

Knowledge is NCAH!

Radio Waves

HAVE YOU EVER WONDERED:

HOW RADIOS PICK UP DIFFERENT STATIONS?



DEMONSTRATION:
MODULATING WAVES

WHAT YOU WILL NEED:

At least 3m rope, chalk, chair or pole, large outside area



WHAT ARE RADIO WAVES?

Radio waves are part of a larger group of waves called electromagnetic radiation. These radio waves are a form of energy that is emitted by a charged particle and travels through space in a wave-like form.

SO HOW DO WE GET TO HEAR PEOPLE ON RADIO?

Radio stations convert sound into electrical signals and then transmit them as radio waves. The antennae on our roof tops pick up the radio waves, and our radio sets convert them into sound that we can hear.



What to do:

- 1 Find a large area like a car park where you can draw on the ground with chalk.



- 2 Tie the rope to a chair leg or pole and lay it down in a straight line.

- 3 Draw three lines parallel to the rope and the same length – one along the rope (A), one 30cm above the rope (B) and one 60cm above the rope (C).

- 4 Holding the end of the rope, move your hand back and forth repeatedly between line A and B. What happens to the rope?



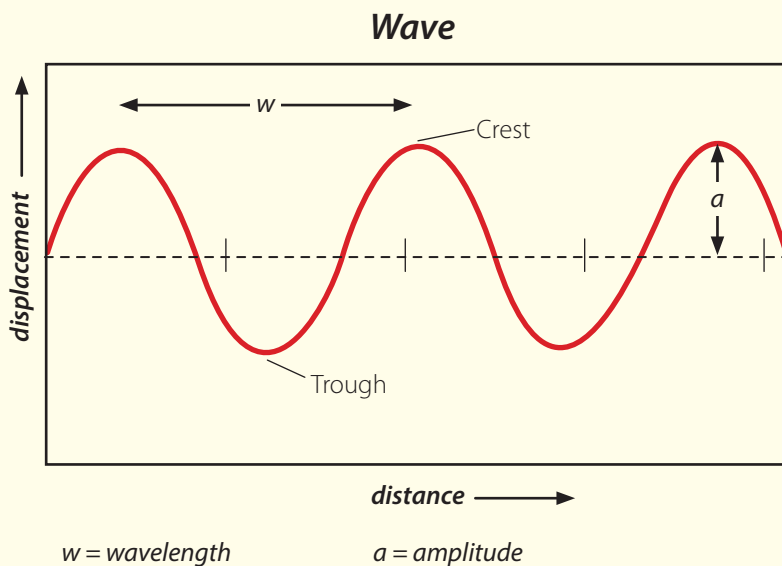
5 Repeat his movement at the same speed between A and C.

6 Repeat Steps 4 and 5 but use quicker hand movements.

What is happening?

You created a wave pattern when you shook the rope from side to side. You then MODULATED (or varied) the properties of these waves by varying your hand movements (vibrations).

When you increased the length of your vibrations, the amplitude of your waves increased. This is called Amplitude Modulation (AM). When you increased the speed of your vibrations, the number of waves per second (frequency) increased because their wavelengths decreased. This is called Frequency Modulation (FM).



AM AND FM RADIO

Your radio's antenna receives information in the form of invisible radio waves. Your radio then converts this information into electrical impulses and your speakers convert these into sound that you can listen to.

But why doesn't your radio get confused by all the radio waves from different radio stations??? Well, each station sends out different sized radio waves by modulating either the frequency (FM Radio) or the amplitude (AM). When you tune your radio you are setting the size of the radio wave it can receive. Eesh!

CAREERS



THERE ARE GREAT JOB OPPORTUNITIES IN:

- RADIO ASTRONOMY
- THE MEDIA SECTOR
- ELECTRONICS/ COMMUNICATIONS TECHNOLOGY

CURRICULUM LINKS:

Mechanics and Waves (Transverse, Electromagnetic)



Puzzle your Mind!!!

Find words which relate to waves and sound in the word search below. There are 16 in total. Look for words that run **across** (from left to right) and **down** (from top to bottom). Two of the words are parts of longer words. How many words can you find without looking at the solutions? Work in groups and then compare your answers.

SCIENCE IS NCAH!



W	A	V	E	L	E	N	G	T	H	E	R
A	M	P	L	I	T	U	D	E	S	U	S
M	U	R	A	D	I	A	T	I	O	N	S
O	S	A	N	U	D	F	M	A	L	V	I
D	I	N	E	N	E	R	G	Y	O	I	G
U	C	T	R	S	I	E	T	O	U	B	N
L	L	E	C	D	I	Q	Y	M	D	R	A
A	O	N	G	I	T	U	D	I	N	A	L
T	R	N	N	S	V	E	R	S	E	T	G
I	R	A	D	I	O	N	I	C	S	I	N
O	S	V	P	I	T	C	H	M	S	O	V
N	N	R	E	V	R	Y	S	O	U	N	D

Solution:
ACROSS: Wave, Wavelength, Amplitude, Radiation, Energy, Radio, Pitch, Sound
DOWN: Modulation, Music, Antenna, Frequency, Loud, Loudness, Vibration, Signal



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STARTING YOUR OWN SCIENCE SPAZA



Think of a place where people get together to have fun, learn from each other and pick up a few essentials. That's right! Your local spaza shop! Only this time you'll be picking up science essentials!

Science Spaza is a science club supported with fun activities as well as tips and tools to make your science time really worthwhile. It's a space where learners can engage with science in a fun and interactive manner and where teachers can get new ideas for practical science teaching.

What will you need?

- A group of friends who are excited about science
- A parent or teacher to assist you
- A time and a place to meet
- Some curiosity and an interest in finding out more about the world!



Application Form - Science Spaza

Name of school: _____

Municipality: _____

Province: _____

Name of your science club:

Contact person: _____

Name: _____

Surname: _____

Telephone number: _____

Email address: _____

Postal address: _____

To be filled in by responsible adult (parent/teacher)

Name: _____

Surname: _____

Position: _____

ID Number: _____

Signature (parent/teacher):

Date: _____

Send to PO Box 22106, Mayor's Walk, 3208, Fax to 086 610 5453
email: info@sciencespaza.org or submit your application online at
www.sciencespaza.org