

What to measure?

- What do you want to measure?
- Where and when do you want to measure?
- What does the sensor measure?
- How long do you want to measure and at what time frame?
- What things could influence your measurements?
- What do you think will happen?
- What do you want to do with this information? Education, community engagement, regulation or enforcement?

Using Sensors

- What does the sensor measure?
- Why is that important?
- How does the sensor measure?
- What are the positives of the sensor?
- What are the negatives of the sensor?

What to look for?

- Cost
- Sensor Availability
- Portability
- Durability
- Battery Life
- Data Availability (Extraction and Display)
- Precision, Accuracy and Bias
- Calibration
- Ease of Use
- Response Time

Sensors

Cost

Media

Availability

Today's Sensors



Air Sensors



Water Sensors



Using Current and Emerging Technology in Citizen Science - Tech Demo -

Rachel McIntosh-Kastrinsky
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Connecting Sensors and Citizen Science

Do you know of other sensors or tools that could also measure this?

What other sensors, tools or technology are you aware of that have been used for citizen science?

Are there sensors, tools or technology you know of that have not been used for citizen science, but you think could be utilized?

What is your "dream" sensor or technology for citizen science?

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Today's Sensors

Water Quality Meter



Sensordrone



Air Quality Monitor



Vaavud



Nitrate Kit



Air Quality Egg



Osorb



Today's Sensors

Sensordrone



Water Quality Meter



Air Quality Monitor



Vaavud



Nitrate Kit



Air Quality Egg



Osorb



What to look for?

Cost

| Sensor | Cost |
|---------|-------|
| BME280 | £1.50 |
| DHT22 | £3.50 |
| DHT11 | £0.50 |
| DHT1629 | £1.50 |
| DHT1629 | £1.50 |
| DHT1629 | £1.50 |

Sensor Availability

Portability

Durability

Battery Life

**Data Availability
(Extraction and
Display)**

**Precision,
Accuracy and Bias**



Calibration

Ease of Use

Response Time

Cost

| Sensor | Cost |
|-------------------|----------|
| EPA Equipment | \$70,000 |
| Sensordrone | \$198 |
| Vaavud Wind Meter | \$50 |
| Nitrate Kit | \$35 |

What to look for?

Cost

| Sensor | Cost |
|----------|------|
| BME280 | 0.50 |
| DHT22 | 0.50 |
| I2C | 0.50 |
| 1-Wire | 0.50 |
| 4-Wire | 0.50 |
| 5-Wire | 0.50 |
| 6-Wire | 0.50 |
| 7-Wire | 0.50 |
| 8-Wire | 0.50 |
| 9-Wire | 0.50 |
| 10-Wire | 0.50 |
| 11-Wire | 0.50 |
| 12-Wire | 0.50 |
| 13-Wire | 0.50 |
| 14-Wire | 0.50 |
| 15-Wire | 0.50 |
| 16-Wire | 0.50 |
| 17-Wire | 0.50 |
| 18-Wire | 0.50 |
| 19-Wire | 0.50 |
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| 32-Wire | 0.50 |
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| 86-Wire | 0.50 |
| 87-Wire | 0.50 |
| 88-Wire | 0.50 |
| 89-Wire | 0.50 |
| 90-Wire | 0.50 |
| 91-Wire | 0.50 |
| 92-Wire | 0.50 |
| 93-Wire | 0.50 |
| 94-Wire | 0.50 |
| 95-Wire | 0.50 |
| 96-Wire | 0.50 |
| 97-Wire | 0.50 |
| 98-Wire | 0.50 |
| 99-Wire | 0.50 |
| 100-Wire | 0.50 |

