

# Mizik Syans ak Teknoloji Anvan Douvanjou

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# Orè

Monday	Tuesday	Wednesday	Thursday
Voice & Hearing	Electricity	Programming	Pitch & Frequency
<u>Vibration</u>	<u>Circuit</u>	<u>Arduino</u>	<u>Song</u>
Sounds	Waveforms	Tones	Sensors
<u>Notes</u>	<u>Oscilloscope</u>	<u>Frequency</u>	<u>Effects</u>

Underlined Text denotes activities



Pale'm de ou ...

De ti mo de nou ...

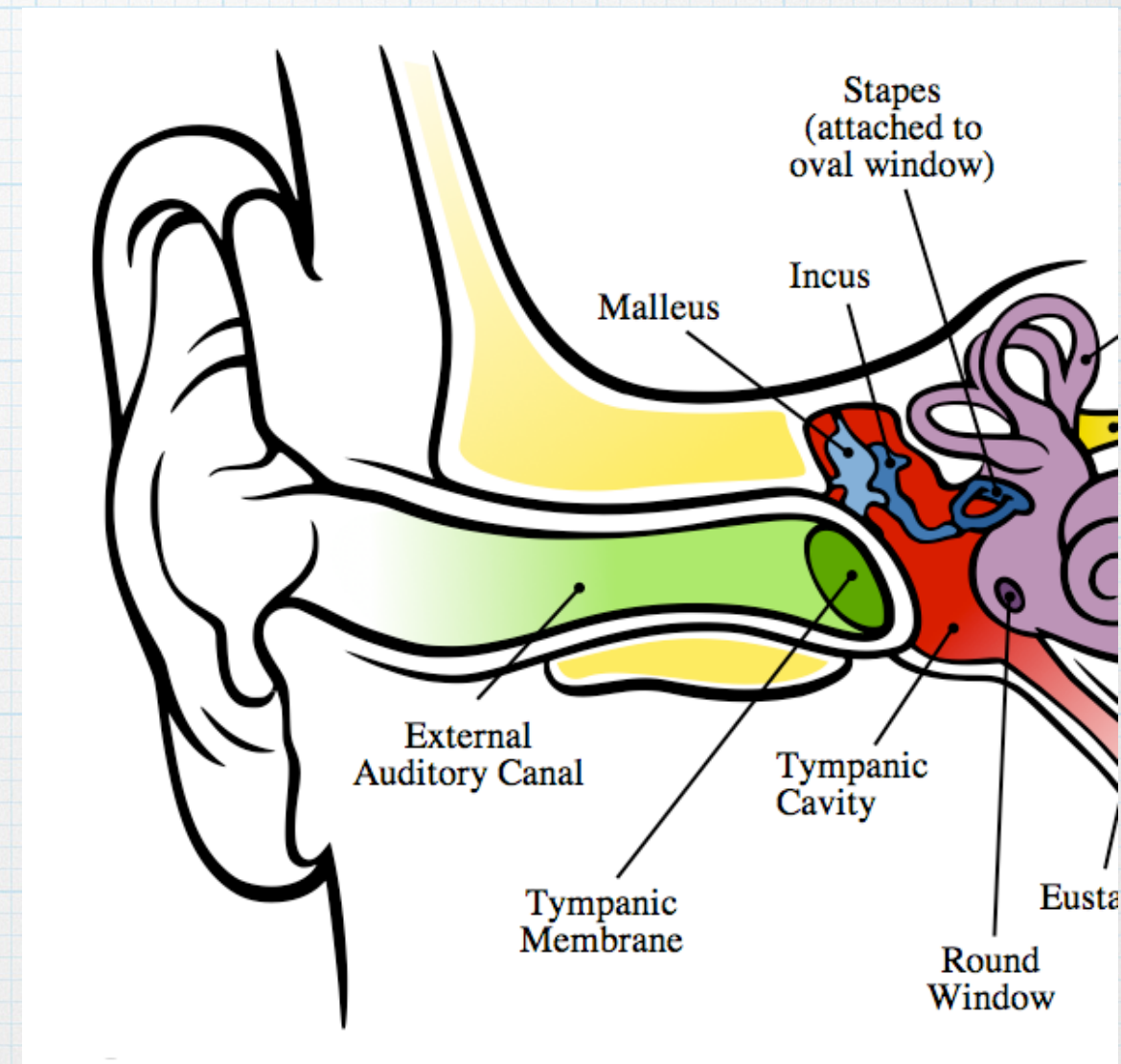


# Kesyon:

- What music do you listen to?
- What is music?
- How do you hear music?
- Tell me about musical instruments

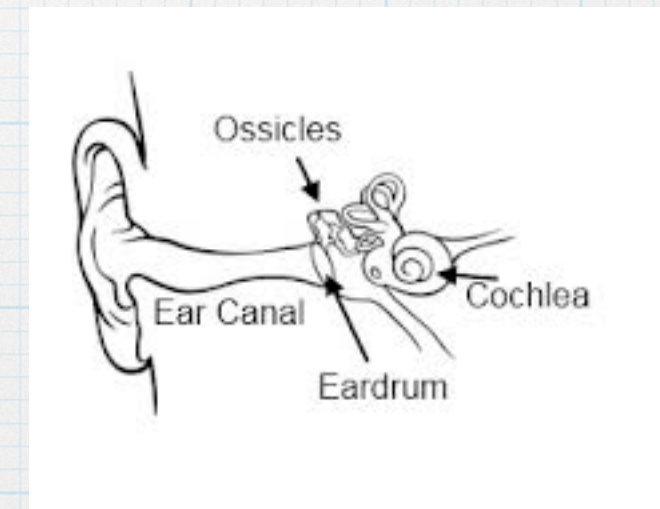
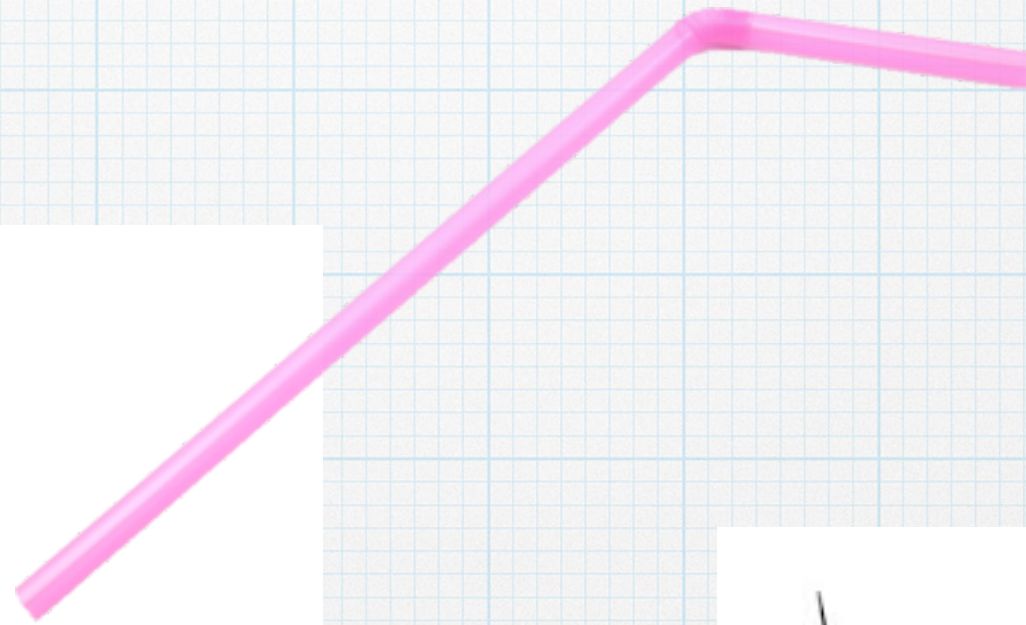
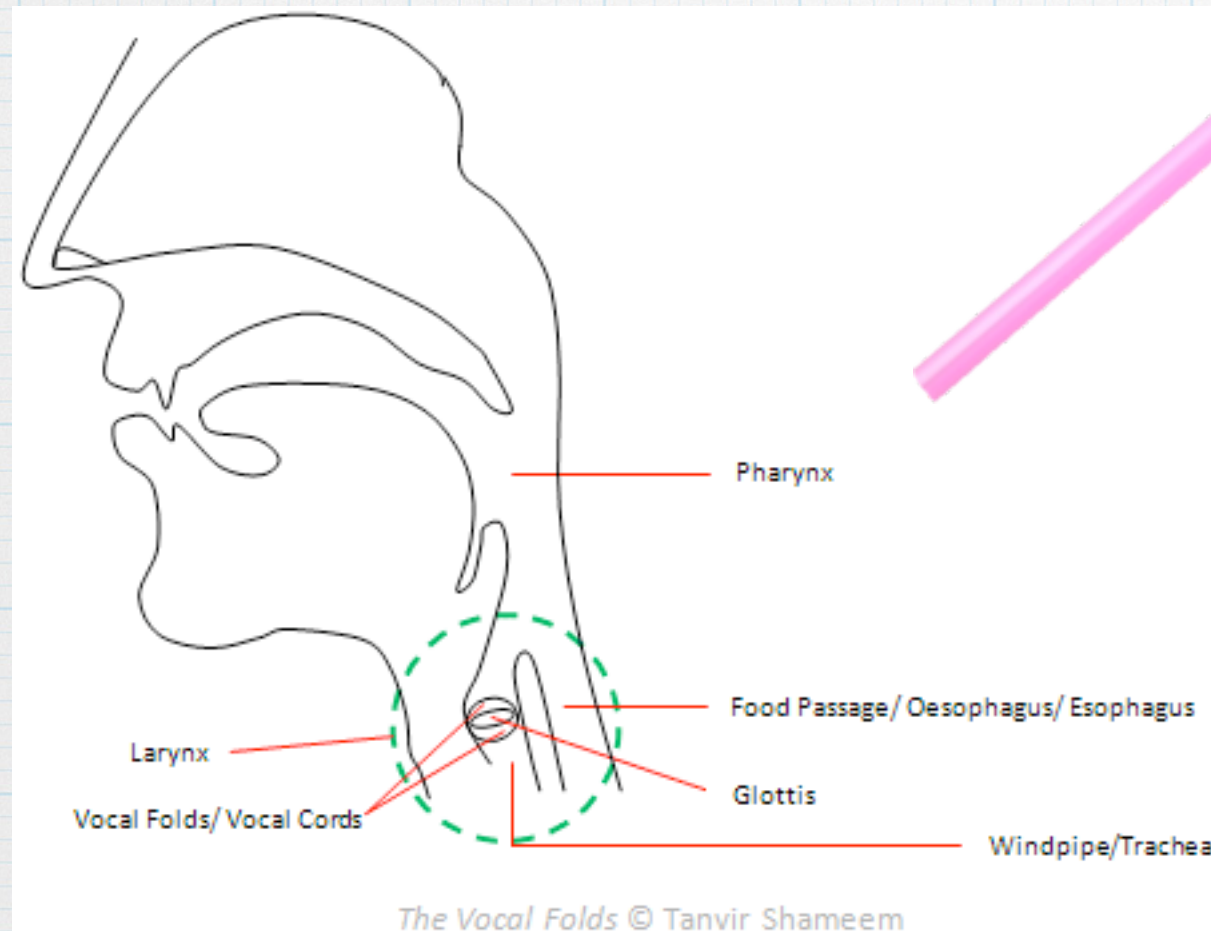


