DRAFT

Grade 8 NGSS
Curriculum Map by Instructional Segment
Instructional Segment 1: Objects Move and Collide

A Guide To The Curriculum Maps

Background

The California Department of Education (CDE) developed a new Science Framework for public schools. The new Framework divided the academic year into instructional segments. Each instructional segment has a set of standards, also called Performance Expectations (PEs). These performance expectations are the same standards featured in The Next Generation Science Standards developed by Achieve Inc. with the collaboration with 26 states including California. The CA Science Framework provides supporting context for the standards in each instructional segment. To access this specific instructional segment as written in the CA Framework click on the link in the title above. The Science Leadership Team, a group of teacher leaders, under the guidance of the Division of Instruction, has developed curriculum maps to help schools with the implementation of the new Framework. The purpose of these curriculum maps is not to provide a detailed account of what teachers need to teach, that has to wait until the adoption or the selection of new instructional materials in the 2020-2021 school year. **The purpose of the curriculum maps is to provide guidance on the standards for each grade level, a suggested sequence to learn the standards, and recommended lessons or units. The sequence of the standards and the lessons provided are OPTIONAL for schools.**

Definition of terms used in the *Curriculum Map*

- ***Instructional Segments* and *Guiding Questions*** provided by the CA Framework to help teachers and students understand the rationale and the context behind bundling specific standards in each instructional segment and how they may be connected. They may also help teachers identify an appropriate phenomenon to engage their students in.
- ***Standards* (PEs)** are listed here as they appear in the CA Framework and The Next Generation Science Standards. Click on the link for each standard to access:
    - The Three Dimensions of learning for this Performance Expectation
    - The Clarification Statement which outlines the focus of the PE
    - The Evidence Statement which lists the observable features of student performance
- ***Possible Phenomena*** CA Framework stated that "The word phenomenon (plural phenomena) in science means any observable event that occurs in a natural or a designed system. A ball bouncing is just as much a phenomenon as is a volcano erupting. To access possible phenomena click on this link. *CA NGSS* instruction begins by introducing phenomena, and lessons progress as students apply each of the three dimensions to understand and explain the phenomena". The phenomena listed in this column are possible examples of how to engage students in a meaningful way so instructional activities are intentionally sequenced and built on each other. The phenomena provide relevant context and a purpose for students to learn science and apply their learning to explain an event, solve a problem, or design a solution. This list is not conclusive and more phenomena may be added. Please send your suggested phenomenon through the feedback link
- ***Assessment*** This section will contain assessments with developed rubrics and/or scoring guide which includes LAUSD Interim Assessments. The items under *Other Suggested Assessment* are available as additional resources for teachers who may wish to implement them. These assessments, including the district interim assessments, are optional for schools and meant to inform instruction in the classroom.

DRAFT

- ***Units/Lessons/Simulations/Labs*** CDE is planning on a new adoption of science instructional materials for schools in 2018-2019. Therefore, until then, a list of instructional resources are suggested here to help teachers in planning. The provided list is not conclusive and may not cover all standards in the segment. The items listed under *Units* have intentionally sequenced lessons so students build on prior experiences to develop a deeper understanding overtime. These units are recommended to teach as is with teachers utilizing appropriate strategies to make the materials accessible to their students. The items listed under *Reading Materials/Lessons/Simulations/Labs* included as resources to be considered in the context of NGSS units and not meant to be taught as stand alone resources. NGSS instruction is best delivered by addressing science phenomena with well sequenced lessons. For LAUSD recommendation on how to collaborate to plan an NGSS unit click on this link.

Safety

The safety of students and staff is paramount. Please take the following steps to ensure safety of everyone in your classroom:

1- Check with your Chemical Safety Coordinator regarding the safety measures you should undertake for each lab
2- Consult with California Safety Handbook prior to conducting labs
3- Get your principal's approval for all labs that require chemicals or any materials that might be hazardous which have potential to cause harm to humans, animals, or the environment including materials that are corrosive, flammable, poisonous, explosive, or toxic
4- Click on this website http://lausd-oehs.org/productreview_chemeval.asp to check the approval for the chemicals you intend to use
5- Check with the Chemical Safety Coordinator at your school for safe disposal of chemicals

Theme: Objects Move and Collide

Guiding Questions:

- What are forces and how do they affect the motions of objects?
- Do objects always need a force in order to keep moving?
- What happens when a moving object collides with something?
- How do fossils provide evidence of an ancient collision that wiped out the dinosaurs?

DRAFT

Performance Expectations	Possible Phenomena	Assessments	Units/Lessons/Simulations/Labs*
MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. MS-PS2-1 Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects. MS-PS2-2 Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. MS-PS3-1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the	What caused the mass extinctions and species diversification events that happen repeatedly in Earth's history? Cannon Recoil Why doesn't a toy car move unless you push it? Why does a soccer ball slow down and stop after you kick it? Rubbing hands together. Billiard balls hitting each other.	LAUSD Interim Assessment _____	**Reading Resources:** CK-12 Physical Science Concepts for Middle School - eTextbook CK-12 Life Science for Middle School - eTextbook CK-12 Earth Science Concepts for Middle School - eTextbook **CK-12 Learning Modules:** CK-12 MS-LS4-1 Resources • Fossils • Mass Extinction • Earth History and Clues from Fossils CK-12 MS-PS2-1 Resources • Newton's Third Law • Momentum • Conservation of Momentum CK-12 MS-PS2-2 Resources • Acceleration • Velocity • Inertia • Free Body Diagrams • Newton's First Law • Newton's Second Law • Friction CK-12 MS-PS2-4 Resources • Newton's Universal Law of Gravitation • Gravity in the Solar System CK-12 MS-PS3-1 Resources CK-12 MS-ETS1-1,2,3&4 Resources

mass of an object and to the speed of an object. 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 that may limit possible solutions. 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.			**Example/Possible Lessons & Labs:** MS-LS4-1 The Day the Mesozoic Died (video) MS-PS2-1 Newton's Third Law - Complete Toolkit MS-PS2-2 Bumper Duck MS-PS2-2 Science of NHL Hockey MS-PS2-4 Exploring Gravity MS-ETS1-2 Lift chair Challenge **Simulations:** PhET Motion Simulations • Collisions Lab (MS-PS2-1) • Forces and Motion: Basics (MS-PS2-2) • Forces in 1 Dimension (MS-PS2-2) • Forces and Motion (MS-PS2-2) • The Moving Man (MS-PS2-2) • Gravity and Orbits (MS-PS2-4) • Energy Skate Park: Basics (MS-PS3-1) • Energy Skate Park (MS-PS3-1)

*Reading materials, individual lessons, and simulations are included as resources to be considered in the context of NGSS units and not meant to be

taught as stand alone resources. NGSS instruction is best delivered by addressing science phenomena. For LAUSD recommendation on how to plan an NGSS unit click on this link.