## Physics

| | |
|---|---|
| experimental science | |
| study of the physical world ( *interactions between energy and matter)* | |

## Models, Theories, and Laws

| Model | analogy |
|---|---|
| | representation of a phenomena in terms of something else we are familiar with |
| Theory | more detailed |
| | gives quantitatively testable predictions |
| Law | concise, general statement of nature behavior |

## Classical Physics

| Acoustics | sound & sound propagation |
|---|---|
| Electromagnetism | electricity |
| Mechanics | object's state of motion |
| Optics | light and color |
| Thermodynamics | heat |

## Modern Physics

| Nuclear/Atomic | nuclear power plants |
|---|---|
| Quantum | matter & energy at fundamental lvl |
| Relativity | focused on Einstein's study |
| Condensed Matter | substances in their solid state |
| Plasma | superheated matter |
| Low Temperature | |

## Filipino Physicists

| Christopher & Ma. Victoria Bernido | teaching physics, innovative way |
|---|---|
| Caesar Saloma, PhD | optics contributions |
| Fr. Jose Ramon Villarin, SJ | atmospheric science contributions |
| Reinabelle Reyes, PhD | astrophysicist, data scientist |
| | confirmed Einstein's Theory of Relativity |
| Reginald Christian Bernardo, PhD | first homegrown gravitational scientist |
| Jacquiline Romero PhD | experimental quantum information expert |

## Measurement

*End all measurements with first uncertain digit*

| Plastic Ruler | piece of plastic |
|---|---|
| | **uncertainty: ±0.5** |
| Vernier Caliper | more accurate than ruler |
| | used on rings |
| | always 3 decimal places |
| | can measure depth of hole |
| | **uncertainty ±0.025** |
| Micrometer | more accurate than ruler and caliper |
| | one revolution: ±0.500 |
| | **uncertainty: ±0.005** |

## Significant Figures Rules

| all nonzero digits are significant | 5, 121, 859 | 6 SigFigs |
|---|---|---|
| zeros between nonzero digits are significant | 5, 101, 009 | 6 SF |
| zeros before first nonzero digit are not sig | 0.0051 | 2 SF |

## Significant Figures Rules (cont)

| trailing zeros after decimal point are sig | 5.0000 | 5 SF |
|---|---|---|
| trailing zeros without decimal point are not sig | 500 | 1 SF |

## Vectors and Scalars

| Scalar Quantities | magnitude only, no direction |
|---|---|
| | distance, speed, time |
| Vector Quantities | magnitude + direction |
| | displacement, velocity, acceleration |

## Vector Additions

| Graphical Method | parallelogram |
|---|---|
| | head-to-tail |
| Mathematical Method | law of sines and consines |
| | supported by graphical method |

## Parallelogram Method
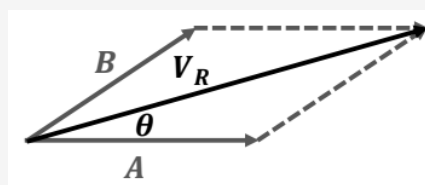


initial points coincide, Vr represents resultant vector

## Head to Tail Method
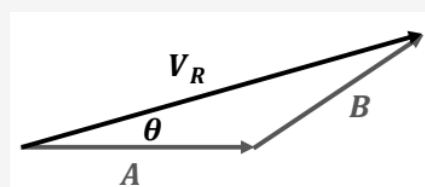


uses the Pythagorean theorem