AI Ready Skills

AI Ready Skills Integration in Washington - Science

Overview

AI Ready Skills offers a dynamic and standards-aligned approach to teaching science through artificial intelligence concepts. It supports Washington State's emphasis on data analysis, systems modeling, and inquiry-based learning, while engaging students in immersive environments like Minecraft Education.

Credential Units Overview

- **Unit 1: Introduction to AI** – What AI is and is not, types of AI, history, and problem-solving.
- **Unit 2: Exploring Data and AI** – Machine learning, data importance, real-world applications.
- **Unit 3: Coding and AI** – Programming for AI, data collection, and algorithm design.
- **Unit 4: Practicing Responsible AI** – Ethics, fairness, bias, and responsible use of AI.

Washington State Science Standards Alignment

The integration aligns with the Washington State Science and Learning Standards (WSSLS), formerly NGSS, which emphasize:

- **Systems Modeling**: Students use AI to simulate scientific systems and predict outcomes.
- **Data Analysis**: Students collect, organize, and interpret data using AI tools.
- **Scientific Inquiry**: Students engage in hypothesis testing and experimentation using AI simulations.
- **Engineering Design**: Students apply AI to design solutions to real-world problems.

Implementation Tips

- This curriculum is suitable for middle school Science.
- AI Ready Skills uses **Minecraft Education** to create immersive learning environments.
- AI Ready Skills focuses on Human-Centered AI thinking:
    - Begin with human inquiry.
    - Use AI tools to explore and analyze.
    - End with human reflection and insight. This approach ensures ethical, inclusive, and responsible use of AI in classrooms.
- Connect AI to Real-World Applications:
    - Encourage students to explore how AI affects careers, media, and society.

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    - Use case studies and current events to spark discussion.
    - Promote digital citizenship and ethical reasoning.
- Support differentiated instruction:
    - Use student-led pacing for independent learners.
    - Offer teacher-led structure for guided exploration.
    - Include extension activities for advanced learners or remediation.
- Includes formative activities and a capstone credential exam.
- Practice exams and lesson quizzes to help students prepare for the Capstone exam.
- AI Ready Skills is flexible. Customize projects and activities to fit your curriculum. Adjust activity topics to match the topics you are covering.
- If you need help getting started, we offer free Certified Educator courses, *Getting Started Guide*, Webinars, and experienced product specialists.
- Utilize instructor resources. Access lesson plans, slide decks, answer keys and assessments in the AI Ready Skills portal.

AI Ready Skills Integration in Science – Unit 1

AI Ready Skills Unit, Lesson	Example Activities	WA Standards Practiced	Instructional Hours
Unit 1, Lesson 1: What is Artificial Intelligence?	• AI is Important Student Activity	• MS-ETS1-2	4 Hours
Unit 1, Lesson 3: Types of AI	• AI Brainstorming Student Activity • AI Handshake Algorithm Student Activity • Generative AI Student Activity	• MS-ETS1-1 • MS-ETS1-4 • MS-ETS1-2	5 Hours
Unit, Lesson 4: Solving Problems with AI	• AI Problem Solving Challenge • Create Your Own AI Assistant	• MS-ETS1-2 • MS-ETS1-1 • MS-ETS1-2	3 Hours

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Washington State Science Standards Alignment

The following standards are directly supported by AI Ready Skills activities and credential units:

Unit 1, Lesson 1: What is Artificial Intelligence?

- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Lesson 1 Connections to Washington Standards

AI is Important Student Activity

- Students compare pre-AI and post-AI solutions in various fields, evaluating how AI improves products and processes.

Unit 1, Lesson 3: Types of AI

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Lesson 3 Connections to Washington Standards

AI Brainstorming Student Activity

- Students brainstorm and design AI inventions, considering their purpose, impact, and how they solve real-world problems.

AI Handshake Algorithm Student Activity

- Students create, test, and refine algorithms, modeling the iterative process of engineering design.

Generative AI Student Activity

- Students test and improve prompts for generative AI, evaluating which approaches yield the best results.

Unit 1, Lesson 4: Solving Problems with AI

- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

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- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.

Lesson 4 Connections to Washington Standards

AI Problem Solving Challenge

- Students brainstorm and present AI solutions to real-world problems, then engage in Q&A and reflection to evaluate the effectiveness of different solutions using a systematic process.
- Students propose how AI would collect data, learn, and improve solutions, reflecting on the iterative design process to achieve optimal outcomes.

