


Welcome to our presentation

 Introduce the **Making Waves** project's big ideas and themes

 Share how educators can use our **hands-on activities** shared through the **NISE Network**

 Share our interactive adventure story app called **Whispers in the Wind** and our website **Radioeverywhere.org**



BSCS Science Learning

Colorado Springs, CO

Children's Creativity Museum

San Francisco, CA

Sciencenter

Ithaca, NY

Museum of Life and Science

Durham, NC

Community Partners

El Centro Hispano

Durham, NC

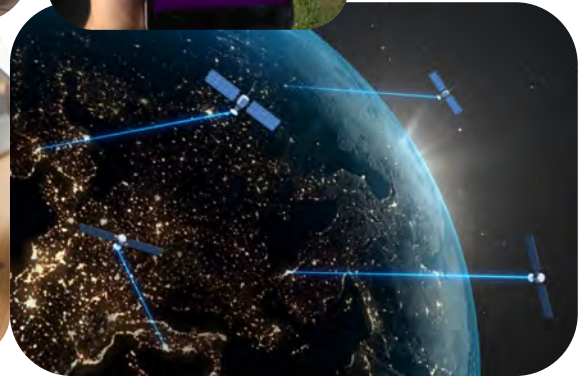
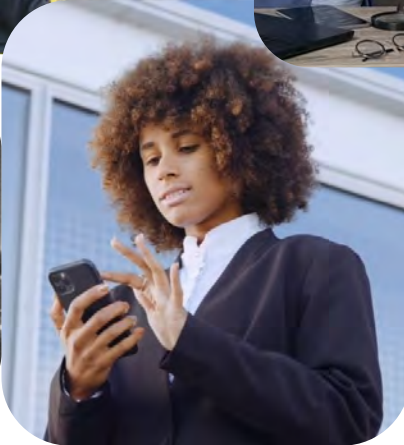
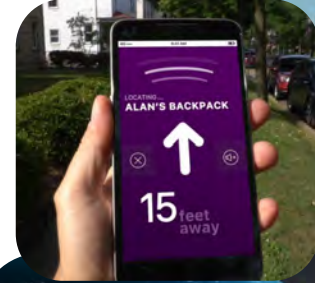
Science & Visitor Center

Arecibo Observatory

Arecibo, Puerto Rico



What is radio?



Why radio?



Radio signals are everywhere and are all around us.

To participate, everyone in society should have a basic understanding of the science of radio, how radio frequency communications technologies work, and envision new possibilities for our future with radio technologies.

Radio literacy is important!



Project Themes

Physics of Radio

Radio Communication
Technology

Radio in Society

5 Big Ideas in Radio Frequency Communications

SCIENCE
TECHNOLOGY
SOCIETY

1

Electromagnetic radiation is all around at all times.

2

Radio waves transfer energy that can be reflected, absorbed, or passed through materials.

3

Engineers create technologies to securely encode and decode information carried by radio waves.

4

Making radio technology equitable requires all of our voices.

5

Radio innovations may create surprising ways to communicate in the future.

Physics of Radio

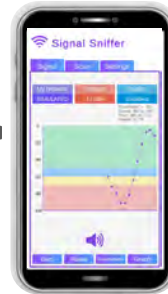
Radio Communications Technology

Radio in Society



Radio Explorers
Messages from Space

Sound Detc.



Radio Explorers
Wi-Fi Detective

Wi-Fi Detc.



Radio Futures
You Decide



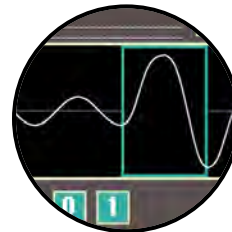
Radio Futures
I Spy Radio



Radio Explorers
Radio Silence



Web Interactive
Parity Blitz



Web Interactive
Operation Modulation



Mobile App
Whispers in the Wind

Making Waves Activities

nisenet.org/radio

Radio Explorers



Radio Silence

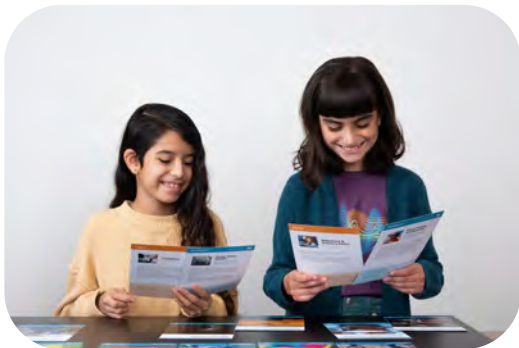


Messages from Space



Wi-Fi Detective

Radio Futures



You Decide



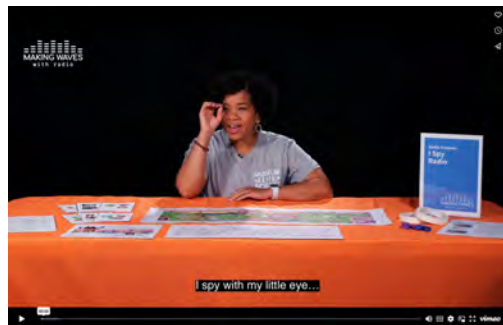
I Spy Radio

NISE
NATIONAL INFORMAL
STEM EDUCATION
NETWORK



Making Waves Activities

nisenet.org/radio



Activities Include:

