



...disc, along its
...bulb to act as an indicator that alerts the
...object is in contact with the Essmeter

CONNECTING THE ARDUINO CIRCUIT

etch prints "length in cm". Here is the circuit:
 RS pin to digital pin 12
 E pin to digital pin 11
 D4 pin to digital pin 6
 D5 pin to digital pin 9
 D6 pin to digital pin 3
 D7 pin to digital pin 8
 RW pin to ground
 VSS pin to ground
 A to resistor to +ve
 VDD pin to +ve
 OK variable resistor, one end to +ve, other end to -ve, middle
 LCD pin V0
 Arduino ground to breadboard -ve and 5v to +ve
 Encoder pin connections: One end to Arduino pin 2, other end
 to Arduino pin 4, middle to -ve
 The RX of the Bluetooth module is connected to TX of the
 Arduino, TX of Bluetooth module to RX of Arduino ground to -ve
 and 5 VCC to +ve
 Install the Essmeter app on your android phone and connect it to
 the Bluetooth module after opening the Bluetooth on your
 phone.
 Write your code on the Arduino software, verify and then upload
 to Arduino board.

PROCEDURE OF USE

- Fill the string along the path whose length is to be measured
- Mark the terminal point with the aid of a clip
- Rotate the disc in the anticlockwise direction until it is tight
- Read the length as displayed on the LCD screen
- For the visually impaired, they will click on the android phone
for sound to be produced conforming the length displayed.

OBSERVATIONS

- The rotary encoder rotates making 42 steps
- The length measured is displayed on the LCD screen in cm
- The HC-06 blinks and on touching the screen of the phone on
the Essmeter app the length is read out
- As the disc moves, it makes a number of complete revolutions,
say $n=2$
- If the length to be measured is less than the circumference,
then $n=0$
- In the last revolution, the disc is in contact with the string

ANALYSIS OF RESULTS

- The length measured is directly proportional to the angle of
rotation in the last revolution
- On the other hand, the length measured increases with the
number of revolutions made when the angle of rotation in the
last revolution is kept constant
- When the Rotary Encoder rotates, signals are sent to the
Arduino board which then transmits the information to the LCD
screen. The LCD screen displays lengths in cm
- Through WiFi App, the Essmeter app is used on an
android phone which reads the length displayed on the LCD
screen.
- A Bluetooth module transmits information from the Arduino to
the android phone.

GRAPH OF LENGTH AGAINST NUMBER OF STEPS

VARIABLES CONSIDERED DURING EXPERIMENTS

| Independent Variable | Dependent Variable |
|--|----------------------------|
| Angle of rotation in the last revolution | Length measured |
| Radius of the middle disc | Number of revolutions made |
| Radius of the inner disc | Number of revolutions made |

FACTORS OF CHANGING THE VARIABLES

Increasing the number of ticks of the rotary encoder increases the
length measured whereas decreasing the number of ticks of the rotary
encoder decreases the length measured.
 Increasing the radius of the middle disc increases the length measured
whereas decreasing the radius of the middle disc decreases the length
measured.
 Increasing the angle of rotation in the last revolution increases the
length measured whereas decreasing the angle of rotation in the
last revolution decreases the length measured.