Create Your Own AI Assistant

- Students design their own AI assistant, considering its functions, data needs, and how it solves a problem, while factoring in scientific principles and potential impacts.

AI Ready Skills Integration in Science – Unit 2

AI Ready Skills Unit, Lesson	Example Activities	WA Standards Practiced	Instructional Hours
Unit 2, Lesson 5: Machine Learning and Data	• Facial Recognition Activity • Machine Learning Research Project • Mapping Terrain Minecraft World	• MS-ETS1-1 • MS-ETS1-2	7 Hours
Unit 2, Lesson 6: Real-World Applications of AI	• AI Brainstorming Student Activity • AI Handshake Algorithm Student Activity • Generative AI Student Activity	• MS-ETS1-1 • MS-ETS1-4 • MS-ETS1-2	5 Hours

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Washington State Science Standards Alignment

The following standards are directly supported by AI Ready Skills activities and credential units:

Unit 2, Lesson 5: Machine Learning and Data

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Lesson 5 Connections to Washington Standards

Facial Recognition Activity

- Students analyze facial features and explore how facial recognition tools learn and make mistakes, identifying constraints and criteria for accurate recognition.
- Students research and compare facial recognition applications in fields like security, healthcare, and entertainment, evaluating their benefits and drawbacks.

Machine Learning Research Project

- Students compare multiple AI applications, assessing their effectiveness and ethical considerations.
- Students learn about supervised, unsupervised, and reinforcement learning, understanding how algorithms solve problems under defined constraints.

Mapping Terrain Minecraft Activity

- Students interact with a simulated environment to explore machine learning concepts, documenting their actions and modeling data collection and learning.

Unit 2, Lesson 6: Real-World Applications of AI

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

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Lesson 6 Connections to Washington Standards

AI-Powered Farm

- Students design a visual plan for an AI-powered farm, identifying the technologies and their roles. This helps them define constraints and criteria for agricultural solutions.

AI Powered Learning Platform Exploration

- Students explore AI learning platforms and evaluate how well they personalize education, comparing features and effectiveness.

Healthcare Ethics Debate

- Students debate the role of AI in healthcare decision-making, evaluating the pros and cons of AI versus human oversight.

Self-Driving Cars Student Activity

- Students research and label AI components in self-driving cars, explaining how each part contributes to decision-making and how the system improves through data.

AI Ready Skills Integration in Science – Unit 3

AI Ready Skills Unit, Lesson	**Example Activities**	**WA Standards Practiced**	**Instructional Hours**
Unit 3, Lesson 7: Coding in AI	• Student Tic Tac Toe Algorithm Activity • Agent Build Near Player Coding Steps • Agent Collect Gold Coding Steps • Build an AI in Minecraft Student Activity • Data Collection Student Activity	• MS-ETS1-1 • MS-ETS1-2 • MS-ETS1-4	5 Hours
Unit 3, Lesson 8: AI Projects	• AI Research Project	• MS-ETS1-1 • MS-ETS1-2 • MS-ETS1-3	5 Hours

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Washington State Science Standards Alignment

The following standards are directly supported by AI Ready Skills activities and credential units:

Unit 3, Lesson 7: Machine Learning and Data

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Unit 3, Lesson 8: Machine Learning and Data

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- **MS-ETS1-3:** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Lesson 7 Connections to Washington Standards

Student Tic Tac Toe Algorithm Activity

- Students develop strategies and pseudocode for winning tic-tac-toe, reflecting on decision-making and algorithmic thinking.

Agent Build Near Player Coding Steps

- Students code an agent to build structures in Minecraft, iteratively test and modify their code to achieve desired outcomes.

AI Algorithm Student Activity

- Students perform a bubble sort algorithm, reflect on its efficiency, and discuss its application in AI.

Build an AI in Minecraft Student Activity

- Students follow steps to define a problem, collect and prepare data, choose and train a model, then evaluate, deploy, and monitor an AI agent in Minecraft.

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Data Collection Student Activity

- Students design an AI, identify required data, plan data collection, consider reliability and ethics, and reflect on the importance of data collection in AI.