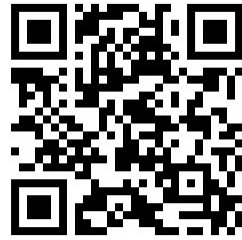
- +Activity guide
- +Facilitation guide
- +All printable materials
- +Spanish versions
- +Mobile apps
- +Activity training videos
- +Content training video

NISE
NATIONAL INFORMAL
STEM EDUCATION
NETWORK



Radioeverywhere.org

- New comprehensive website
- Browse features along with thematic categorization



MAKING WAVES WITH RADIO

Home Browse Learn About Us

RADIO EVERYWHERE

You're surrounded by radio.
We're making it visible.

[Browse Activities](#)

About Making Waves

The Making Waves activities explore the science and social impacts of radio frequency technology. They are designed for science educators in science centers and community-based organizations, but have been used in classrooms and by kids and parents at home.

[Learn More](#)

MAKING WAVES WITH RADIO

Home **Browse** Learn About Us

BROWSE

activities & products

Type

- Activity
- Craft
- Demonstration
- Game
- Mobile App
- Thinking / Experimenting
- Make

Audience

- classroom
- shop or visitor
- individual
- pair
- small group

Runtime

- 15-28 minutes

You Decide *Demonstration*

⌚ +5 minutes 👤 2+ shop or visitors ✂ paper

Explore the future of radio with cards that blend science, imagination, and curiosity, sparking thought about its role in our lives and brainstorming possibilities for future technologies.

[waves](#) [society](#)

LOL! That dog is wearing a really funny hat!

Draw a Radio Text Message *Activity*

⌚ 15-30 minutes 👤 classroom ✂ paper-pencil

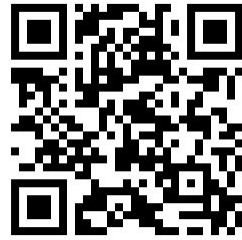
Learners draw how a cell phone message is sent to make their initial ideas visible about how radio communications work.

[waves](#) [cell phones](#) [satellites](#) [communication](#)

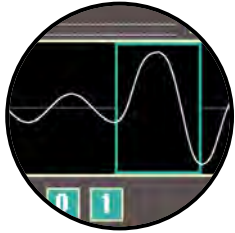
Sending Digital Images *Activity*

⌚ 30+ minutes 👤 classroom ✂ paper-pencil

Learners explore the concepts of coding and decoding messages by creating and decoding digital images using a binary code.



Web interactives to showcase digital radio



Web Interactive Operation Modulation

Digital modulation is a method used to transform digital bits of information (0s and 1s) into radio waves that can be transmitted over long distances. A radio wave, called a **carrier signal**, is changed, or **modulated**, in response to the digital bits being transmitted. The **amplitude** or the **frequency** of the carrier signal can be changed to represent the specific 0s or 1s of the digital bits.

amplitude key shifting **frequency key shifting**

0 1

0 = low amplitude
1 = high amplitude

0 1

0 = low frequency
1 = high frequency

Next

010010101

Quit

0 1

NIVEL 1

¡Una onda de radio que tiene la información digital de un smile emoji viene en camino!

¡Ahora TÚ eres la computadora y debes decodificar correctamente la onda portadora modulada digitalmente!

Cuando entre la onda de radio que usa la modulación por desplazamiento de amplitud, decide si la forma de la onda muestra un 0 o un 1 basándote en su amplitud. Los cuadros blancos se representan como un 0. Los cuadros negros se representan como un 1. ¡Al final, compararemos tu imagen decodificada con la que se envió!

0 1

Jugar

LEVEL COMPLETE!

How did you do?

Transmitted image Your decoded image

73% accurate!

