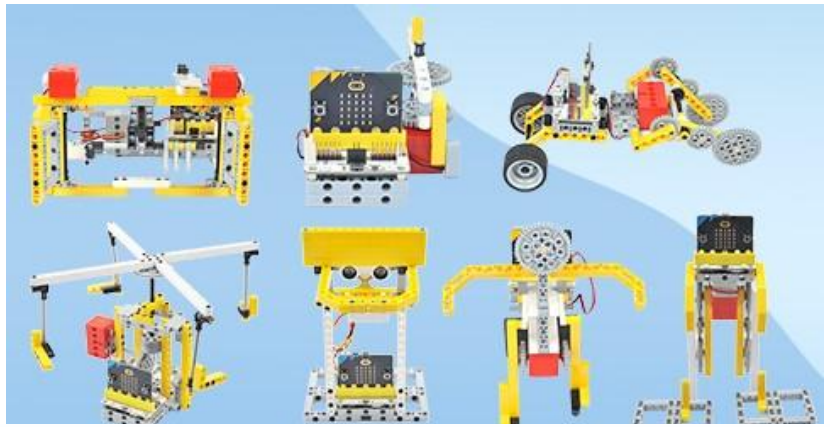
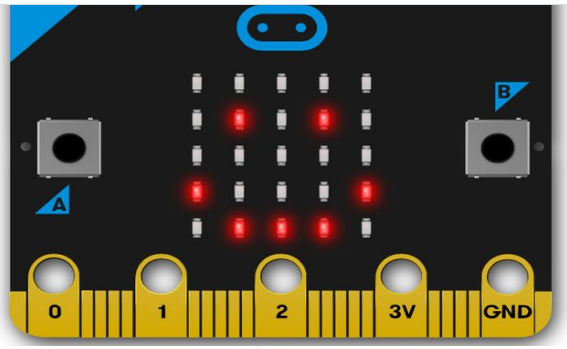
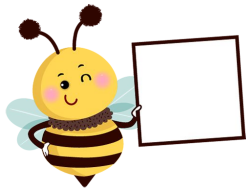


STEM education LLC



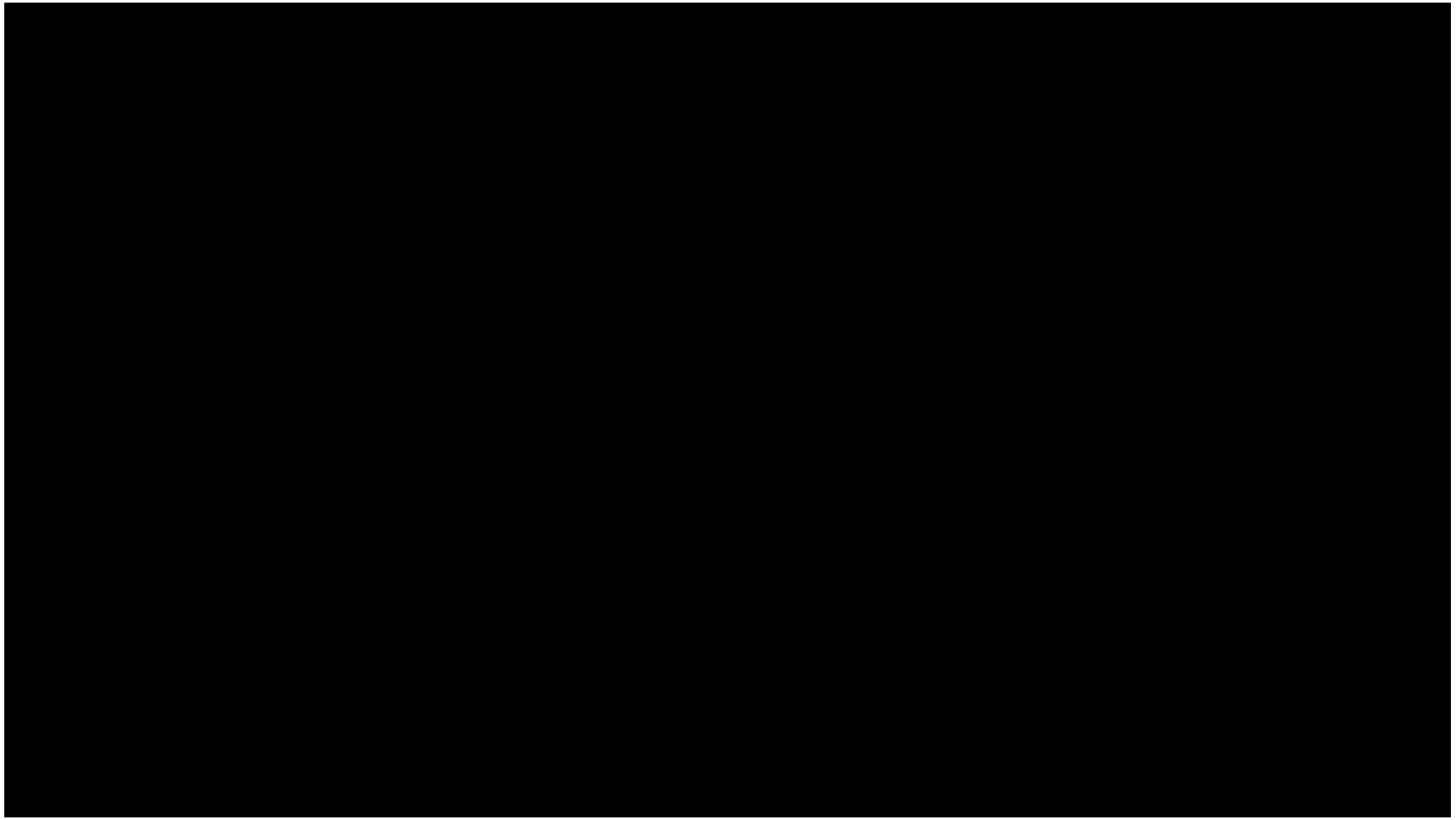
Τι είναι τα «Ραδιοφωνικά Σήματα» ; (Υπενθύμιση)

