<table>
<tr><td>Strand 8.2: Energy is stored and transferred in physical systems</td><td colspan="2">Objects can store and transfer energy within systems. Energy can be transferred between objects, which involves changes in the object’s energy. There is a direct relationship between an object's energy, mass, and velocity. Energy can travel in waves and may be harnessed to transmit information.</td></tr>
<tr><td>Standard: 8.2.6

(MS-PS4-3.)</td><td colspan="2">Obtain and evaluate information to communicate the claim that the <u>structure</u> of digital signals are a more reliable way to store or transmit information than analog signals. Emphasize the basic understanding that waves can be used for communication purposes. Examples could include using vinyl record vs. digital song files, film cameras vs digital cameras, or alcohol thermometers vs. digital thermometers.</td></tr>
<tr><td>SEP/CCC</td><td>Obtaining, Evaluating and Communicating Information
Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings.</td><td><u>Structure and Function</u>
Structures can be designed to serve particular functions.</td></tr>
<tr><td>DCI</td><td colspan="2">PS4.C: Information Technologies and Instrumentation
Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information.</td></tr>
<tr><td>Student Friendly Objective</td><td colspan="2">I can research different ways that waves can be used for communication.

I can evaluate the reliability of digital vs analog signals.</td></tr>
<tr><td>Anchor Phenomena</td><td colspan="2">Digital signals are a more reliable way to store or transmit information than analog signals.</td></tr>
<tr><td rowspan="2">Vertical Learning Progression</td><td>Previous Science Content
(Discussed in K-7 Standards)</td><td>Future Science Content
(Discussed in 9-12 Standards)</td></tr>
<tr><td>People use devices to send and receive information.
Patterns can encode, send, receive and decode information.</td><td>Waves can be used to transmit information and energy.
Large amounts of information can be stored and shipped around as a result of being digitized.
Shapes of analog vs. digital waves. Analog waves are sinusoidal and digital waves are square.</td></tr>
<tr><td>What students will be doing this year:</td><td colspan="2">Obtaining information
a. Given materials from a variety of different types of sources of information (e.g., texts, graphical, video, digital), students gather evidence sufficient to support a claim about a phenomenon that includes the idea that using waves to carry digital signals is a more reliable way to encode and transmit information than using waves to carry analog signals.
Evaluating information
a. Students combine the relevant information (from multiple sources) to support the claim by describing:
i. Specific features that make digital transmission of signals more reliable than analog transmission of signals, including that, when in digitized form, information can be:
1. Recorded reliably.
2. Stored for future recovery.</td></tr>
</table>

	3. Transmitted over long distances without significant degradation. ii. At least one technology that uses digital encoding and transmission of information. Students should describe how the digitization of that technology has advanced science and scientific investigations (e.g., digital probes, including thermometers and pH probes; audio recordings).