CONTENT ASSESSMENT GUIDE

Why are digital signals a more reliable way to send information than analog signals?	
The continuum of understanding should be assessed based on how much of a thorough understanding/explanation students develop overall, not necessarily how many specific bullet-pointed ideas they include.	

Thorough Understanding	Explanation addresses all the following ideas in some way:
	• Signal characteristics:
	  ○ Signals are sent via electromagnetic (EM) waves.
	  ○ Digital signals represent only 0 and 1 (discrete), while analog signals have many possible values (continuous).
	  ○ Digital signals are frequency-dependent, while analog signals vary based on amplitude.
	• Connection between signal characteristics and reliability:
	  ○ Since analog signals are continuous, they may generate meaningless signals (i.e., "static" or "noise") through sending waves of the wrong amplitudes.
	  ○ Digital signals are "cleaner" because there are only two possible signals, and there is a brief gap between each signal sent. Even if signal amplitude varies, it will still transmit the same information.

Partial Understanding	Explanation addresses some combination of ideas from the "Thorough Understanding" category. Some possible combinations: • Thorough explanation of **both** signal characteristics and reliability for **only one** of the signal types. • Thorough explanation of **both** signal characteristics and reliability for **only one** signal type and a partial explanation for the other signal type. • Addresses **both** signal characteristics and reliability for digital and analog signals, but details are only **partially** explained.
Limited Understanding	Explanation addresses a limited number of ideas from the "Thorough Understanding" category. Some possible responses: • Thorough explanation of **either** signal characteristics **or** reliability for **only one** signal type. • Addresses **both** signal characteristics and reliability for digital and analog signals, but it is an **incomplete**, disconnected, and/or random explanation of ideas.

Why do video game graphics improve over time?	
The continuum of understanding should be assessed based on how much of a thorough understanding/explanation students develop overall, not necessarily how many specific bullet-pointed ideas they include.	
Thorough Understanding	Explanation addresses all the following ideas in some way: • The higher resolution of newer video game graphics is generated by an increased number of electromagnetic (EM) wave signals, compared with the limited number of EM waves that produce graphics in older video games. ○ Newer video game graphics have more pixels. This means the images in newer games have more details and, therefore, have higher resolution than the images in older games. • Newer electronic devices have more memory and are faster than older ones. This allows newer devices to quickly process the increased number of EM wave signals that generate high-resolution images.
Partial Understanding	Explanation addresses **only one** of the ideas from the "Thorough Understanding" category. Either: • How resolution increases (with or without pixel details), **or** • How increased memory and processing speed allows for high-resolution images.
Limited Understanding	Explanation **partially** addresses **only one** of the ideas from the "Thorough Understanding" category. Either: • How resolution increases (with or without pixel details), **or** • How increased memory and processing speed allows for high-resolution images.