Τα ραδιοφωνικά σήματα, είναι τα σήματα πληροφορίας που στέλνονται με την χρήση των **ραδιοκυμάτων*. Μπορούμε να χρησιμοποιήσουμε ραδιοκύματα για να μεταδώσουμε πληροφορία σε μεγάλες αποστάσεις.



*Ραδιοκύματα είναι τα ηλεκτρομαγνητικά κύματα με συχνότητα από περίπου 3 Hz έως 300 GHz

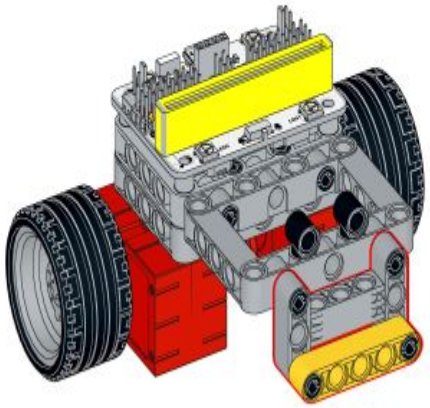
Remote Control (RC) Vehicles :

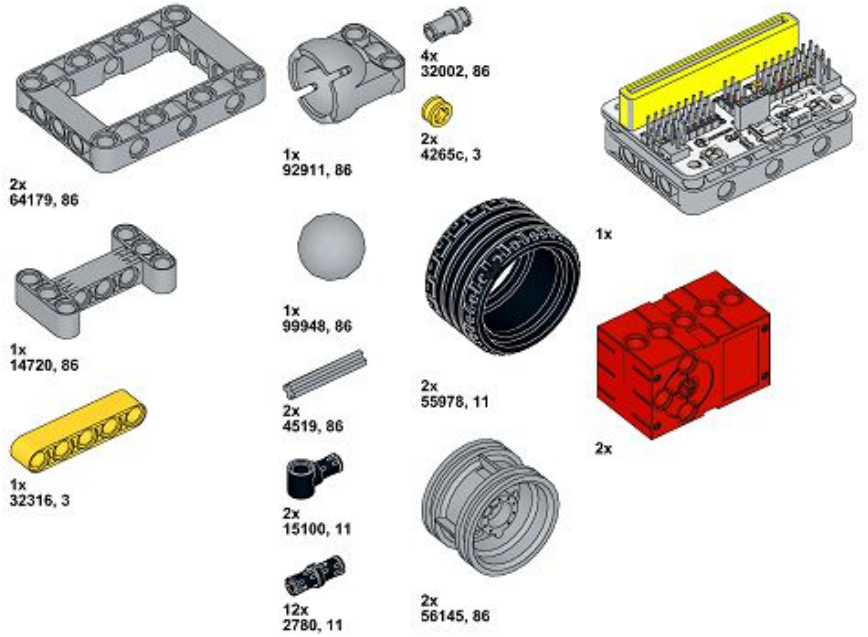


How do these kinds of vehicles work? Could we, with what we know so far, build our own drone?

Φυσικά! Μπορούμε να χρησιμοποιήσουμε το radio!

Build the basic vehicle:





Let's think about , what do we need to make our vehicle Radio - Controlled?

Θα χρειαστούμε ένα microbit για το ρόλο του πομπού (τηλεχειριστήριο) και ένα microbit για το ρόλο του δέκτη που θα βρίσκεται στο όχημα!

