Students in grade seven learn about earth science topics such as plate tectonics. Specifically, they have gathered information about how plate tectonics relate to earthquakes in California, and they are now creating a labeled diagram to show the plates' locations and movements. During science instruction, the students engage in collaborative discussions about the informational texts they read and the multimedia they view. These conversations are particularly animated as the school is not far from the epicenter of a recent earthquake.

During designated ELD time, teachers discuss the language resources used in the science texts and tasks to support ELs' use of this language in speaking and writing. They draw students' attention to domain-specific vocabulary (e.g., mantle, lithosphere), general academic vocabulary (e.g., distribution, movement), and adverbials (e.g., along breaks in the crust, at the rate of) that students will need in order to comprehend the content of the texts they read and to effectively express their understandings during discussions, labs, and in writing. Teachers also highlight morphology in the informational texts students read, showing them how shifts in word structure (e.g., suffixes) can change not only a word's part of speech but also where it can be used in a sentence (e.g., converge/convergent, diverge/divergent). Instruction about morphology can deepen understanding of syntax. In addition to word level analysis and discussion, teachers strategically select sentences, such as complex sentences or those with long noun phrases, that may be challenging for the students to unpack and understand (e.g., “The second type of earthquake associated with plate tectonics is the shallow-focus event unaccompanied by volcanic activity.” [http://earthquake.usgs.gov]). When analyzing these sentences with students, teachers first model their thought processes by using strategies, such as think alouds, and then engage students in deciphering the meanings of the sentences before identifying the grammatical boundaries (e.g., which words constitute the noun phrases or dependent clauses in sentences).

Ultimately, the discussion is about how the language of the science texts is used to convey particular meanings about content students are learning. Therefore, during designated ELD, teachers provide structured opportunities for students to practice analyzing and discussing the language in the science texts they are reading and to talk about their ideas using the new language. With such practice, students will be better able to use the language more confidently during science-based speaking and writing tasks, and their awareness of how English works to make meaning in science will be enhanced.

CA ELD Standards: ELD.P1.7.6a, c, 8, 12a-b; ELD.P1.7.4-7
CA CCSS for ELA/Literacy: RI.7.3-4; L.7.1, 3, 6
Related CA Next Generation Science Standard:
MS-ESS2-2 History of Earth: Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
### DISCIPLINE SPECIFIC GRADE EIGHT INSTRUCTIONAL SEGMENT 4: WAVES TRANSMITTING ENERGY AND INFORMATION

The bundle of performance expectations above focuses on the following elements from the NRC document *A Framework for K–12 Science Education*:

<table>
<thead>
<tr>
<th>Highlighted Science and Engineering Practices</th>
<th>Highlighted Disciplinary Core Ideas</th>
<th>Highlighted Crosscutting Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>[SEP-8] Obtaining, Evaluating, and Communicating Information</td>
<td></td>
<td></td>
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</tbody>
</table>

**CA CCSS Math Connections:** 6.RP.1, 3a–d; 7.RP.2a–d; 8.F.3; MP.2, MP.4

**CA CCSS for ELA/Literacy Connections:** RST.6–8.1, 2, 9; WHST.6–8.9; SL.8.5

**CA ELD Connections:** ELD.PI.1.1, 3, 6a, 6b, 10b, 11a; ELD.PI.1.1

Learning how to convert electricity to electromagnetic radiation has allowed engineers to design an array of technology, especially technology to help communicate voices, images, and data. In this instructional segment, students make simple models of how waves travel and how they can be used to transmit information.

### Opportunities for ELA/ELD Connections

During the instructional segment, have students develop a sequenced set of illustrations with accompanying content vocabulary to convey their understanding of waves. Students can use concept maps, word webs, or graphic organizers (e.g., Frayer Model) to identify corresponding types, examples and nonexamples, definitions, illustrations of a concept, or essential (or nonessential) characteristics. These strategies help all learners acquire effective vocabulary-development strategies as they acquire content knowledge.

**CA CCSS for ELA/Literacy Standards:** RST. 6–8.4; L.6–8.4

**CA ELD Standards:** ELD.PI.6–8.6

Even though radio waves used for communication are invisible oscillations of electromagnetic fields, they share a lot in common with waves in the ocean and other examples of *mechanical waves*. Mechanical waves involve the back-and-forth motion...