Sensor Availability

Portability

Durability

Battery Life

**Data Availability
(Extraction and
Display)**

**Precision,
Accuracy and Bias**



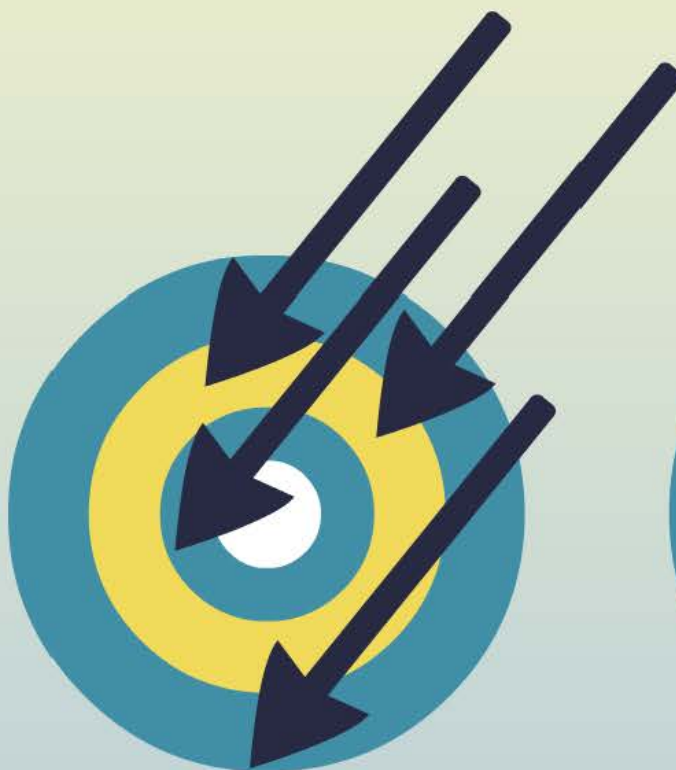
Calibration

Ease of Use

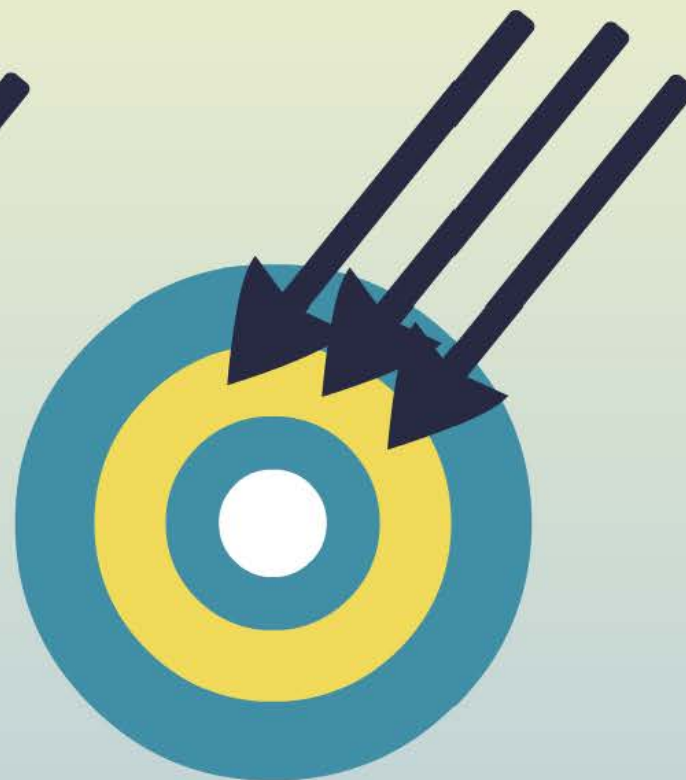
Response Time



Accuracy



Precision



Bias

What to look for?

