. 4. Articulate your role in climate solutions and how you envision contributing to a sustainable future.	Activity: Referencing job descriptions and postings, students start connecting their personal qualities with potential career paths. They will describe their interests that align with one or more climate-critical occupations and identify the skills that would be useful to pursue that career. MA connections: none