# Vwa & Odisyon





# Glòt & Tenpan



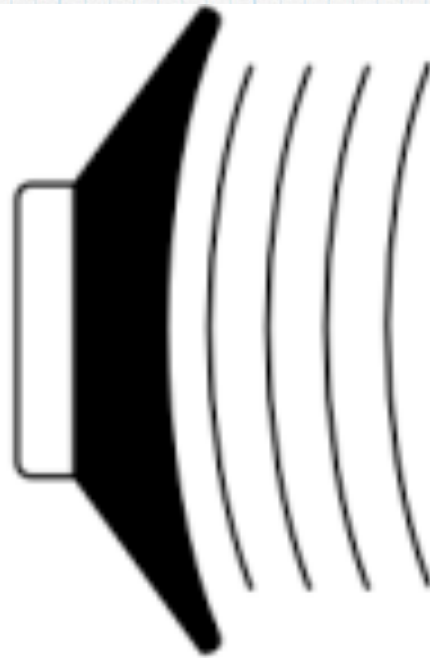


# Vibrasyon

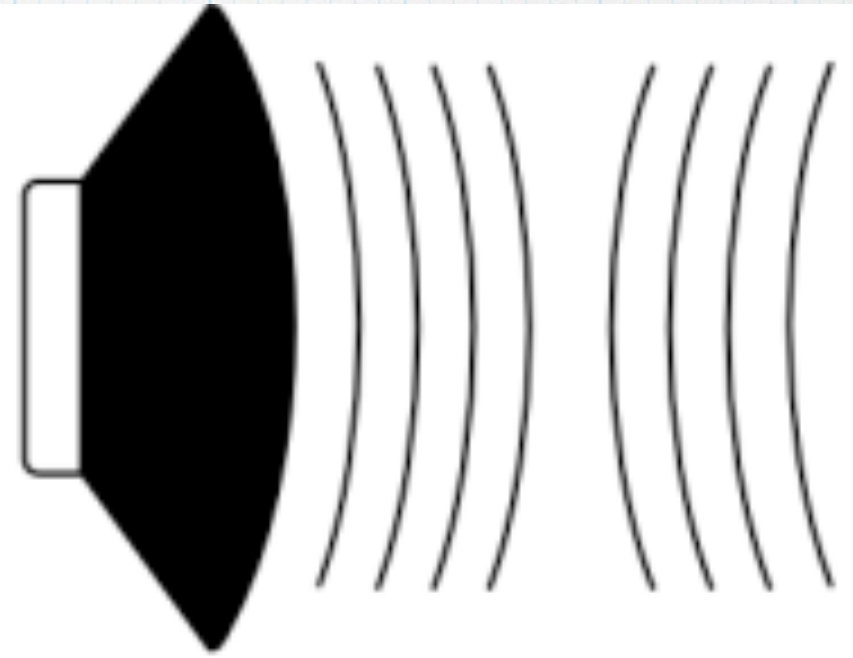
Creates variations in pressure



1. speaker at rest



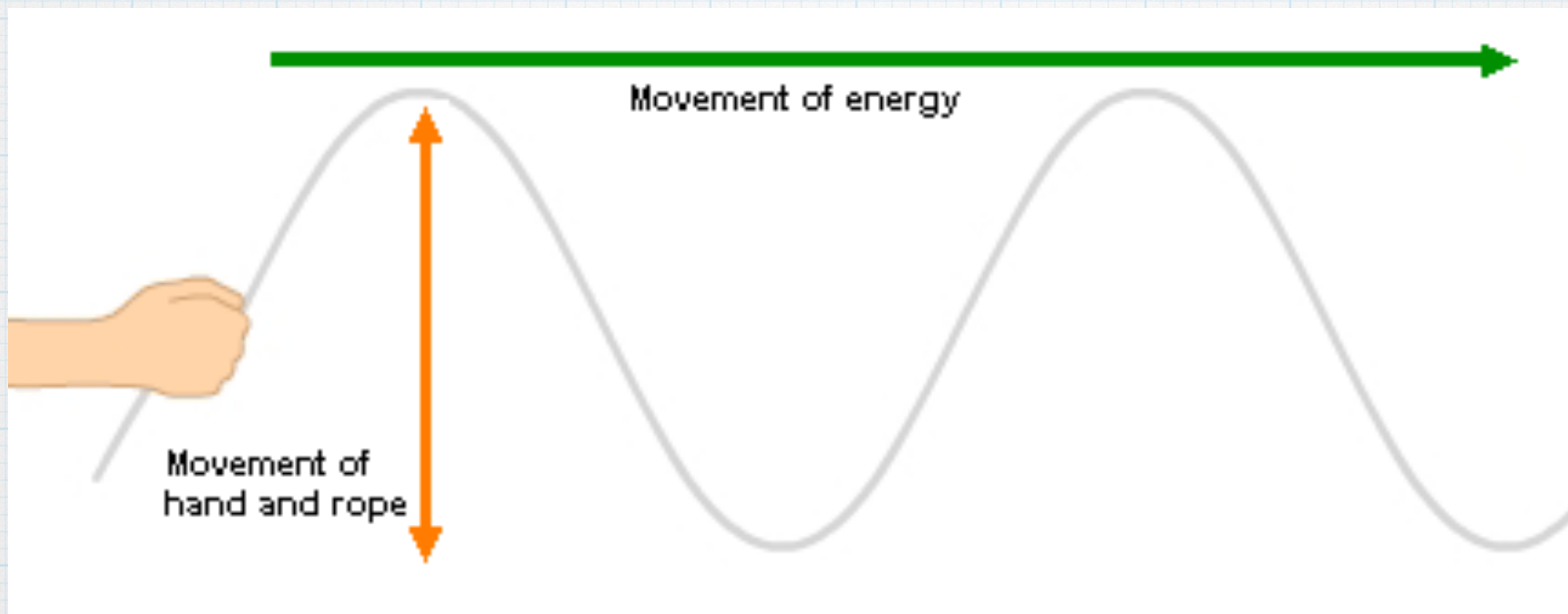
2. speaker with negative voltage



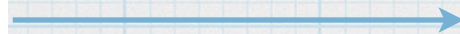
3. speaker with positive voltage



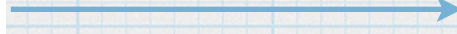
# End



**Vibration**



**Air**



**Vibration**



# Vibrasyon Opalè

1. Connect the speaker to the computer
2. Start the tone generator
3. Adjust the stroboscope frequency until the speaker stops
4. Read the frequency

