

MATH & SCIENCE MODEL COURSES

PARENT & COMMUNITY INFORMATION MEETING



California Department of
EDUCATION



HIGH SCHOOL MATH:
TRADITIONAL &
INTEGRATED

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Comparison of Traditional and Integrated Math Pathways

Traditional				Integrated			
Math 8	Algebra 1	Geometry	Algebra 2	Math 8	Integrated I	Integrated II	Integrated III
Rational and Irrational Numbers	Rational and Irrational Numbers	Congruence and Similarity through Transformations	Perform Arithmetic with Complex Numbers	Rational and Irrational Numbers	Seeing Structure in Expressions and Reason Quantitatively	Rational and Irrational Numbers	Apply Trigonometric Ratios involving Triangles
Integer Exponents, Radicals, Proportional Relationships	Seeing Structure in Expressions and Reason Quantitatively	Prove Geometric Theorems	Use Complex Numbers in Polynomial Identities	Integer Exponents, Radicals, Proportional Relationships	Exponential Equations and Functions	Quadratic Equations and Functions	Use Complex Numbers in Polynomial Identities
Linear Equations and Systems	Linear Equations, Systems and Functions	Similarity in Triangles	Seeing Structure in Expressions	Linear Equations and Systems	Linear Equations, Systems and Functions	Prove Geometric Theorems	Seeing Structure in Expressions
Congruence and Similarity through Transformations	Exponential Equations and Functions	Apply Trigonometric Ratios involving Triangles	Perform Arithmetic Operations with Quadratic and Beyond	Congruence and Similarity through Transformations	Congruence and Similarity through Transformations	Similarity in Triangles	Perform Arithmetic Operations with Quadratic and Beyond
Understand and apply Pythagorean Theorem & Volume	Quadratic Equations and Functions	Circles	Create, solve, and understand Equations	Understand and apply Pythagorean Theorem & Volume	Distance Formula and the Pythagorean Theorem	Circles	Create, solve, and understand Equations
Statistics and Probability	Statistics and Probability	Translate between Geometric Descriptions and Prove Theorems	Geometric Properties with Equations	Statistics and Probability	Statistics and Probability	Translate between Geometric Descriptions and Prove Theorems	Geometric Properties with Equations
		Distance Formula and the Pythagorean Theorem	Statistics and Probability			Geometric Measurements, Dimensions, and Modeling	Statistics and Probability
		Geometric Measurements, Dimensions, and Modeling				Probability	
		Probability				Perform Arithmetic with Complex Numbers	

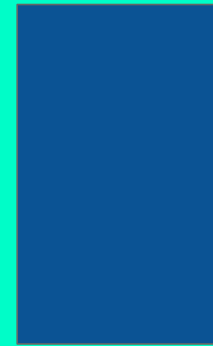
ALGEBRA 1



GEOMETRY



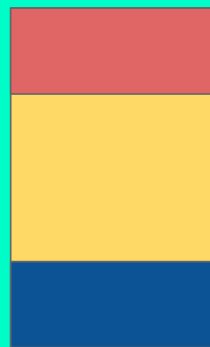
ALGEBRA 2



INTEGRATED I



INTEGRATED II



INTEGRATED III



SECONDARY SCIENCE:
INTEGRATED &
DISCIPLINE SPECIFIC

NEXT GENERATION SCIENCE STANDARDS (NGSS)

- K-12 Science Standards
- Developed through a collaborative, state-led process
 - K-12 teachers, state science and policy staff, higher education faculty, scientists, engineers, cognitive scientists, and business leaders
- Designed to provide all students an internationally benchmarked science education



Gerald Wheeler-NSTA Executive Director



2013—State adopts Next Generation Science Standards

2016—California Science Framework (Currently in draft form)