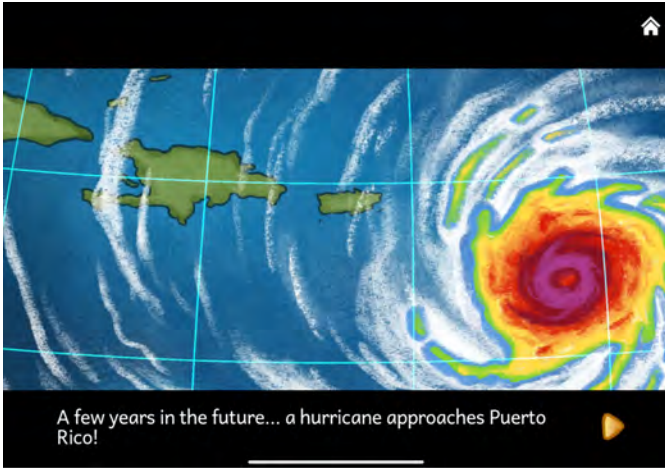
Next Level

Interactive Story App

- Phones & tablets, Apple & Android
- Awareness of Radio in your everyday life
- Reflected overall learning objects of the projects



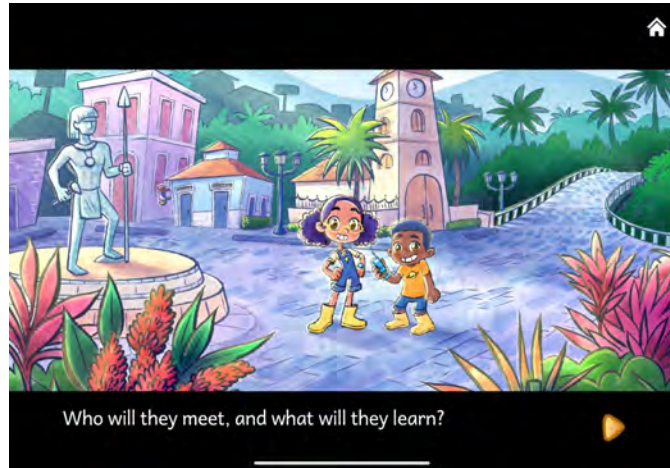
English + Español



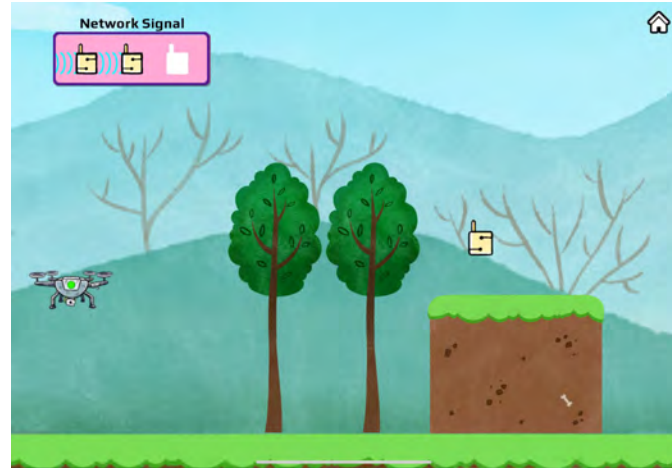
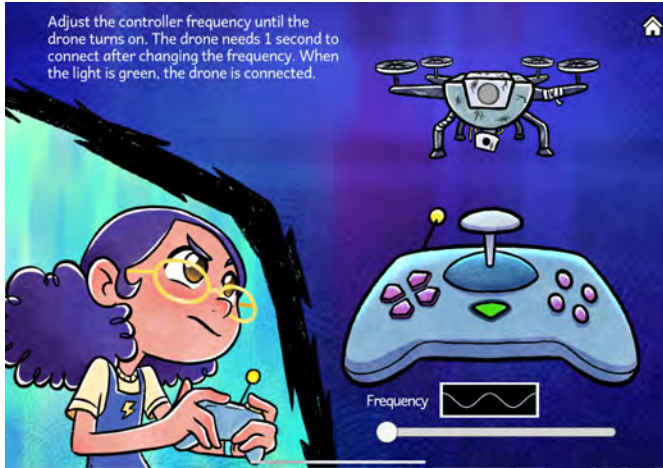
A few years in the future... a hurricane approaches Puerto Rico!



Mayor Rosa: Buenos días. Hurricane Jerrold is on the way and El Paraíso is right in its path.



Who will they meet, and what will they learn?



Thank You



ARECIBO OBSERVATORY
Puerto Rico



MUSEUM
of LIFE +
SCIENCE

iexplora!



EL
CENTRO
HISPANO
www.elcentro.org



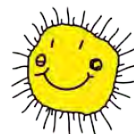
MAKING WAVES
with radio



GT
Georgia
Tech.



Global Alliance
of
Community
Science
Workshops



Children's Museum
of Brownsville



Children's
Museum
of Houston

CORPUS CHRISTI
MUSEUM
of SCIENCE
& HISTORY



CHILDREN'S
CREATIVITY
MUSEUM



Knight Williams Inc.



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