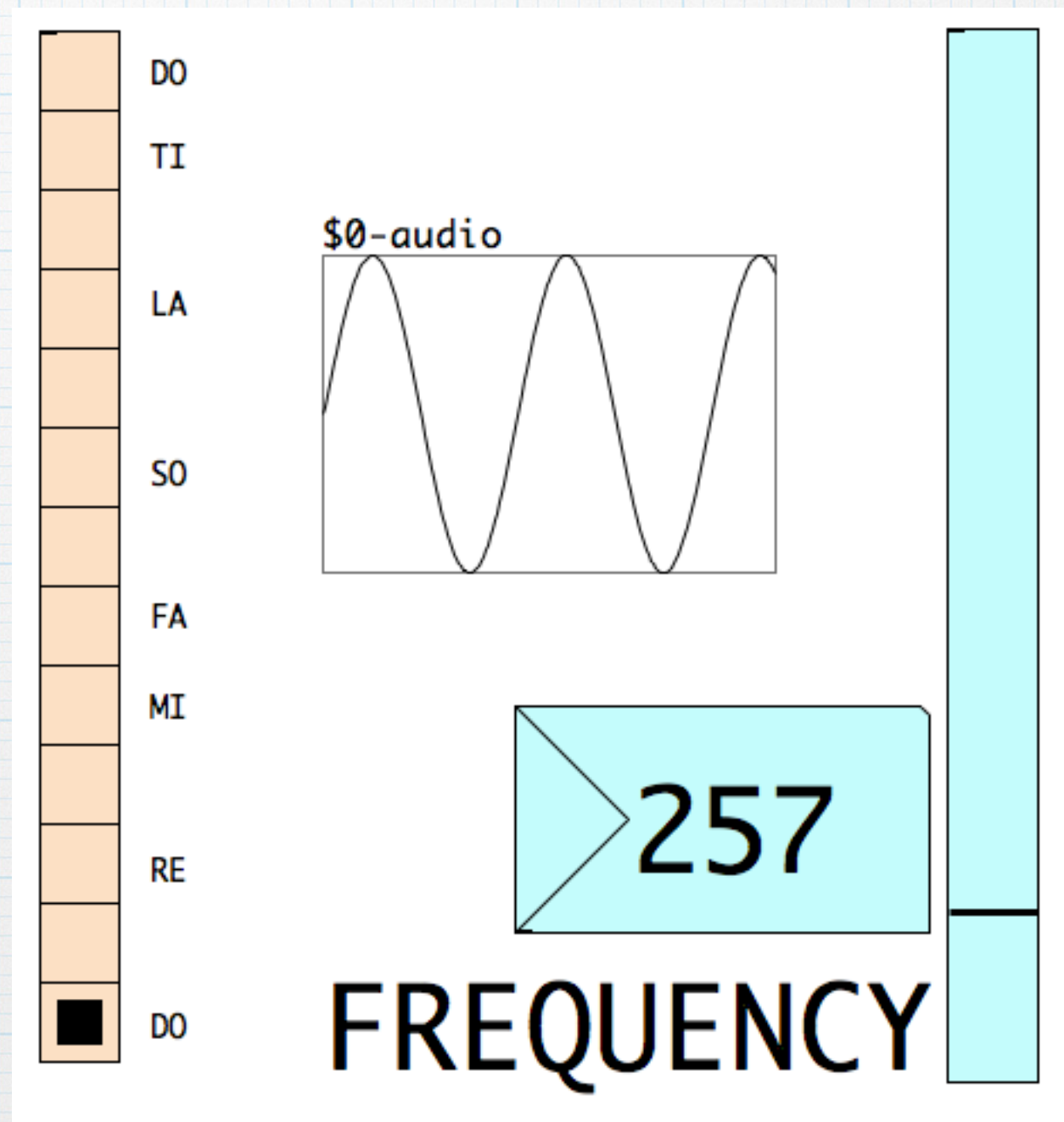


# Vibrasyon - MI

1. Play 'MI' by clicking the MI on the left column

2. Keep the "MI" in your head and match the pitch by moving the slider on the right

3. What frequency corresponds to 'MI'?



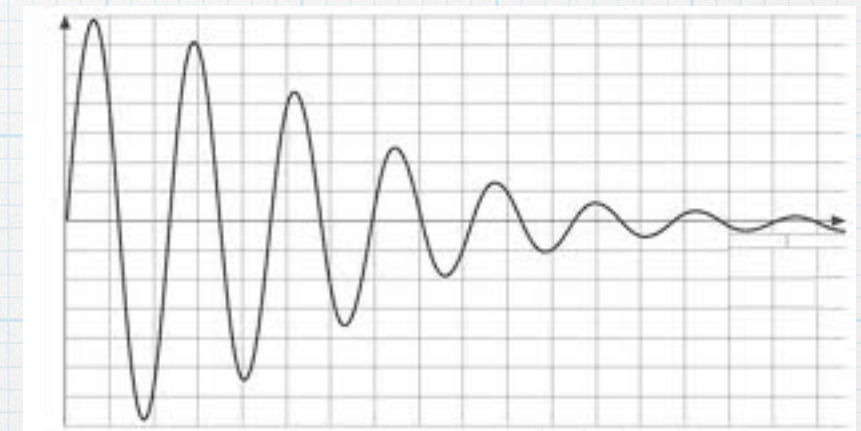


# Kalite Son

## Amplitude



## Decay



## Frequency





# Kategori Son

Sine

Triangular

Square



# Nòt Mizik

DO, RE, MI, FA, SOL, LA, SI, DO

1. Using the stroboscope, determine the frequency of each note. Write each down.
2. What is the frequency difference between consecutive notes?