2017—Pilot Item/Item Tryout Assessment

2018—Instructional Materials Adoption by SBE;
Assessment Field Test

2019—Operational NGSS Science Assessments

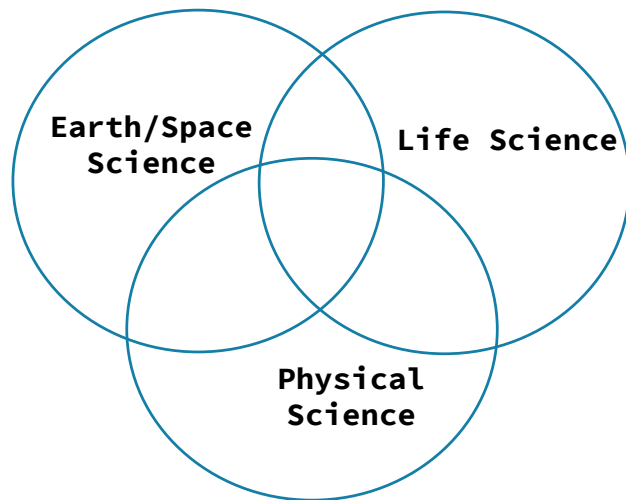
CONCEPTUAL SHIFTS OF NGSS

The *NGSS* promote a new way of teaching and learning that allows students to actively do and experience science in a deep, meaningful way, not just learn about it from a textbook or a lecture. The standards accomplish this by integrating three dimensions of learning:

- **Science disciplinary core ideas** (the content, for example, biology);
- **Major practices** (how science is conducted in the real world, such as through planning and carrying out investigations); and
- **Crosscutting concepts** (science ideas, like *cause and effect*, that permeate all the sciences).

NGSS MIDDLE SCHOOL MODELS

PREFERRED INTEGRATED PROGRESSION



6th-8th Grade:
Earth/Space Science, Life Science,
Physical Science

DISCIPLINE SPECIFIC



6th Grade: Earth/Space Science
7th Grade: Life Science
8th Grade: Physical Science

PREFERRED INTEGRATED PROGRESSION MODEL

GRADE 6 INTEGRATED STORYLINE

Climate arises from system interactions and strongly influences organism structures and behaviors.

Life Science

Earth & Space Science

Physical Science

ETS

Unit 1

A cell, a person and planet Earth are each a system made up of subsystems.

All living things are made of cells.

Water continually cycles among the land, ocean and atmosphere.

Design criteria

The body is a system made of multiple interacting subsystems.

Weather and climate involve interactions among Earth's subsystems.

Evaluate solutions

Unit 2

Weather conditions result from the interactions among different Earth subsystems.

Changes and movements of water help determine local weather patterns.

Temperature is a measure of average particle kinetic energy.

Design criteria

Motions and interactions of air masses result in changes in weather conditions.

Energy transfers from hotter regions or objects to colder ones.

Evaluate solutions

The ocean exerts a major influence on weather and climate.

Temperature change depends on the environment and type/amount of matter.

Analyze data

Iteratively test & modify

HIGH SCHOOL MODELS

3 COURSE

Living Earth

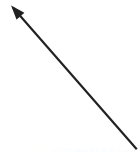
{Integrating Biology & Earth/Space Science}

