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|  | AP Environmental Science Guide  2022-2023  SCI 501/502 |

<http://grading.dmschools.org>

<http://science.dmschools.org>

**Foreword**

* Foreword includes purpose as well as what can be expected from the guide. (How to use this document…)
* Explains what expectations are for teacher action

**How to use this document:**

**This curriculum guide is *not…***

* A lock-step instructional guide detailing exactly when and how you teach.
* Meant to restrict your creativity as a teacher.
* A ceiling of what your students can learn, nor a set of unattainable goals.

**Instead, the curriculum guide *is* meant to be a common vision for student learning and a set of targets and success criteria directed related to grade-level standards by which to measure and report student progress and provide meaningful feedback.**  
  
The curriculum guide outlines the learning that is **most essential** for student success; it is our district’s guaranteed and viable curriculum. The expectation is that every student in our district, regardless of school or classroom, will have access to and learn these targets. As the classroom teacher, you should use the curriculum guide to help you to decide how to scaffold up to the learning targets and extend your students’ learning beyond them.   
  
Within this document, you will find a foundational structure for planning sequential instruction in the classroom which can be supplemented with materials from any number of the linked resources.

Please consider this guide a living and dynamic document, subject to change and a part of a continuous feedback loop.

## AP Environmental Science: Year at a Glance

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| **Semester 1** | **Topic 1: Scientific Practices** | **Topic 2: My Ecological Footprint** | **Topic 3: My Community Ecology** |

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| **Semester 2** | **Topic 4: Scientific Practices** | **Topic 5: Food Systems & Resources** | **Topic 6: Oceans in Action** | **Topic 7: Global Climate Summit** |

\* Suggested Curriculum Resource: [KIA AP Environmental Science](https://sprocket.lucasedresearch.org/home/curriculum/apes)

Follow the link to sign up for free access to the curriculum materials.

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| **Evidence shows the student ...** | **Topic Score** |
| Demonstrates proficiency (AT) in all learning targets and success at Level 4 | 4.0 |
| Demonstrates proficiency (AT) in all learning targets with partial success at Level 4 | 3.5 |
| Demonstrates proficiency (AT) in **all** learning targets | 3.0 |
| Demonstrates proficiency (AT) in **at least half** of the learning targets | 2.5 |
| Demonstrates some success criteria (PT) toward **all** learning targets | 2.0 |
| Demonstrates some success criteria (PT) towards **some** of the learning targets | 1.5 |
| Does not yet meet minimum criteria for the targets. | 1.0 |
| Produces no evidence appropriate to the learning targets at any level | 0 |

**Standards-Referenced Grading Basics**

**Our purpose in collecting a body of evidence is to:**

* Allow teachers to determine a defensible and credible topic score based on a representation of student learning over time.

**Start at Level 3 when determining a topic → score.**

* Clearly communicate where a student’s learning is based on a topic scale to inform instructional decisions and push student growth.
* Show student learning of targets through multiple and varying points of data
* Provide opportunities for feedback between student and teacher.

**Scoring**

A collaborative scoring process is encouraged to align expectations of the scale to artifacts collected. Routine use of a collaborative planning and scoring protocol results in calibration and a collective understanding of evidence of mastery. Enough evidence should be collected to accurately represent a progression of student learning as measured by the topic scale. Teachers look at all available evidence to determine a topic score. All topic scores should be defensible and credible through a body of evidence.

**Guiding Practices of Standards-Referenced Grading**

1. A consistent 4-point grading scale will be used.
2. Student achievement and behavior will be reported separately.
3. Scores will be based on a body of evidence.
4. Achievement will be organized by learning topic and converted to a grade at semester’s end.
5. Students will have multiple opportunities to demonstrate proficiency.
6. Accommodations and modifications will be provided for exceptional learners.

**\*\*\*Only scores of 4, 3.5, 3, 2.5, 2, 1.5, 1, and 0 can be entered as Topic Scores**.

**Multiple Opportunities**

Philosophically, there are two forms of multiple opportunities, both of which require backwards design and intentional planning. One form is opportunities planned by the teacher throughout the unit of study and/or throughout the semester. The other form is reassessment of learning which happens after completing assessment of learning at the end of a unit or chunk of learning.

Students will be allowed multiple opportunities to demonstrate proficiency. Teachers need reliable pieces of evidence to be confident students have a good grasp of the learning topics before deciding a final topic score. To make standards-referenced grading work, the idea of “multiple opportunities” is emphasized. If after these opportunities students still have not mastered Level 3, they may then be afforded the chance to reassess.