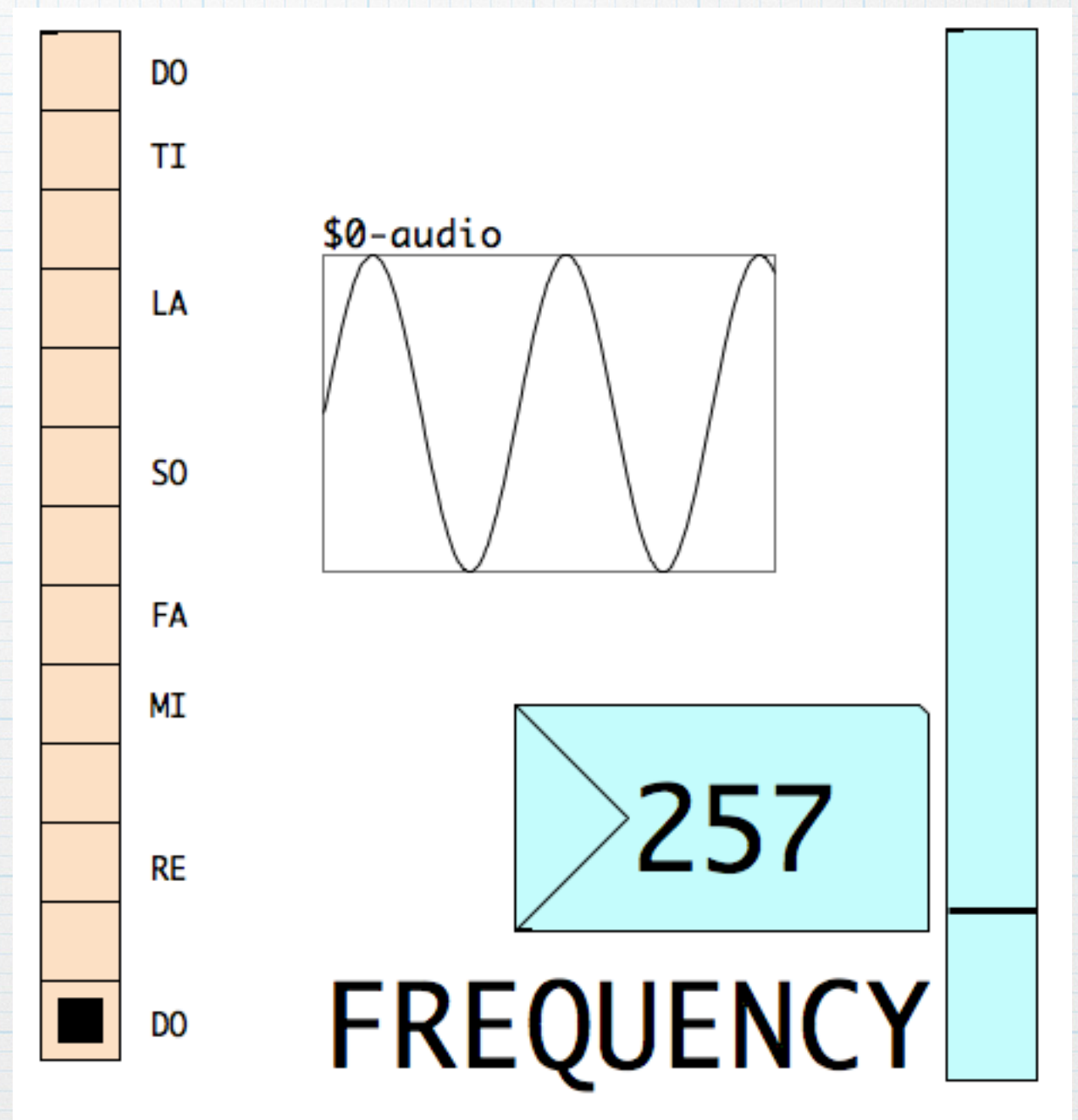


# Nòt Mizik

1. Using the slider, determine the frequency corresponding to each note

2. Find the frequency difference between consecutive note

3. What notes have the smallest and largest frequency gaps?



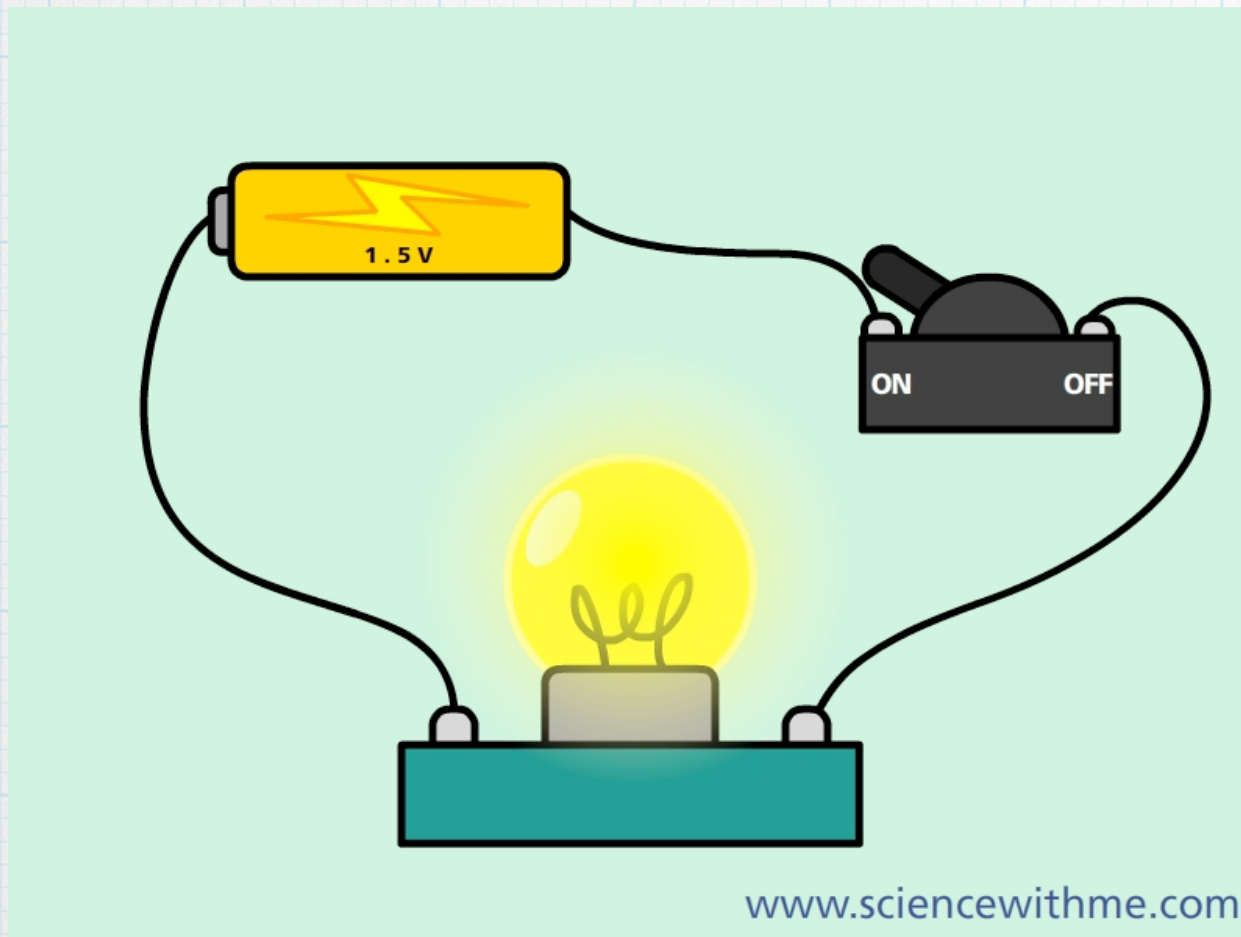


# Kesyon:

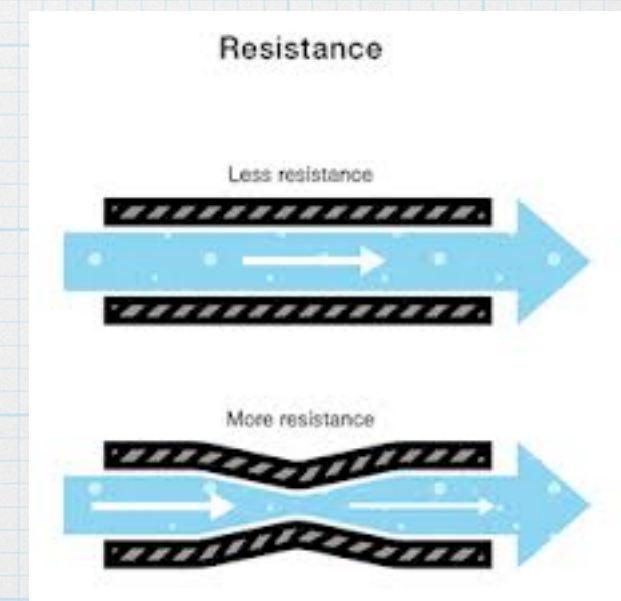
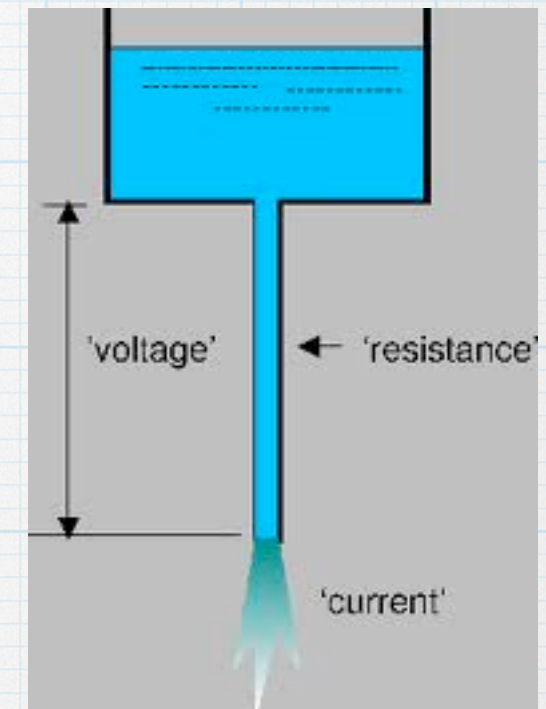
- What is electricity?
- How does electricity produce sounds?
- How does a speaker work?