Cost

| Sensor | Cost |
|--------|-------|
| BME280 | £0.50 |
| DHT22 | £1.50 |
| SHT30 | £0.50 |
| SHT31 | £0.50 |
| SHT35 | £0.50 |
| SHT38 | £0.50 |
| SHT39 | £0.50 |
| SHT40 | £0.50 |
| SHT41 | £0.50 |
| SHT42 | £0.50 |
| SHT43 | £0.50 |
| SHT44 | £0.50 |
| SHT45 | £0.50 |
| SHT46 | £0.50 |
| SHT47 | £0.50 |
| SHT48 | £0.50 |
| SHT49 | £0.50 |
| SHT50 | £0.50 |

Sensor Availability

Portability

Durability

Battery Life

**Data Availability
(Extraction and
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**Precision,
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Calibration

Ease of Use

Response Time

Using Sensors

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Air Sensors

Sensordrone



Positives

Portable Many parameters
Durable Data Availability
Ease of Use

Negatives

Battery Life
Need Device

Air Quality Monitor



Positives

Portable Data Availability
Durable Ease of Use

Negatives

Battery Life
Need Device

Air Quality Egg



Accuracy Response Time
Portability Data Availability Need Direct Connection



Vaavud

Positives

Ease of Use Portability
No Battery History Price

Negatives

Need Device Only Wind Speed
Data Availability

Sensordrone



Positives

Portable Many parameters

Durable Data Availability

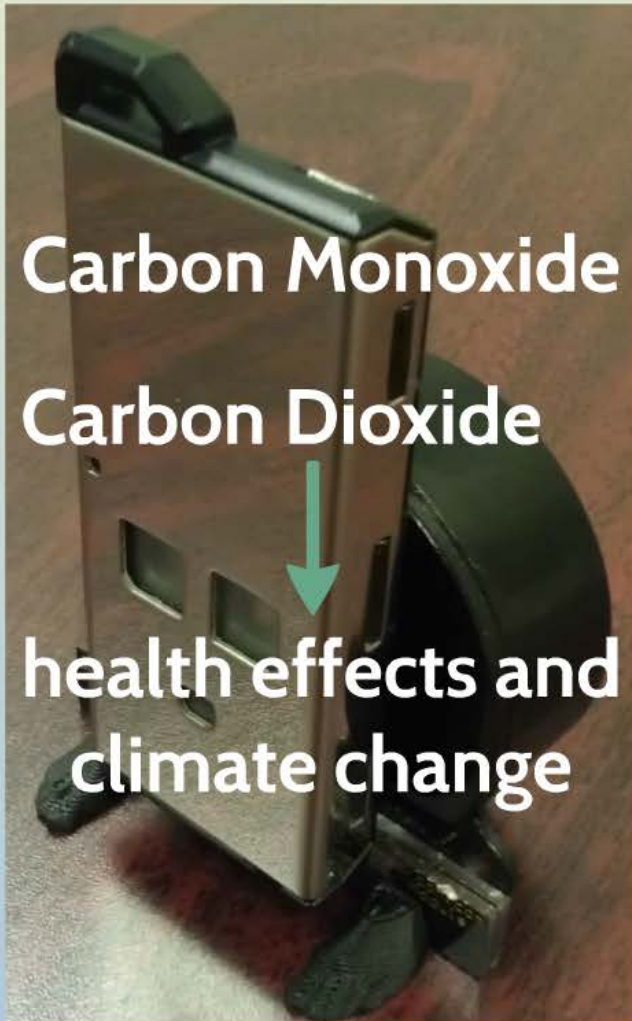
Ease of Use

Negatives

Battery Life

Need Device

Air Quality Monitor



Positives

Portable Data Availability
Durable Ease of Use

Negatives

Battery Life
Need Device

Air Quality Egg

Nitrogen Dioxide
Carbon Monoxide

NO₂ and CO can
cause poor health

Temperature Humidity

Temperature and humidity
affects NO₂ and CO.