**Topic 1: Scientific Practices**

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| **Scientific Practices** | **Achieving Grade Level (AT)** |
| **LT1A- Apply scientific practices to the solution of environmental problems.**   * + Interpret data correctly.   + Form conclusions of sustainability using the three lenses.   + Develop an evidence-based argument.   + Communicate conclusions accurately and meaningfully. |

**Topic 2: My Ecological Footprint**

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| **My Ecological Footprint** | **Achieving Grade Level (AT)** |
| **LT2A- Collect, convert units, and analyze data using dimensional analysis.**   * Perform audits on water, energy, transportation, and waste use * Identify trends in personal resource use   **LT2B- Evaluate the environmental effects of human resource use (including water, air, renewable and non-renewable energy sources, waste, and minerals).**   * Describe the distribution, consumption, and conservation of renewable and non-renewable resources * Describe the distribution, consumption, and conservation of water resources * Describe sources and effects of air pollution * Describe waste disposal methods and waste reduction strategies * Describe mineral formation, mining, and extraction techniques   **LT2C- Propose evidence-based environmental, social/cultural, and economic arguments for human behavioral change.**   * Explain how and why people use different natural resources. |

**Topic 3: My Community Ecology**

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| **My Community Ecology** | **Achieving Grade Level (AT)** |
| **LT3A- Interpret various maps and graphs.**   * + Model and calculate population dynamics   + Model population representations over time using structure diagrams   + Carrying capacity   + R-selected species and K selected species   **LT3B- Explain how changes to an Earth system impacts other parts of Earth’s systems.**   * + Describe the components of a typical ecosystem, ecosystem services and ecological niches   + Describe components of a typical ecosystem using food webs and trophic levels   + Describe the importance of biodiversity to an ecosystem and its stability, including succession   + Describe how development of natural and urban systems can impact ecosystems   **LT3C- Evaluate options and create an argument for environmental, social/cultural and economic sustainable development.**   * + Describe current and future land use and conservation and their impacts on ecosystems.   + Describe the impacts of urbanization on the environment.   + Identify mitigation strategies for urban runoff.   + Identify solutions for ecosystem management and urban planning to promote sustainability. |

**Topic 4: Scientific Practices**

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| **Scientific Practices** | **Achieving Grade Level (AT)** |
| **LT4A- Apply scientific practices to the solution of environmental problems.**   * + Interpret data correctly.   + Form conclusions of sustainability using the three lenses.   + Develop an evidence-based argument.   + Communicate conclusions accurately and meaningfully. |

**Topic 5: Food Systems & Resources**

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| **Food Systems & Resources** | **Achieving Grade Level (AT)** |
| **LT5A-** **Describe the physical and biological components, processes, and cycles of agricultural systems.**   * + Describe the physical and chemical properties of soil.   + Evaluate appropriate soil conservation strategies to minimize soil degradation.   + Evaluate the characteristics of a watershed   **LT5B- Compare and contrast various types of agriculture, including sustainable agriculture.**   * + Discuss the characteristics of historical agricultural strategies.   + Discuss impacts and use of GMOs   **LT5C- Analyze the environmental, social/cultural, and economic drivers of agriculture and their implications.**   * + Evaluate the sustainability of different agricultural practices (tilling, slash and burn farming, fertilizers, irrigation, pest control, meat production methods) |

**Topic 6: Oceans in Action**

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| **Oceans in Action** | **Achieving Grade Level (AT)** |
| **LT6A-** **Discuss how the sun’s energy impacts the Earth’s surface (wind, temperature, movement of water).**   * + Describe the layers of the Earth’s atmosphere.   + Describe the Coriolis effect and explain its impact on global wind patterns.   + Describe the global ocean current patterns and their effects on el Nino/la Nina.   **LT6B- Analyze human impact on the health of aquatic ecosystems.**   * + Describe aquaculture, overfishing, acidification, ocean warming.   + Describe mineral formation, mining, and extraction techniques.   + Compare and contrast different fishing practices and impacts on ecosystems.   **LT6C- Evaluate environmental, social/cultural, and economic solutions to environmental problems.**   * + Compare and contrast aquaculture and oil drilling |

**Topic 7: Global Climate Summit**

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| **Global Climate Summit** | **Achieving Grade Level (AT)** |
| **LT7A-** **Explain the drivers of Earth’s climate system and how scientists study and understand the climate.**   * + Compare and contrast how short term and long-term climate changes impact ecosystems.   **LT7B- Explain climate change and connect how varied access to populations, habitats, and resources in different parts of the country and the world influence use habits and policies.**   * + Describe and connect atmospheric carbon dioxide to climate change.   + Research population, habitats, and resources of one UN member country.   **LT7C- Evaluate the successes and failures of various international treaties and policies/protocols and understand the complexity of finding solutions to global environmental issues.**   * + Discuss relevant environmental protocols that influence global climate conversations (CITES, Montreal, Kyoto)   + Discuss relevant environmental protocols that influence US conversations (CERCA, FIFRA, FFDCA, FQPA, ESA, PRIA, CWA, CAA) |