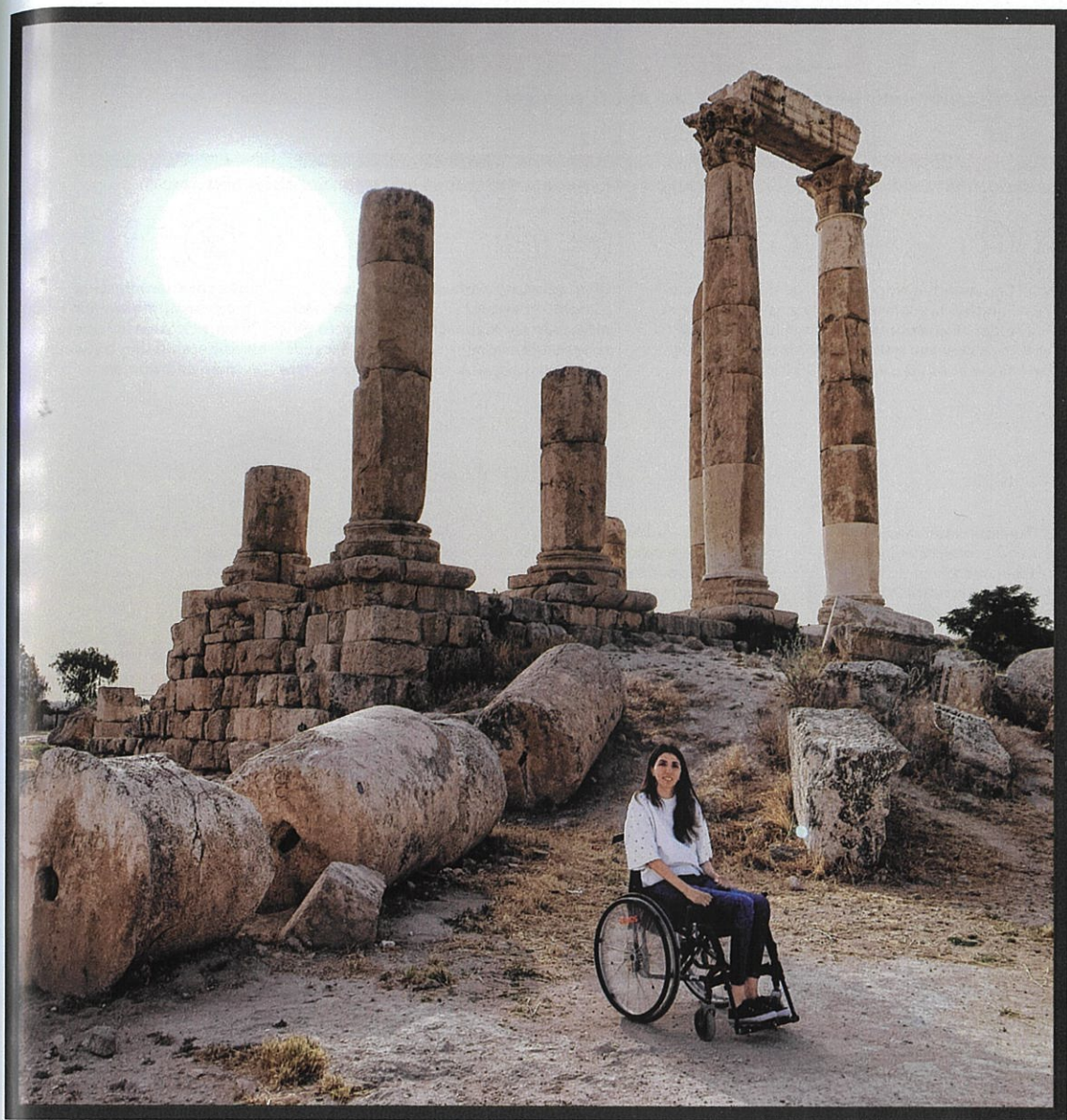
CONCLUSION

It is concluded that the length measured is directly proportional to the
angle of rotation in the last revolution. The length measured is
independent of the radius of the middle disc and the radius of the
inner disc. The Essmeter project is a simple and easy to use
device that can be used to measure the length of an object.
 The use of this device is very simple and reliable. It is also
easy to use and the length measured is displayed on the LCD screen.
 All before taking the reading, one must ensure that the
string is properly placed around the inner disc. We
think that this project should be encouraged to design
other devices that can be used to measure the length of an object.

FUTURE RECOMMENDATION

We recommend that the use of this device
should be encouraged to design other devices that can be used to
measure the length of an object. We think that this project should
be encouraged to design other devices that can be used to measure
the length of an object.

Esther Anyanzwa (at left) and Salome Njeri created a revolving disk apparatus to help visually impaired and deaf people measure objects. At home in Kenya, the students face skepticism about their scientific abilities as girls. "I really wanted to prove society wrong," Njeri told the Society for Science & the Public.



No. It's a different vision, a different experience."

She made *Capernaum* to shake people out of their blindness to the sight of children suffering and because "I need to show what's happening."

It's a responsibility that extends beyond filmmaking. In 2016 Labaki ran for a seat on Beirut's municipal council but did not win. "At some point you become an activist without even wanting it," she says. "For me it's not a question of choice; it's my duty now. I don't know if it will mean me going into politics or just lobbying for certain things to change."

Labaki asks, "How do we start making a real change?" and asserts that "I want to do things my way from my platform, using my voice, because sometimes you have more voice than any politician, and your voice resonates so much louder than any political speech through a film or a speech or a small video." She says, "I cannot stop at the frontiers of just another film. It needs to go further ... I need to use my voice in that way, and I need to start really working." □

EARLY IMAGES OFTEN CAST WOMEN AS POSED MODELS IN TRADITIONAL SCENES.

IT TOOK MANY DECADES FOR WOMEN TO BE SHOWCASED IN THE MAGAZINE as men commonly were: as scientists, explorers, adventurers, and leaders. In the early years, women often were depicted as exoticized, bare-breasted beauties. From the 1970s through today, women increasingly have appeared in stories as varied as the lives they live.

FAR RIGHT

A young girl draped with gold coins belongs to the Ouled Naïl tribe in Algeria. A 1922 caption describes girls acquiring coins for their dowries by dancing in Mediterranean port cities.

RUDOLF LEHNERT AND ERNST LANDROCK

TOP LEFT

Eliza Scidmore, believed to be *National Geographic's* first female photographer, pushed for color photos in the magazine. Here, she framed young Japanese girls with cherry blossom branches.

ELIZA SCIDMORE

TOP RIGHT

Two fishing enthusiasts show off their haul of native Yellowstone cutthroat trout at the national park circa 1940.

EDWIN L. WISHERD

BOTTOM LEFT

Performing swimmers apply lipstick in crystal clear Wakulla Springs, Florida, a popular spot for filming underwater scenes.

J. BAYLOR ROBERTS

BOTTOM RIGHT

At the annual rose show in Thomasville, Georgia, a festival queen and her attendants hold bouquets of local red roses.

HOWELL WALKER



PRE-1918, JAPAN



PRE-1940, YELLOWSTONE



PRE-1944, FLORIDA



1953, GEORGIA