The logic of the system is as follows : Whenever the microbit transmitter has a tilt in one of the four basic directions (up , down , right , left) it will send a corresponding letter to the receiver (F , B , R , L) .
By reading each letter the receiver, will transmit , and the corresponding command to the vehicle to move (forward , backward , right , left)

Transmitter code:

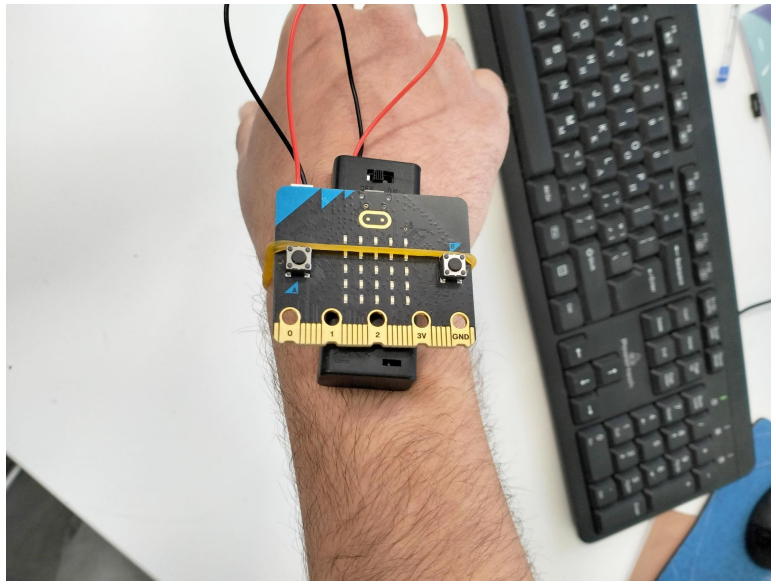
```
import Wukong
from microbit import *
import radio


radio.on()
radio.config(channel = 1)
```

```
while True:
    if accelerometer.is_gesture("left"):
        radio.send("L")
    elif accelerometer.is_gesture("right"):
        radio.send("R")
    elif accelerometer.is_gesture("up"):
        radio.send("B")
    elif accelerometer.is_gesture("down"):
        radio.send("F")
    elif accelerometer.is_gesture("face up"):
        radio.send("S")
    sleep(100)
```

Receiver Code:

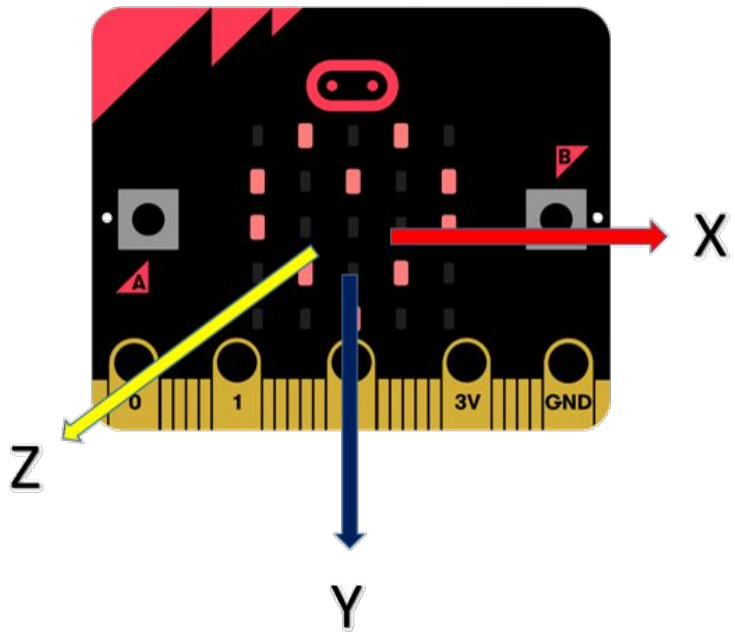
```
import Wukong
from microbit import *
import radio

wk = Wukong.WUKONG()

radio.on()
radio.config(channel = 1)

def forward(speed):
    wk.set_motors(1, speed)
    wk.set_motors(2, speed)

def backward(speed):
    wk.set_motors(1,-speed)
    wk.set_motors(2,-speed)

def turn_left(speed):
    wk.set_motors(1, 0)
    wk.set_motors(2, speed)


def turn_right(speed):
    wk.set_motors(1, speed)
    wk.set_motors(2, 0)


def stop():
    wk.set_motors(1,0)
    wk.set_motors(2,0)

while True:
    command = radio.receive()
    if command == "F" :
        forward(40)
    elif command == "B" :
        backward(40)
    elif command == "L" :
        turn_left(40)
    elif command == "R" :
        turn_right(40)
    else:
        stop()
    sleep(100)
```

Add a battery case to the microbit transmitter, and mount with Wukong's rubber bands , on your hand:



Try racing with your classmates on a track set by your teacher. How quickly were you able to get off the track?

The accelerometer of the microbit has the ability to give its slope in the x, y, z axes with values from -1023 to 1023. Which means we can make our transmitter more sensitive!



Receiver Code:

```
import Wukong
from microbit import *
import radio


radio.on()
radio.config(channel = 1)
```

```
while True:
    x = accelerometer.get_x()
    y = accelerometer.get_y()
    if x < -512 :
        radio.send("L")
    elif x > 512 :
        radio.send("R")
    elif y < -512 :
        radio.send("B")
    elif y > 512 :
        radio.send("F")
    else:
        radio.send("S")
    sleep(100)
```

Make any customization you want on your vehicle, and with your Teacher as referee, play robot soccer!