8th Grade Science YAG

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Year-at-a-Glance

This Year-At-A-Glance document is intended to provide chunks, in a logical and progressive manner, of what is expected for students to know and be able to do over the course of a year. It serves as a suggested timeline for planning, but the focus remains on the learner and should not be viewed as a coverage of content. Through ongoing monitoring of student progress, adjustments need to be made to provide students the necessary supports in order to reach the year-end learning goals.

Definitions

Priority Standards: Priority standards are essential learning goals guaranteed for all students. They form the foundation of a viable curriculum—one that ensures sufficient time and opportunity for students to demonstrate mastery by the end of the academic year.

Unit Standards: Students must show progress towards proficiency standards. They work in tandem with the priority standards and are woven into those targeted in the units.

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Quarter Addressed	Unit of Study	Oklahoma Academic Standards		Unit Resources
		Priority	Unit	
1st Quarter (42 days)	**Unit 1A** Science Safety "What does it mean to make sense of the natural and designed world in a safe manner?" *4 Days: 8/13-8/16*			Rules of the Mogwai
	Unit 1B Forces, Motion, and Interactions "Why do things sometimes get damaged when they hit each other?" *33 Days: 8/19-10/4*	8.PS2.1 8.PS2.2	8.PS2.1 8.PS2.2 8.PS2.3 8.PS2.5	**Module 1: Lessons 1, 2, and 3** **Module 2: Lessons 1, 2, and 4** Core Lab: Ace in the Hole OpenSciEd Supporting Unit: 8.1 Contact Forces
2nd Quarter (38 days)	**Unit 1C** Waves and their Application for Information Transfer "How can a sound make something move?" *28 Days: 10/7-11/22*	8.PS4.1	8.PS4.1 8.PS4.3	**OpenSciEd Unit 8.2 Sound Waves (modified)** **Module 3: Lesson 2** OpenSciEd Supporting Unit: 8.2 Sound Waves

3rd Quarter (46 days)	**Unit 2A** Earth's Place in the Universe "How are we connected to the patterns we see in the sky and space?" *28 Days: 12/2-1/24*	8.ESS1.1 8.PS2.4	8.ESS1.1 8.ESS1.2 8.ESS1.3 8.PS2.4	**Module 7, Module 1: Lesson 4, and Module 8** Core Lab: Radiation and The Inverse Square Law OpenSciEd Supporting Unit: 8.4 Earth in Space
	Unit 3A Heredity "Why are living things different from one another?" *33 Days: 1/27-3/14*	8.LS3.1 8.LS3.2	8.LS3.1 8.LS3.2	**Module 4: Lessons 2, 3, 4** **Module 4: Lesson 1** **Model 5: Lesson 1** OpenSciEd Supporting Unit: 8.5 Genetics
4th Quarter (42 days)	**Unit 4A** Evidence of Ancestral Relationships "How do we know living things are connected to things that lived long ago?" *11 Days: 3/25-4/8*	8.LS4.1	8.LS4.1 8.LS4.2 8.LS4.3	**Module 6** Core Lab: Doggos, Digestion, and Fossils, Oh My! OpenSciEd Supporting Unit: 8.6 Natural Selection & Common Ancestry
	Unit 4B Biological Unity and Diversity "How could things living today be connected to the things that lived long ago?" *31 Days: 4/9-5/22*	8.LS1.4 8.LS4.4 8.LS4.6	8.LS1.4 8.LS1.5 8.LS4.4 8.LS4.5 8.LS4.6	**Module 5** OpenSciEd Supporting Unit: 8.6 Natural Selection & Common Ancestry

8th Grade Honors Science Supplement

This Honors Science Supplement supports the extension of core science instruction into honors-level learning experiences that prepare students for advanced coursework such as AP and concurrent enrollment. Leveraging the OpenSciEd instructional model, this supplement is grounded in the Anchored Inquiry and Next Generation Storylines approaches that promote coherence, sensemaking, and equitable access to rigorous science learning. It aligns with the Oklahoma Academic Standards for Science and identifies opportunities to integrate high school performance expectations into middle school units, ensuring a coherent and challenging progression of learning.

Unit 1B – Forces, Motion, and Interactions

Anchoring Question: Why do things sometimes get damaged when they hit each other?

Quarter: Q1

Instructional Days: 33 (Aug 18 – Oct 3)

Core Unit: OpenSciEd 8.1: Contact Forces

Grade-Level Standards: 8.PS2.1, 8.PS2.2, 8.PS2.3, 8.PS2.5

HS PE Extensions: PS.PS2.1, PS.PS2.2

High School Standard Extensions:

HS PE Code	Full Performance Expectation	Conceptual Link to 8th Grade DCI/CCC	Instructional Notes
PS.PS2.1	Apply Newton's Third Law...	Models force pairs.	Use motion carts to show action/reaction.
PS.PS2.2	Plan an investigation...	Extends net force into F=ma.	Graph force vs acceleration.