Positives

Only need Internet
Long Term
No Recharge

Negatives

Accuracy

Response Time

Portability

Data Availability

Need Direct Connection

Vaavud

Positives

Ease of Use Portability
No Battery History Price

Negatives

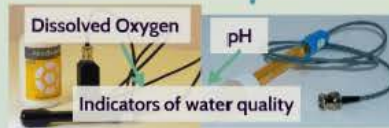
Need Device Only Wind Speed
Data Availability



Water Sensors

Water Quality Meter

| Positives | Negatives |
|-------------|-------------------|
| Portable | Parameters |
| Durable | Data Availability |
| Ease of Use | Battery Life |
| | Need Device |
| | Extra attachments |



Nitrate Kit

| Positives | Negatives |
|--------------|--------------------|
| Price | Limited Quantity |
| All included | Many Steps |
| | Single Measurement |



Osorb

| Positives | Negatives |
|-------------|-------------------|
| Easy to use | Response Time |
| Durable | Data Availability |
| Portable | |



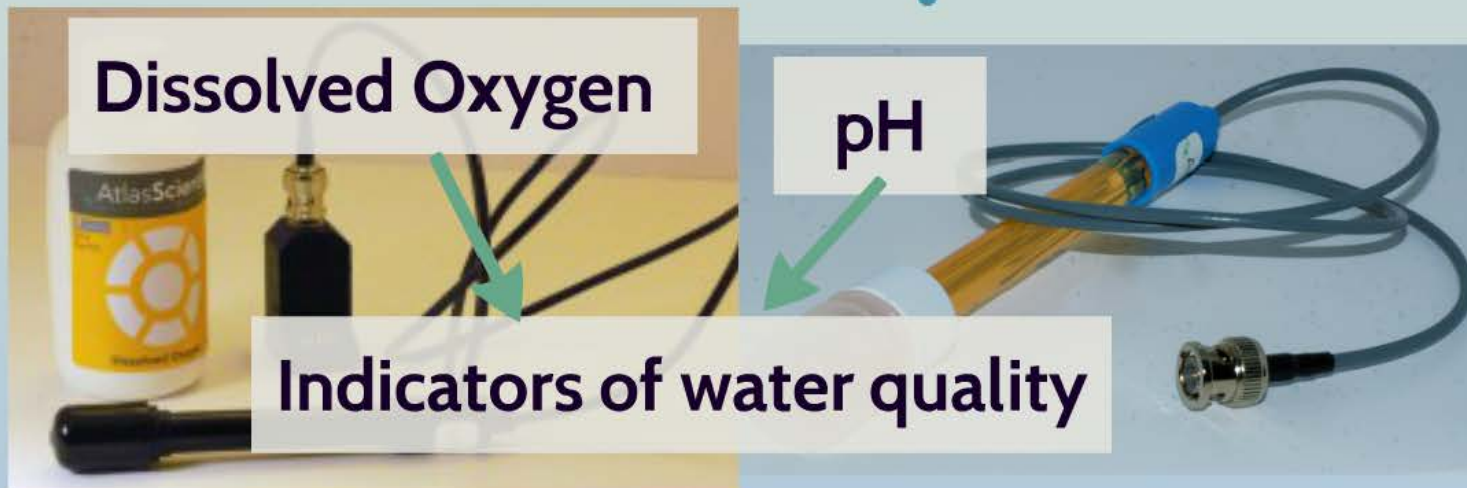
Water Quality Meter

Positives

Portable Parameters
Durable Data Availability
Ease of Use

Negatives

Battery Life
Need Device
Extra attachments



Nitrate Kit

Positives

Price

All included

Negatives

Limited Quantity

Many Steps

Single Measurement



Osorb

Positives

Easy to use Durable
Portable

Negatives

Response Time
Data Availability

ABSMaterials: Osorb®-Coated Sand
Make your filter bed do more:
Osorb-coated sand removes Atrazine and Metaldehyde to NO DETECT

Organic compounds

Health issues

microporous surface
absorbs contaminants

SE 24-Jan-14 WD 9.1mm 15.0kV x1.0k 50um

BioMix-Osorb® coated on Fairmount Minerals AquaQuartz™

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