# Elektricit 

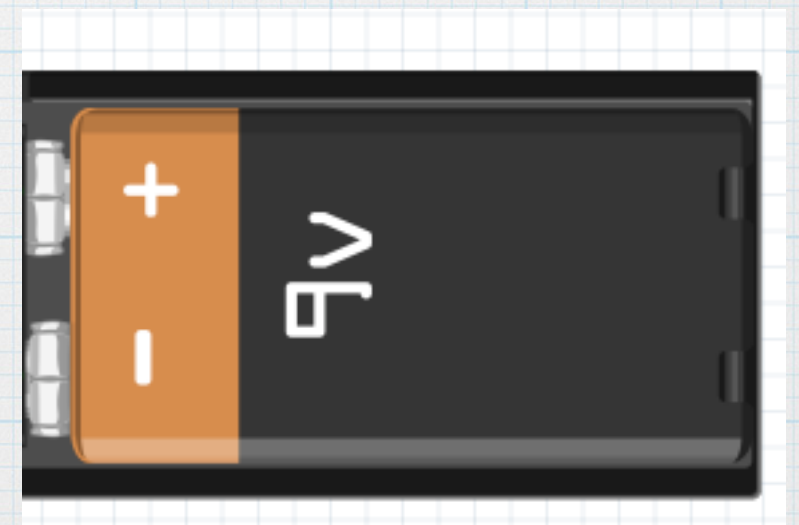
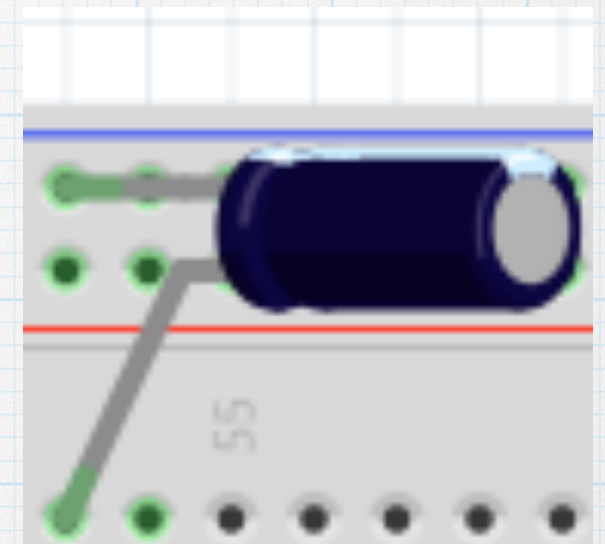
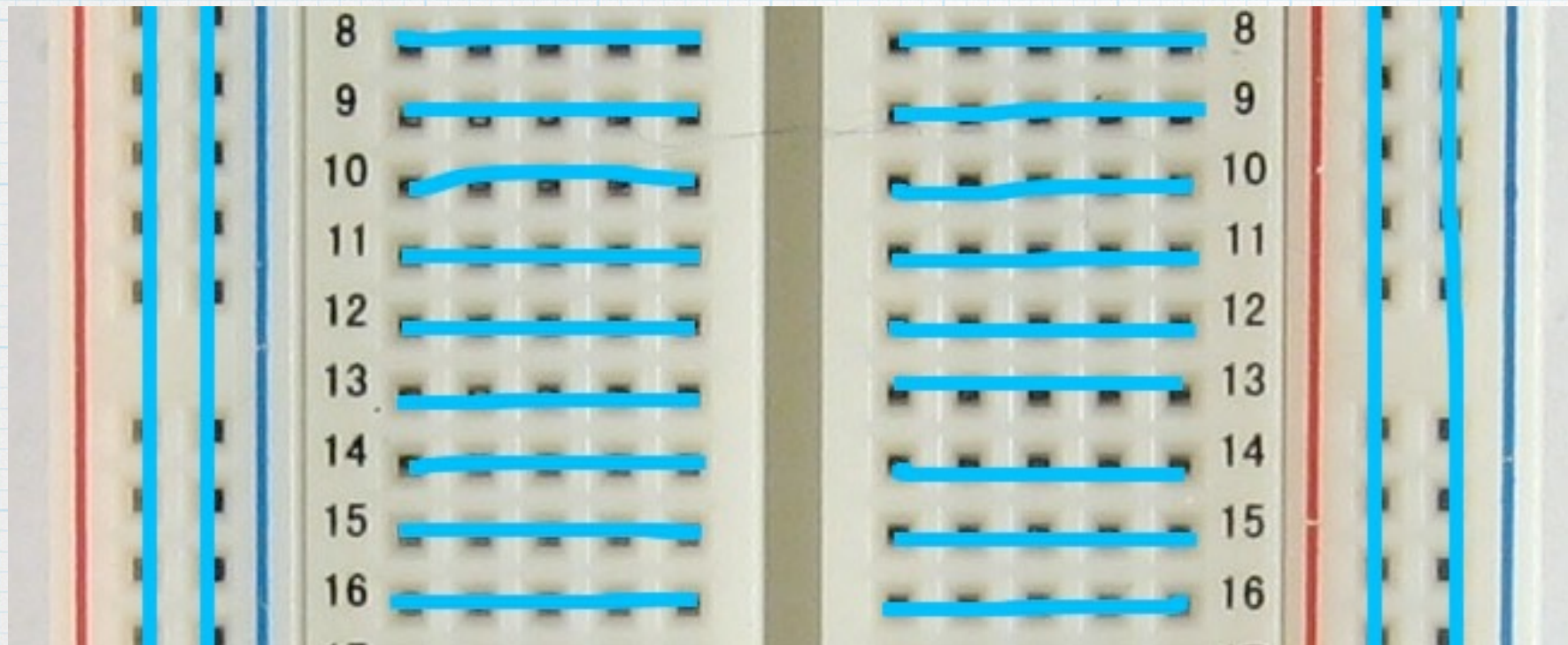


- direction (down)
- wires  $\leftrightarrow$  hose
- water  $\leftrightarrow$  current
- pressure  $\leftrightarrow$  voltage