Conceptual Focus:

- - Collisions cause changes in motion
- - Forces act in pairs

Honors Extension Strategies by Standard:

- - 8.PS2.1 → PS.PS2.1: Use sensors to track force pairs
- - 8.PS2.2 → PS.PS2.2: Calculate net force and acceleration

Mathematical & Computational Thinking Opportunities:

- - F = ma calculations
- - Graph motion
- - Estimate Momentum

Sample Extension Task:

Use motion carts to analyze how forces affect motion.

Teacher Notes & UDL Considerations:

- - Use scaffolded data tables
- - Incorporate multilingual supports

Unit 1C – Waves and Information Transfer

Anchoring Question: How can we use waves to communicate over long distances?

Quarter: Q1

Instructional Days: 29 (Oct 6 – Nov 21)

Core Unit: OpenSciEd 8.2: Sound Waves

Grade-Level Standards: 8.PS4.1, 8.PS4.2, 8.PS4.3

HS PE Extensions: PS.PS4.1, PS.PS4.2

High School Standard Extensions:

HS PE Code	Full Performance Expectation	Conceptual Link to 8th Grade DCI/CCC	Instructional Notes
PS.PS4.1	Use mathematical representations to describe wave patterns and relate frequency, wavelength, and wave speed.	Expands on MS concepts with quantitative representations.	Model wave behavior using v = fλ.
PS.PS4.2	Evaluate wave models in terms of their ability to describe phenomena.	Deepens understanding of model limitations.	Use digital/analog comparisons to test wave model predictions.

Conceptual Focus:

- - Waves transfer energy and information
- - Wave properties affect signal quality

Honors Extension Strategies by Standard:

- - 8.PS4.1 → PS.PS4.1: Calculate frequency, wavelength, speed
- - 8.PS4.2 → PS.PS4.2: Analyze wave models in context

Mathematical & Computational Thinking Opportunities:

- - Use v = fλ to solve problems
- - Graph amplitude and frequency
- - Compare wave types using data

Sample Extension Task:

Design a communication system using light or sound and analyze wave properties that impact clarity.

Teacher Notes & UDL Considerations:

- - Provide wave simulation tools
- - Embed visual and physical models
- - Use bilingual labels on wave diagrams

Unit 2A – Earth's Place in the Universe

Anchoring Question: Why do the Sun, Moon, and stars appear to move across the sky?

Quarter: Q2

Instructional Days: 28 (Dec 1 – Jan 23)

Core Unit: OpenSciEd 8.3: Earth-Sun-Moon System

Grade-Level Standards: 8.ESS1.1, 8.ESS1.2

HS PE Extensions: ESS1.4

High School Standard Extensions:

HS PE Code	Full Performance Expectation	Conceptual Link to 8th Grade DCI/CCC	Instructional Notes
ESS1.4	Use mathematical or computational representations to predict motion of orbiting objects in the solar system.	Links solar and lunar motion to observed phenomena (eclipses, phases).	Create simulations to model orbital motion and Earth-Sun energy variation.

Conceptual Focus:

- - Celestial bodies follow predictable patterns
- - Orbital motion affects Earth's energy input and climate

Honors Extension Strategies by Standard:

- - 8.ESS1.1 → ESS1.4: Create 2D and 3D models of Earth's rotation and revolution
- - 8.ESS1.2 → ESS1.4: Simulate eclipses using scaled models

Mathematical & Computational Thinking Opportunities:

- - Calculate angles of rotation
- - Scale distance and time of Earth/Moon orbits
- - Graph Sun energy at different latitudes

Sample Extension Task:

Develop and justify a model showing how sunlight intensity and duration change across Earth's surface throughout the year.

Teacher Notes & UDL Considerations:

- - Use labeled globe models and light sources
- - Include sentence starters for explaining cause and effect
- - Highlight key vocabulary in multiple languages

Unit 3A – Heredity

Anchoring Question: How do living organisms pass traits from one generation to the next?

Quarter: Q3

Instructional Days: 33 (Jan 26 – Mar 13)

Core Unit: OpenSciEd 8.4: Genetic Variation

Grade-Level Standards: 8.LS3.1, 8.LS3.2

HS PE Extensions: B.LS3.1, B.LS3.2

High School Standard Extensions:

HS PE Code	Full Performance Expectation	Conceptual Link to 8th Grade DCI/CCC	Instructional Notes
B.LS3.1	Ask questions to clarify how DNA sequences vary and influence traits.	Connects gene structure to expressed traits.	Analyze DNA sequences to identify variation and resulting traits.
B.LS3.2	Make and defend claims that genetic variation may result from mutation or recombination.	Deepens understanding of mechanisms behind variation.	Compare inherited vs. environmental causes of mutation and variation.

