

## HS-PS4-2

Students who demonstrate understanding can:

**HS-PS4-2. Evaluate questions about the advantages of using a digital transmission and storage of information.** [Clarification Statement: Examples of advantages could include that digital information is stable because it can be stored reliably in computer memory, transferred easily, and copied and shared rapidly. Disadvantages could include issues of easy deletion, security, and theft.]

The performance expectation above was developed using the following elements from *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Asking Questions and Defining Problems</b> Asking questions and defining problems in grades 9–12 builds from grades K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.</p> <ul style="list-style-type: none"> <li>Evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set or the suitability of a design.</li> </ul>	<p><b>PS4.A: Wave Properties</b></p> <ul style="list-style-type: none"> <li>Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses.</li> </ul>	<p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Systems can be designed for greater or lesser stability.</li> </ul> <p>-----</p> <p><b>Connections to Engineering, Technology, and Applications of Science</b></p> <p><b>Influence of Engineering, Technology, and Science on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>Modern civilization depends on major technological systems.</li> <li>Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks.</li> </ul>

### Observable features of the student performance by the end of the course:

1	Addressing phenomena or scientific theories
	<p>a Students evaluate the given questions in terms of whether or not answers to the questions would:</p> <p style="padding-left: 20px;">i. Provide examples of features associated with digital transmission and storage of information (e.g., can be stored reliably without degradation over time, transferred easily, and copied and shared rapidly; can be easily deleted; can be stolen easily by making a copy; can be broadly accessed); and</p> <p>b In their evaluation of the given questions, students:</p> <p style="padding-left: 20px;">i. Describe* the stability and importance of the systems that employ digital information as they relate to the advantages and disadvantages of digital transmission and storage of information; and</p> <p style="padding-left: 20px;">ii. Discuss the relevance of the answers to the question to real-life examples (e.g., emailing your homework to a teacher, copying music, using the internet for research, social media).</p>
2	Evaluating empirical testability
	Students evaluate the given questions in terms of whether or not answers to the questions would provide means to empirically determine whether given features are advantages or disadvantages.