# Композан



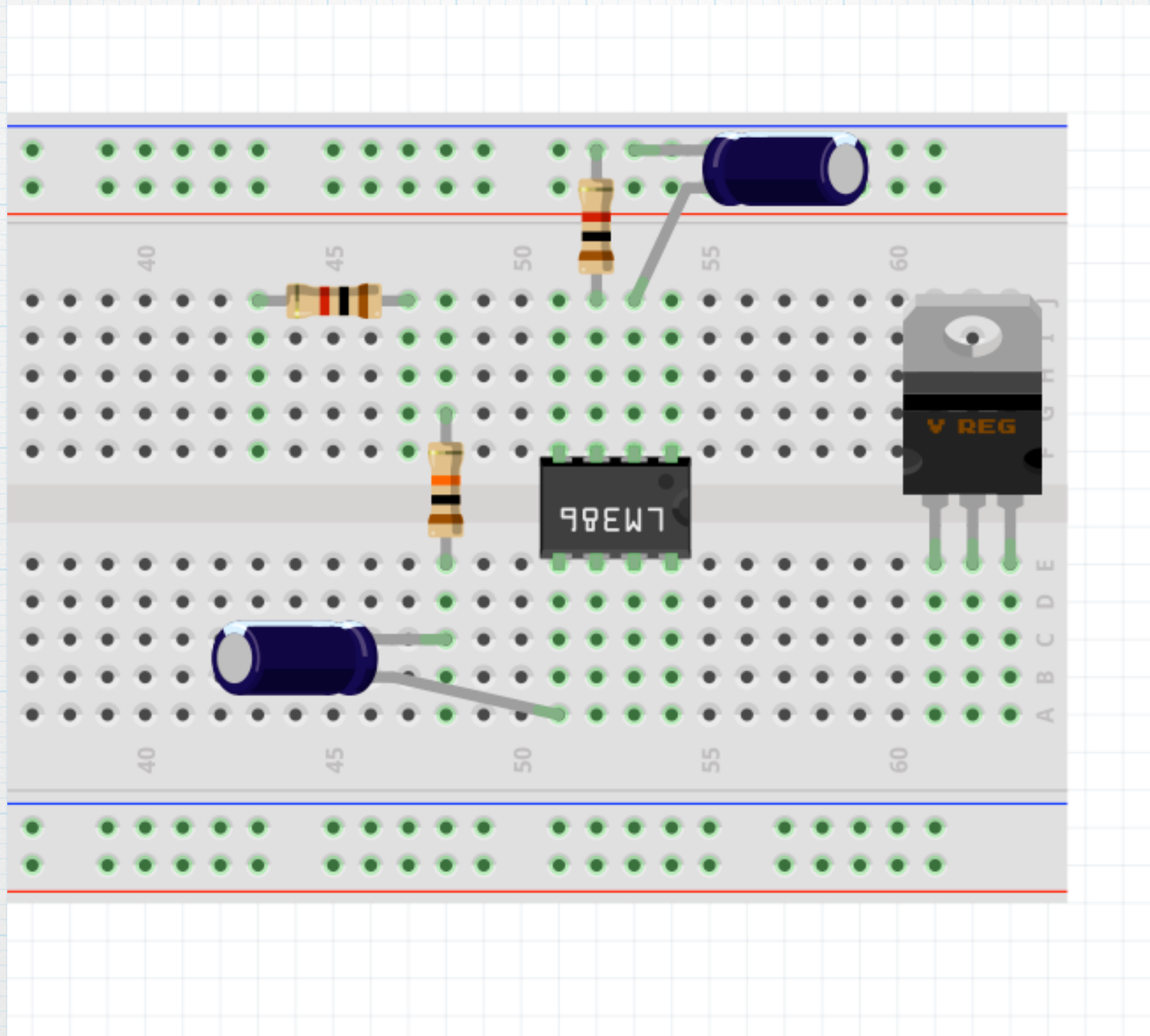


# Sikwi Osyatwa

Similar to the up/down rope movements,  
the circuit creates an electrical voltage  
vibration or oscillation