Conceptual Focus:

- - Genes are units of inheritance
- - Mutations affect variation

- - Inheritance patterns follow predictable rules

Honors Extension Strategies by Standard:

- - 8.LS3.1 → B.LS3.1: Interpret sequences and predict trait outcomes
- - 8.LS3.2 → B.LS3.2: Evaluate causes and consequences of mutations

Mathematical & Computational Thinking Opportunities:

- - Use Punnett squares for probability
- - Track trait frequency with data
- - Analyze real or simulated mutation cases

Sample Extension Task:

Use models of DNA and chromosomes to show how variation in sequence can influence phenotype in offspring.

Teacher Notes & UDL Considerations:

- - Use sentence frames for claim-evidence reasoning
- - Color code chromosomes and gene locations
- - Support multilingual learners with key vocabulary guides

Unit 4A – Evidence of Ancestral Relationships

Anchoring Question: What can fossils tell us about life and how it has changed?

Quarter: Q4

Instructional Days: 11 (Mar 24 – Apr 7)

Core Unit: OpenSciEd 8.5: Evolution and Fossils

Grade-Level Standards: 8.LS4.1, 8.LS4.2

HS PE Extensions: B.LS4.1, B.LS4.2

High School Standard Extensions:

HS PE Code	Full Performance Expectation	Conceptual Link to 8th Grade DCI/CCC	Instructional Notes
B.LS4.1	Communicate scientific information that common ancestry is supported by anatomical and genetic evidence.	Links fossil and DNA evidence to shared traits and structures.	Use data sets and diagrams to construct family trees and cladograms.
B.LS4.2	Construct explanations based on evidence for how	Demonstrates how selection drives	Simulate trait shifts across generations

	natural selection results in changes over generations.	population-level trait changes.	using probability models.

Conceptual Focus:

- - Traits are inherited from common ancestors
- - Populations change over time
- - Evidence includes fossils, structures, and DNA

Honors Extension Strategies by Standard:

- - 8.LS4.1 → B.LS4.1: Compare DNA and anatomical structures
- - 8.LS4.2 → B.LS4.2: Model trait frequency shifts using data

Mathematical & Computational Thinking Opportunities:

- - Graph trait change over generations
- - Interpret evolutionary trees
- - Apply probability to survival simulations

Sample Extension Task:

Construct an evidence-based argument that a group of species share a common ancestor using structural and genetic similarities.

Teacher Notes & UDL Considerations:

- - Use vocabulary banks for fossil and DNA terms
- - Support CER writing with bilingual templates
- - Provide diagrammed steps for building cladograms

Unit 4B – Biological Unity and Diversity

Anchoring Question: Why are some traits more common in some environments?

Quarter: Q4

Instructional Days: 31 (Apr 8 – May 21)

Core Unit: OpenSciEd 8.6: Natural Selection

Grade-Level Standards: 8.LS4.3, 8.LS4.4, 8.LS4.5, 8.LS4.6

HS PE Extensions: B.LS4.3, B.LS4.4, B.LS4.5

High School Standard Extensions:

HS PE Code	Full Performance Expectation	Conceptual Link to 8th Grade DCI/CCC	Instructional Notes

B.LS4.3	Apply statistics and probability to support explanations of trait advantages.	Introduces fitness-based reasoning tied to data.	Simulate selection events and analyze trait survival.
B.LS4.4	Construct explanations for how genetic variation and environmental pressure lead to adaptation.	Connects trait variation and environmental change to species survival.	Analyze scenarios of trait distribution across time.
B.LS4.5	Evaluate evidence supporting common ancestry and biodiversity.	Links macroevolutionary changes to speciation and diversity.	Use fossil and molecular data to trace evolution over time.

Conceptual Focus:

- - Organisms are adapted to their environment
- - Trait frequency changes in populations over time
- - Data supports evolutionary trends

Honors Extension Strategies by Standard:

- - 8.LS4.3 → B.LS4.3: Analyze population data to explain trait advantages
- - 8.LS4.4 → B.LS4.4: Model long-term effects of environmental pressures
- - 8.LS4.5 → B.LS4.5: Synthesize evidence from fossil records and DNA

Mathematical & Computational Thinking Opportunities:

- - Apply 10% Rule in food chains
- - Graph trait shifts across generations
- - Analyze survival probabilities based on trait-environment fit

Sample Extension Task:

Create a simulation to show how traits spread or disappear over generations based on changing environmental conditions.

Teacher Notes & UDL Considerations:

- - Help students create bilingual glossaries for evolution terms
- - Provide annotated food webs
- - Support data analysis with guided graphing tools