Lesson 8 Connections to Washington Standards

AI Research Project

- Students research and summarize what the assigned AI model is designed to do, identifying the problem it addresses and its main features.
- Students analyze algorithms and data requirements, comparing how different models function and evaluating their effectiveness.
- Students discuss strengths and weaknesses of the AI model, considering trade-offs and constraints.
- Students synthesize and present findings, comparing models and identifying best practices.

AI Ready Skills Integration in Science – Unit 4

AI Ready Skills Unit, Lesson	Example Activities	WA Standards Practiced	Instructional Hours
Unit 4, Lesson 9: What are Ethics?	• Ethics in AI Case Studies	• MS-ETS1-1	5 Hours
Unit 4, Lesson 10:	• Bias and Fairness Comic Strip • Explore Inclusiveness in AI • Bias Detective	• MS-ETS1-1 • MS-ETS1-2 • MS-ETS1-3 • MS-ETS1-4	6 Hours
Unit 4, Lesson 11:	• Privacy Poster Campaign • AI Security Breach Case Analysis	• MS-ETS1-1 • MS-ETS1-2	4 Hours
Unit 4, Lesson 12:	• AI Safety Guidelines • Build Your Own Reliable AI	• MS-ETS1-1 • MS-ETS1-3 • MS-ETS1-4	6 Hours

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AI Ready Skills Unit, Lesson	Example Activities	WA Standards Practiced	Instructional Hours
Unit 4, Lesson 13:	• AI Accountability Scavenger Hunt	• MS-ETS1-1 • MS-ETS1-3	4 Hours

Washington State Science Standards Alignment

The following standards are directly supported by AI Ready Skills activities and credential units:

Unit 4, Lesson 9: What are Ethics?

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- **MS-ETS1-3:** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Lesson 9 Connections to Washington Standards

Ethics in AI Case Studies

- Students analyze how biased training data can affect AI hiring decisions and discuss how to define fair criteria and constraints for AI systems.
- Students evaluate how personal data is used by AI and consider constraints like privacy and ethical boundaries in designing AI system.

Unit 4, Lesson 10: AI Bias, Fairness and Inclusiveness

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- **MS-ETS1-3:** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

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- **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Lesson 10 Connections to Washington Standards

Bias and Fairness Comic Strip

- Students identify biased AI decisions and propose solutions, defining criteria and constraints for fair AI systems.
- Students evaluate how different AI systems make decisions and brainstorm improvements to reduce bias.

Explore Inclusiveness in AI

- Students analyze who benefits from AI tools, identify constraints that exclude certain groups, and propose inclusive design criteria.
- Students compare different AI tools and suggest improvements based on observed differences in inclusiveness and accessibility.

Bias Detective

- Students analyze facial recognition errors across demographics and propose data improvements for fairness.
- Students propose model adjustments and data enhancements to improve equity in healthcare predictions.

Unit 4, Lesson 11: Privacy and Security

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

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Lesson 11 Connections to Washington Standards

Privacy Poster Campaign

- Students design posters that communicate privacy and security tips for AI use, identifying key constraints such as clarity, relevance, and ethical messaging.

AI Security Breach Case Analysis

- Students analyze real-world AI security breaches and propose solutions, evaluating which strategies best prevent future incidents.
- Students identify specific security risks and constraints in AI systems and define criteria for effective security measures.

Unit 4, Lesson 12: Reliability and Safety in AI

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-3:** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Lesson 12 Connections to Washington Standards

AI Safety Guidelines

- Students write actionable guidelines for AI safety, specifying constraints and criteria for developers, users, and policymakers.
- Students group and refine guidelines, comparing ideas to create a cohesive and effective set of safety practices.

Build Your Own Reliable AI

- Students identify a real-world problem and define the purpose, goals, and constraints of their AI system.
- Students outline how their AI will meet reliability goals such as accuracy, consistency, and fairness, modeling its behavior under various conditions.
- Students conduct thought experiments to test their AI under different conditions, identify challenges, and propose improvements.

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Unit 4, Lesson 13: Transparency and Accountability

- **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment.
- **MS-ETS1-3:** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

Lesson 13 Connections to Washington Standards

Accountability Scavenger Hunt

- Students identify real-world AI systems and describe their purpose and creators, aligning with the process of defining criteria and constraints for successful AI solutions.
- Students analyze risks and impacts of AI errors and propose preventive measures, comparing different approaches to accountability and safety.

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