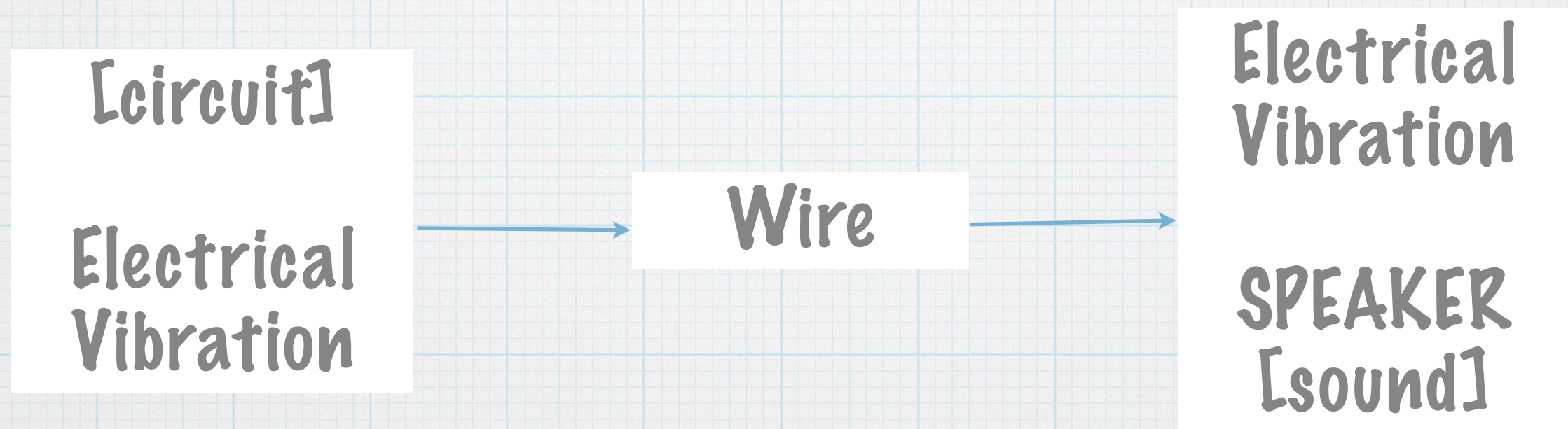


# Plasma Kompozit





# Son Elektronik



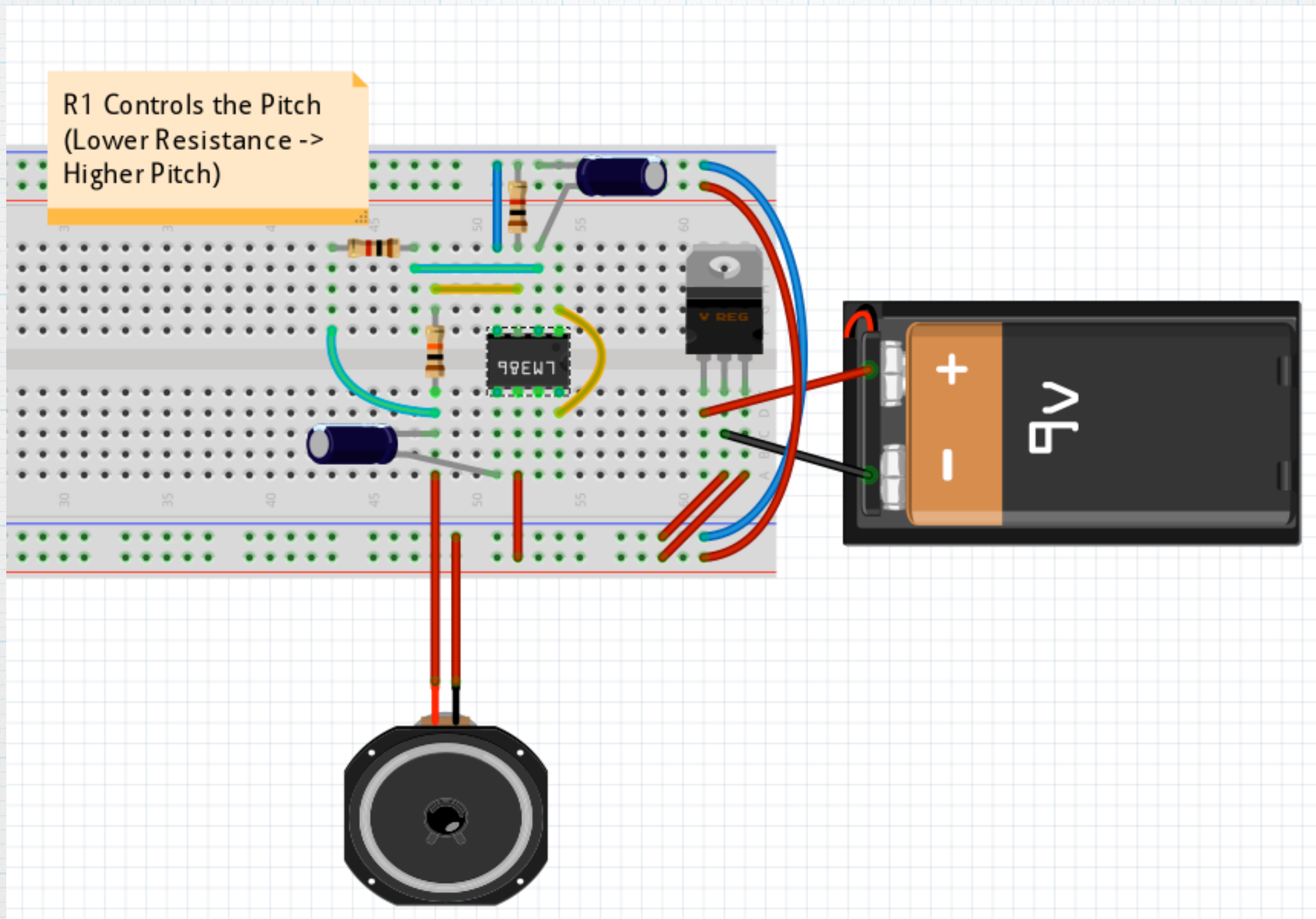


# Kreye Son

- Use Oscilloscope to visualize the voltage waveforms
- Connect Speaker

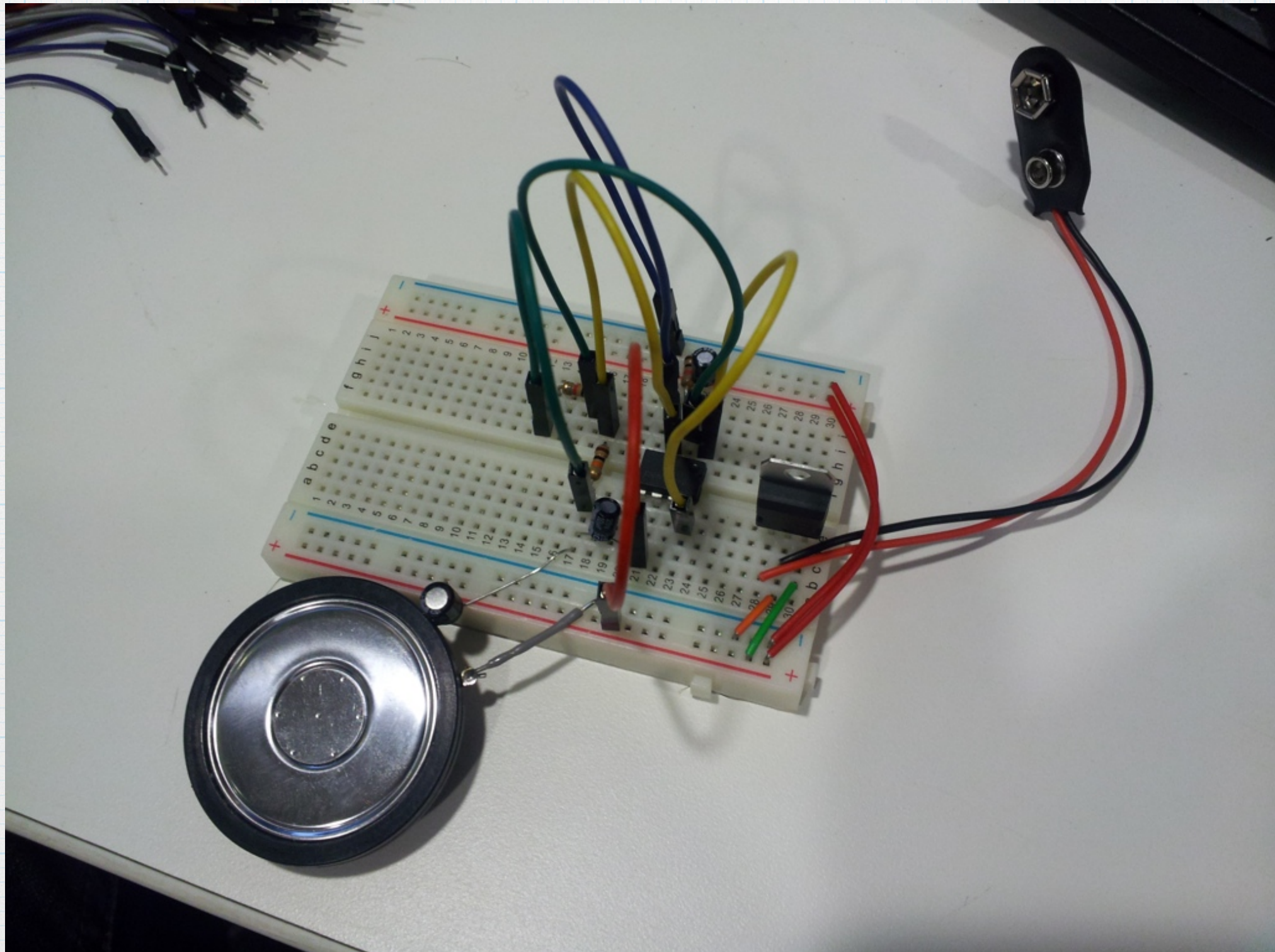


# Sikwi Konplè



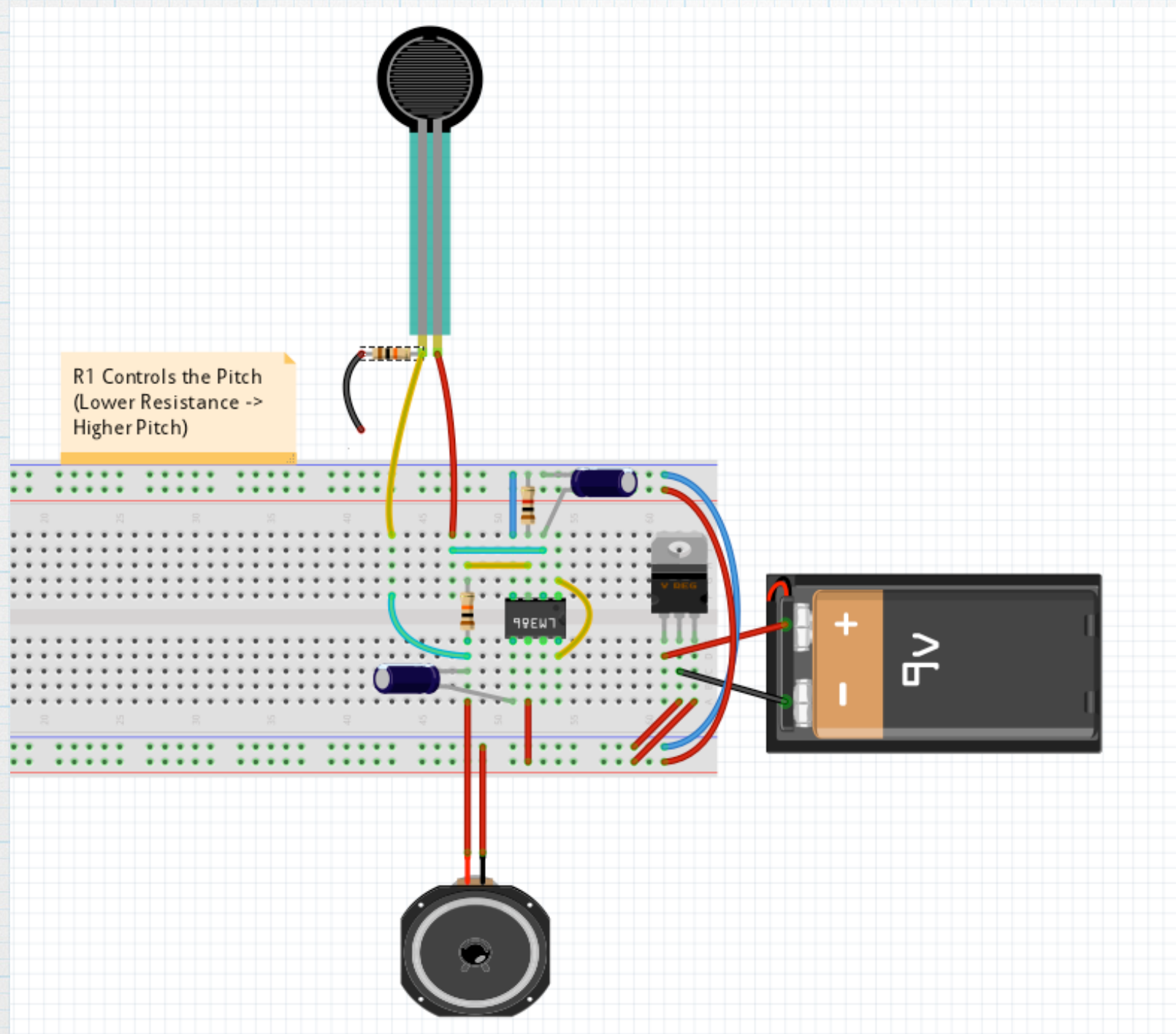


# Von Ekzamp Sikwi





# Chanjman Rezistans



- Swap fixed resistors and hear pitch changes

- Swap resistors with sensors



# Kesyon:

- What is programming?
- Why do people program?
- Examples of computers?
- What are functions of computers?