Chemistry of the Earth System

{Integrating Chemistry & Earth/Space Science}

Physics in the Universe

{Integrating Physics & Earth/Space Science}



4 COURSE

Biology



Chemistry



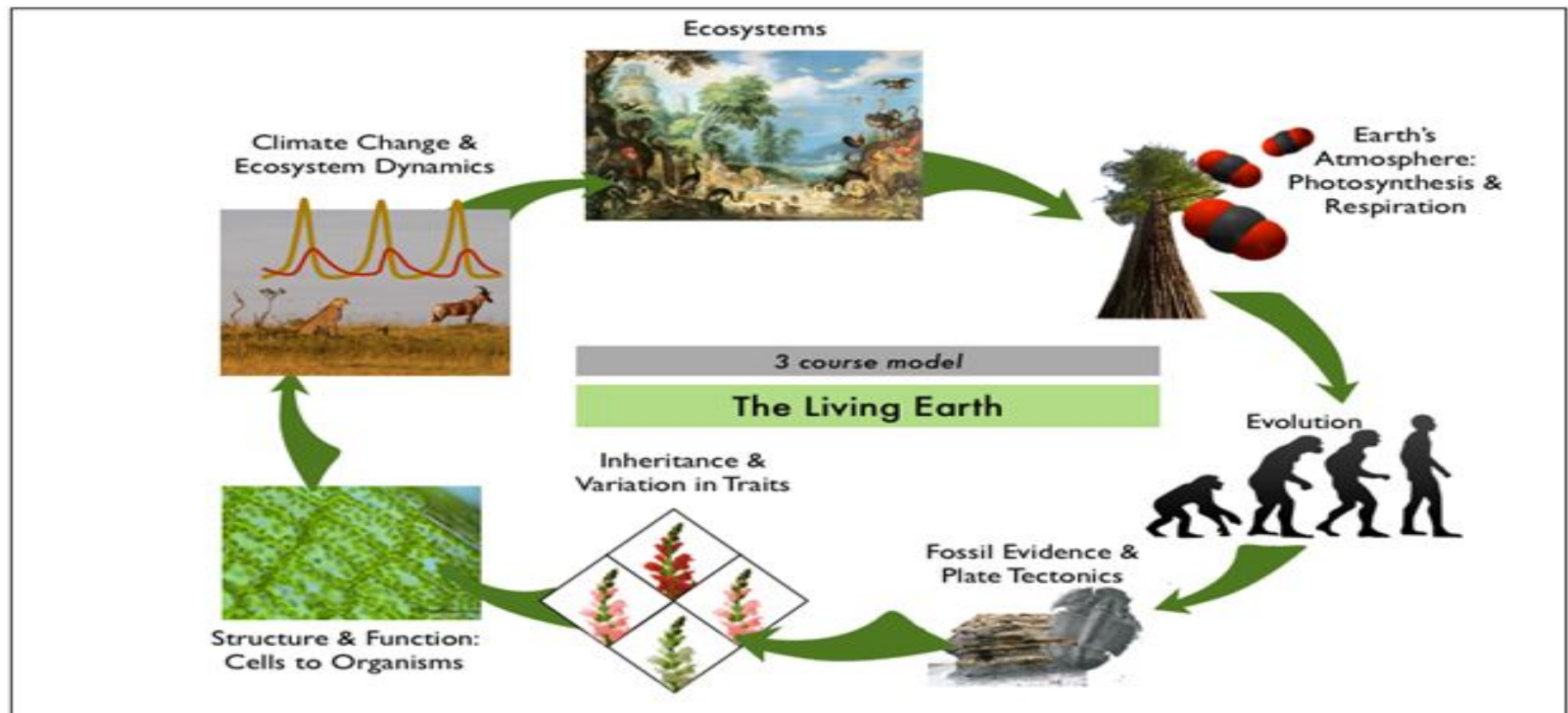
Physics



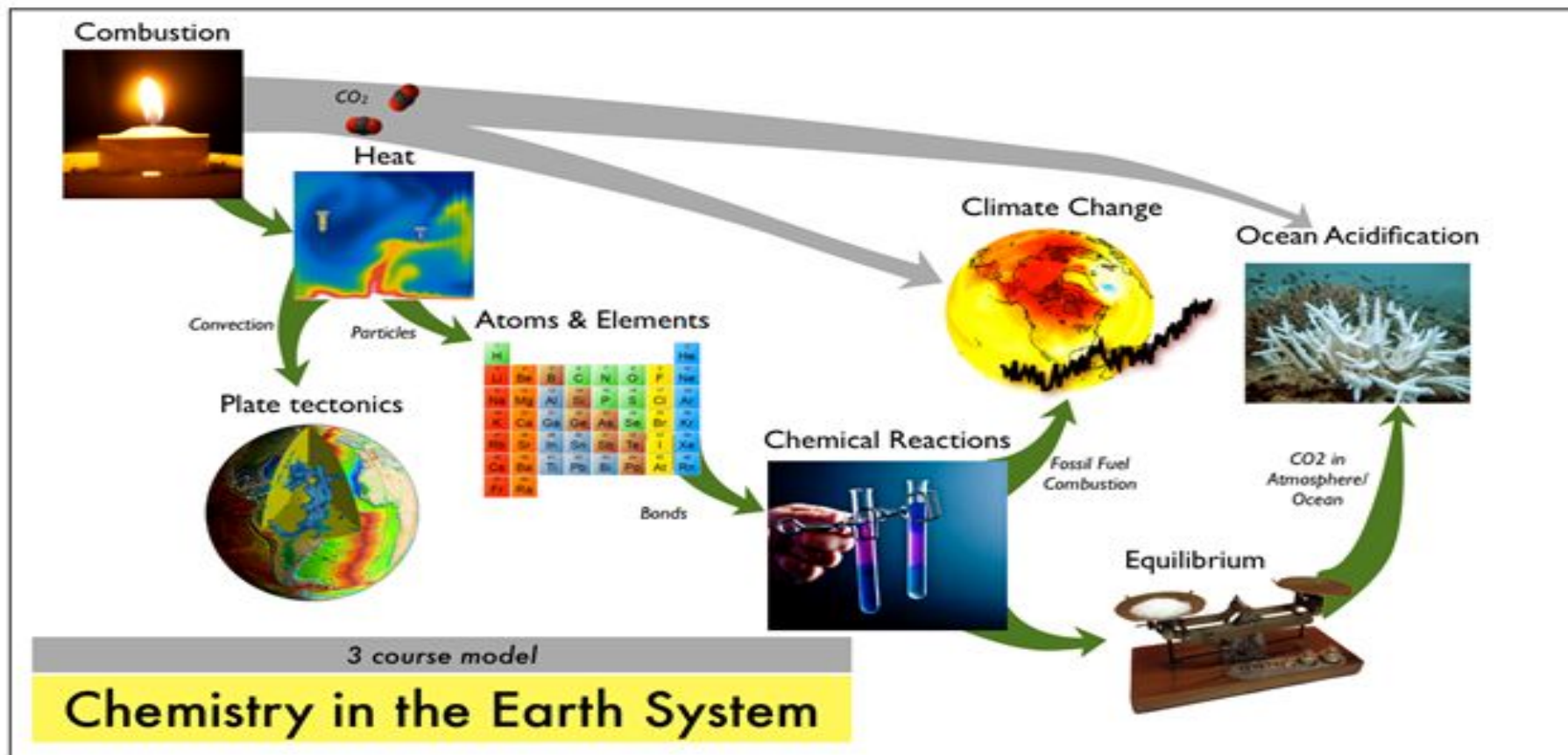
Earth/Space Science



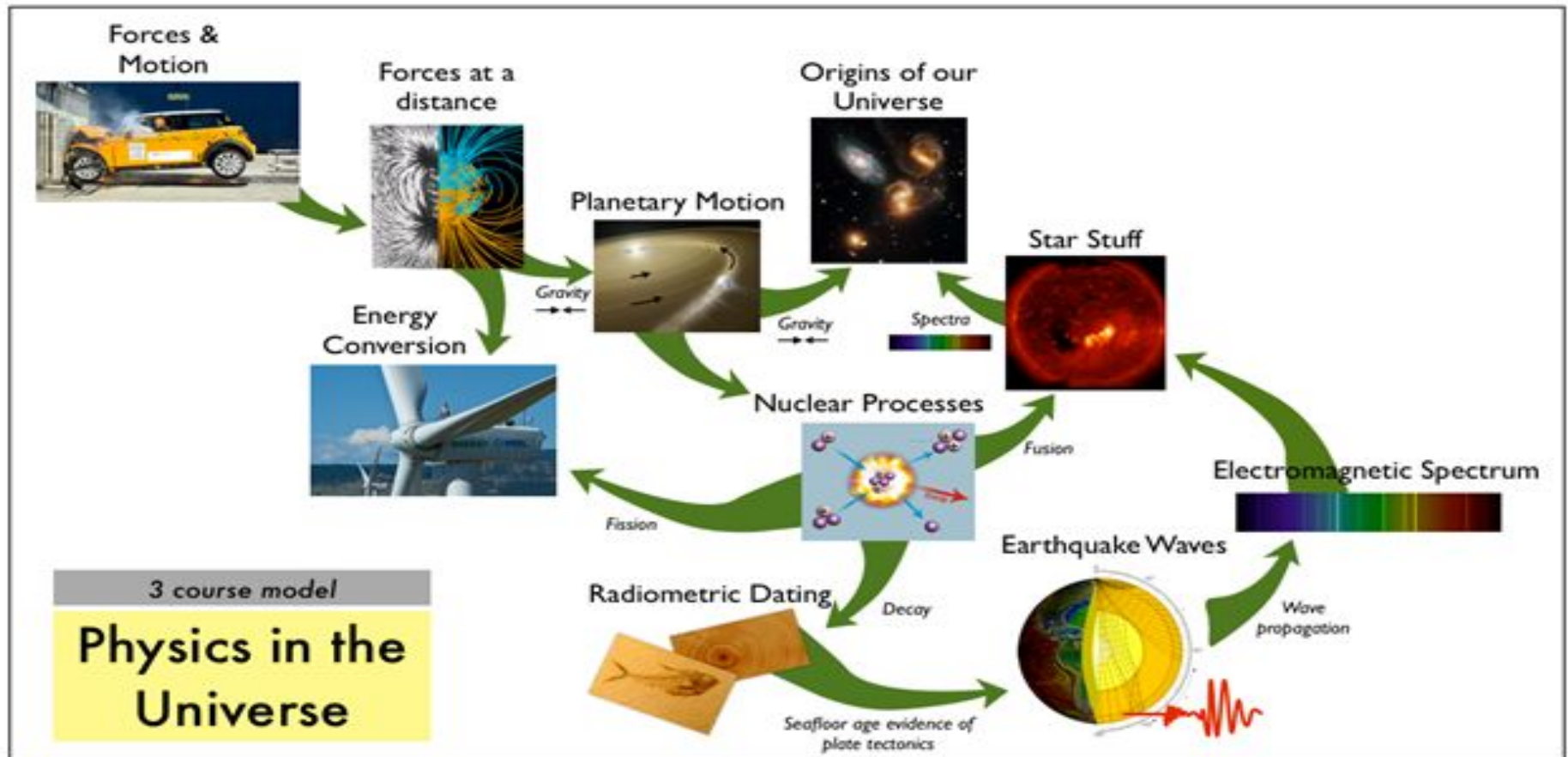
THE LIVING EARTH: INTEGRATING LIFE & EARTH SCIENCE



CHEMISTRY IN THE EARTH SYSTEM: INTEGRATING CHEMISTRY & EARTH SCIENCE



PHYSICS IN THE UNIVERSE: INTEGRATING PHYSICS AND EARTH & SPACE SCIENCE



SCIENCE ASSESSMENT



Spring 2017
Pilot item/
item tryout



Spring 2018
Field Test
(census)



Spring 2019
Operational
Administration

Segment A

Segment B

Segment C

**CA NGSS PEs
measured by
grade/grade span**

Gr. 5: Grade 5-specific PEs
Gr. 8: Grade-span PEs
Gr. 10/11/12: Grade-span
PEs

Gr. 5: Grade 5-specific PEs
Gr. 8: Grade-span PEs
Gr. 10/11/12: Grade-span
PEs

Gr. 5: Grade-span PEs
Gr. 8: Grade-span PEs
Gr. 10/11/12: Grade-span
PEs

RESOURCES

NGSS Standards

<http://www.nextgenscience.org/>

California Draft Science Framework

<http://www.cde.ca.gov/ci/sc/cf/scifw1st60daypubreview.asp>

NGSS Parent Q & A

<http://ngss.nsta.org/parent-q-and-a.aspx>

Common Core Math Standards

<http://www.corestandards.org/Math/>

Designing High School Math Courses

http://www.corestandards.org/assets/CCSSI_Mathematics_Appendix_A.pdf