

Lab- Analog vs. DIGITAL

In this activity, you will visit 9 different stations. At those stations, you will learn about communicating through analog vs. digital. Complete the activities and questions at each station.

Station 1- Structure of Waves

Watch the following video to answer the questions below.

<https://www.youtube.com/watch?v=XCu6L4kQF3k&index=3&t=77s&list=PLC4Twbo4BF7DKjez7f4yh3iAbZVVg7-s>

1. Trace over the ANALOG wave in RED. Trace over the DIGITAL wave in BLUE.

2. Analog signals vary _____ in amplitude and frequency.

4. A digital signal can only take two values... a _____ or a _____.

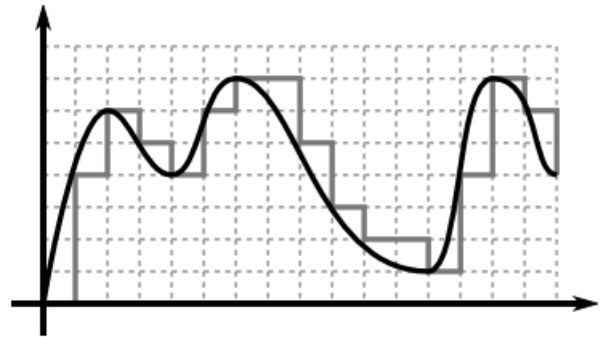
5. Digital is a much better way of sending information over _____ distances.

6. Noise or _____ damages an analog signal.

7. _____ is not a problem for digital but is a _____ problem for analog.

8. List 2 benefits of digital signals:

- _____ quality
- Can carry more _____.



Station 2- Cameras

At your lab station, there are pictures of two different types of cameras. Read about each type of camera and answer the following questions.

1. Which type of camera is analog?

2. Which type of camera is digital?

3. How do I see the picture from the digital camera after it is taken?

4. How do I see the picture from the analog camera after it is taken?

Read the Pros and Cons about **cameras** to answer the following questions.

5. Which type of camera has better natural lighting?
6. Which type of camera is more pricey up front?
7. Which type of camera can show you the pictures as soon as they are taken?
8. Which type of camera is more convenient?

Station 3- Communicating with Waves

Read the information sheet about Communicating with Waves and fill out the chart below describing how each type of wave is used in communication.

Type of Wave	Example of how the type of wave is used in communication.
Radio	
Microwave	
Visible Light	
Infrared	

Station 4- Walkie Talkie

Have one student go out into the stairwell and call back into the lab on the walkie talkie. Read about walkie talkies and answer the following questions.

1. Can walkie talkies work without cell service?
2. What type of frequency do walkie talkies work on?
3. Give 2 examples of vacations where walkie talkies would be preferred over cell phones.
 - a.
 - b.
4. List 2 examples of why walkie talkies are better than cell phones.
 - a.
 - b.
5. List 2 examples of why cell phones are better than walkie talkies.
 - a.
 - b.

Station 5- Comparing Analog to Digital

Using the information at your table, fill in the chart below comparing analog to digital.

	Analog	Digital
Signal		
Waves		
Representation		
Example		
Technology		
Data Transmissions		
Response to Noise		
Flexibility		
Uses		
Bandwidth		
Memory		
Power		
Cost		

Station 6- Thermometers

Put the thermometer in the beaker of water on your lab table. Add a cube of ice. Take the temperature of the water every 30 seconds for 2 minutes (using both types of thermometers) and record in the table below. Then answer the questions.

Time	Regular Thermometer	Digital Thermometer
0:00		
0:30		
1:00		
1:30		
2:00		

1. Which type of thermometer was easier to read?
2. Which type of thermometer had to be plugged in and charged?
3. Which type of thermometer seemed to gradually increase?
4. Which type of thermometer seemed to instantly jump to the next degree?