# Programasyon

- Computer: intelligence, memory, and ... program
- Program: what to do
- Language: set of instructions
- Ex: add 12 and 3
- Special instructions:
  - If ... then -> conditional
  - Loop -> repeat



# "Awdouyno"

- Example of computer
- Instructions prepared on PC
- Special software
- Arduino executes
- Some advantages:
  - Small
  - 9v battery
  - Access to the "inside"!



# Son "Awdouyno"

- Plug in speaker
- Plug Arduino
- Download code
- Hear tone
- Look at voltage in Oscilloscope
- Change frequency in program
- Note difference in tone



# Chanjman Son

## "Awdouyno"

- Plug in speaker
- Plug Arduino
- Download code
- Hear tone
- Change frequency in program
- Note difference in tone



# Chanjman Son "Awdouyno"

- Plug in speaker
- Plug Arduino
- Change frequency in program
- Determine frequency from PD

program slider "Spencermeter"



# Kesyon:

- How would you create music with Arduino?
- How can you control the sound mid-song?



# Son, Frekans

- Note: timbre + pitch + amplitude
  - Timbre: note character
  - Pitch: main frequency
  - Amplitude: loudness
- Song: notes w/lengths + timing



# Jwe Chan

- Connect the arduino
- Play 'Tonton Bouki, Tonton  
Bouki ...'



# Ajoute Kontrol

- Revisiting sensors
- Sensor input now modify either  
pitch or speed
- Download new program



# Kontwòl Entèaktiv

- Connect sensors
- Play using Spencer's code
- Modify



# Anèks A: Glosè - Syans

- \* Vocal folds - vibrating membrane which initiate sound in the throat
- \* Throat - conduit for air to exit (among other things)
- \* Tympanic membrane - membrane inside the ear which reacts to pressure
- \* Vibration - pulsating motion
- \* Propagation - movement in space
- \* Tone generation - instrument producing a continuous tone (sound)
- \* Stroboscope - an instrument that flashes light at variable frequencies
- \* Amplitude - how loud
- \* Frequency - what pitch (low or high note)
- \* Decay - same, increase, decrease over time
- \* Log-scale - increase in value over time



# Anèks B: Glosè - Elektronik

- \* Voltage - how hard power is pushing electricity
- \* Current - how much electricity is flowing through a component
- \* Battery - provides power, a reservoir for electricity
- \* Capacitor - allows a small amount of current to flow
- \* Speaker - turns electricity into sound
- \* Breadboard - board with holes to hold and connect electronic components
- \* Frequency - measurement of how often a signal repeats itself
- \* Sensor - converts physical property (light, pressure) into electricity
- \* Amplifier - makes an electrical signal louder or stronger
- \* Pin - a connection point on an electronic component



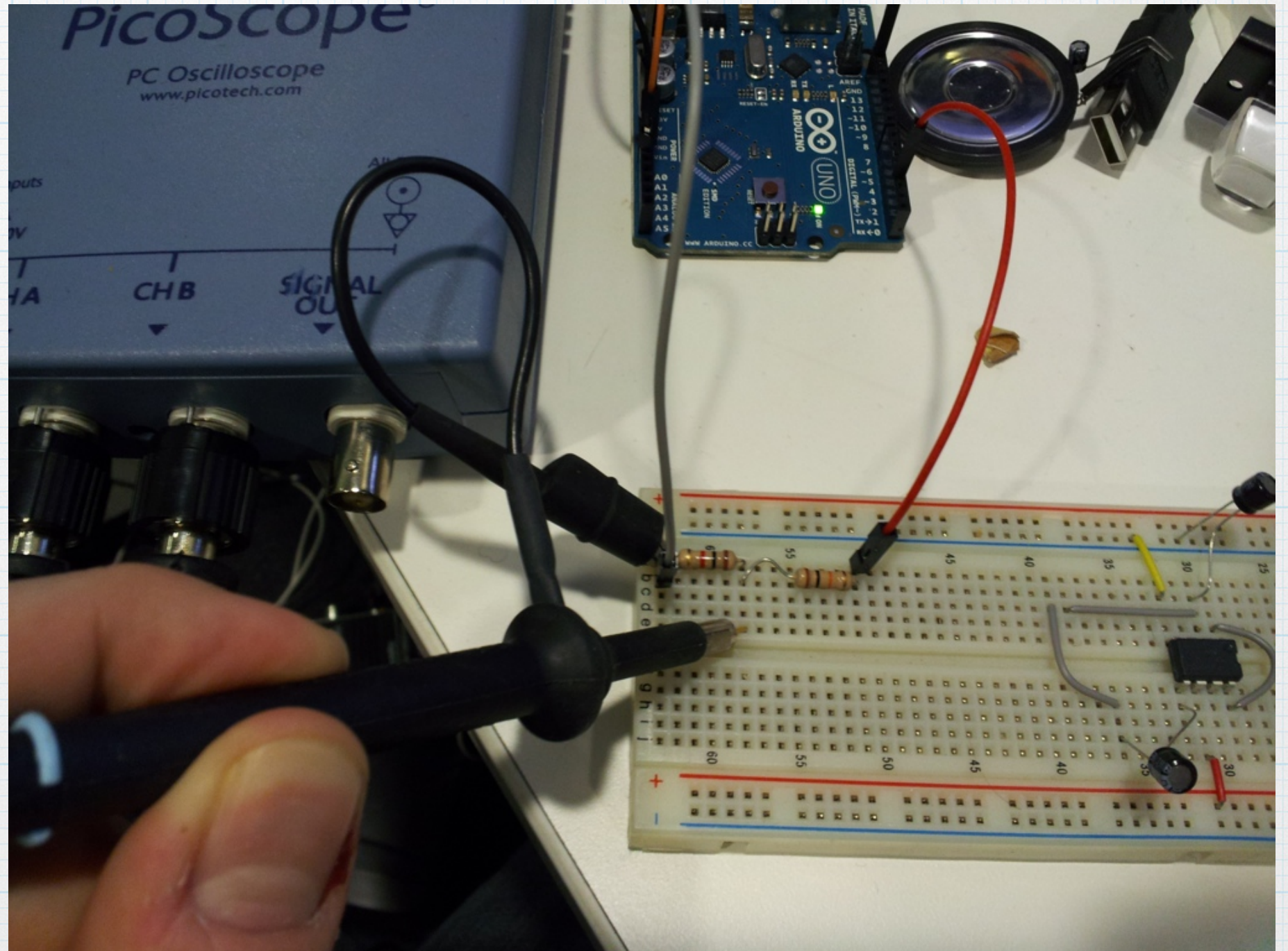
# Anèks C: Glosè - Programasyon

- \* Programming - telling a computer what to do
- \* Code - instructions for a computer to follow
- \* Arduino - a small computer to do simple things
- \* Integer - (int) a number such as 0, 1, 2, 3
- \* Return - key to give back the result of a function
- \* Function - a packaged set of instruction that can be repeated
- \* If - condition as in the normal language: if this, then that
- \* Setup - special Arduino function executed at the beginning
- \* Loop - a repetition of instruction
- \* OUTPUT - a connection pin to provide control or information
- \* INPUT - a connection pin to receive information



# Anèks D: Enstriman - Osyoskòp

- \* Measures voltage
- \* Needs a reference
- \* Displays measurements on the computer
- \* Can display two voltages at once





# Anèks E: Enstriman - Stroboskòp

- \* Position at time intervals
- \* Movement stops when strobe's frequency is a multiple of object's
- \* Can appear to slow down movement





# Anèks F: English - Kreyòl

voice	vwa	amplitude	valè/fòs/ amplitid	battery	pil/batri
hearing	odisyon/ ekout	decay	dezentegre/ dekalaj/ amòtisman	sensor	kaptè siyal
glottis	glòt	current	kouran	pin	janm fè / pye fè
vibration	vibrasyon	voltage	voltaj	integer	chif won
waveform	ond/siyal	breadboard	plak tè	function	fonksyon
speaker	opalè	resistor	rezistans	input	antre
tone	ton/son	capacitor	kondansatè	output	sòti
strobelight	limyè stroboskopik	program	pwogram	oscillator	osyatè
frequency	frekans	pitch	ton	circuit	sikwi
timbre	tenb	note	nòt		



# English - Kreyòl

red	wouj			
green	vè			
blue	ble			
light	limyè			
button	bouton			
pressure	presyon			
black				
wire	fil			



# Remèsiman

- \* Nan-Wei MIT/Media Lab
- \* Jean Piou MIT/Lincoln Lab
- \* Jim Bales MIT/Edgerton Center