PROGRAMMA DI PHYSICS
Classe 1E

a.s. 2020-2021

Docente-.Prof.ssa Sabina Bonamico
Docente Lettore madre lingua: Prof.ssa Ginny Prince

Libri adottati:
"Complete Physics for Cambridge IGCSE, third edition" di S.Pople ed. Oxford University Press
"Complete Physics for Cambridge IGCSE Workbook" di S. Lloyd ed. Oxford University Press

1. Introduction to physics
o Scientific method: induction and deduction
o Historical period of physics: classical physics, modern physics, contemporary physics o Science and technique
2. Making measurements
o Standard form, mixed form
o International System of units of measurements: fundamental units of measurements, definition of meter, kilogram and second o Time interval, length, area, volume and density. Definition of liter.
o Conversion among different units o Measuring instruments: sensitivity and capacity
o Vernier caliper
o Absolute errors, relative errors
o Mean value
o Significant figures and roundings: measurements with errors
o The parallax error
o Direct and indirect measurements
o Error on sum, difference (composition rule),
o Error on product and ratio (using the number of significant figures)

3. How to make a laboratory report
o Aim of the experiment
o Instruments and materials
o Procedure
o Data taking
o Data analysis
o Conclusions

4. Representation of data and phenomena
o How to read a formula: inverse formulae
o Cartesian graph
o Direct and inverse proportionality
o Linearity and non linearity
o How to plot errors on graph
o Graphical fit with the estimation of slope and its error

5. Describing motion
o Vectors: definition, sum and difference of vectors, decomposition along given directions
o Understanding speed: distance-time graphs
o Understanding acceleration: speed-time graphs
o Calculating speed and acceleration

6. Forces and motion
o Mass, weight and gravity
o Sliding, rolling friction, drag
o Falling and turning
o Terminal velocity

o Force, mass, acceleration
o Action and reaction
o Moving in circles
o The idea of momentum

7. Turning effects of forces
o Centre of mass
o The moment of a force
o Calculating moments
o Stretching and compressing
o Lever of different classes
o Equilibrium: stable, unstable, neutral

8. Forces and matter
o Forces acting on solids
o Stretching springs
o Hooke's law

9. Pressure
o Pascal's principle and Stevin's law, hydraulic jack
o Pressure measurements: manometer
o Atmospheric pressure: barometer
o Archimedes' law

10. Energy transformations and energy transfer
o Forms of energy: energy store and transfer
o Energy conversions
o Conservation of energy: efficiency
o Energy calculations

11. Work and power
o Doing work
o Potential energy, kinetic energy and mechanical energy
o The conservation of mechanical energy
o Power o Calculating power

12. Energy resources
o The energy we use: renewables and non-renewables, wind and wave, biomass, fossil and nuclear fuels, geothermal energy
o Energy from the sun

13. The kinetic model of matter
o States of matter
o The kinetic model of matter: Brownian motion
o Forces and the kinetic theory
o Gases and the kinetic theory

14. Thermal properties of matter
o Temperatures and temperatures scales
o Designing a thermometer
o Thermal heat capacity
o Latent heat of fusion and vaporization

15. Introduction to waves
o Transverse versus longitudinal waves
o Electromagnetic spectrum

INTEGRAZIONE E APPROFONDIMENTI DI FISICA

Introduzione alla Fisica e al suo studio. Il metodo sperimentale.

Il S.I. , grandezze fisiche derivate e sue unità di misura. Notazione scientifica.

Laboratorio 1 (in classe): il pendolo; calcolo del periodo tramite misure ripetute; valore più attendibile di una misura,errore di sensibilità dello strumento, errore assoluto, errore relativo e percentuale, scrittura di una misura.

Differenza tra grandezze scalari e vettoriali; i vettori e la loro somma. Regola del parallelogramma e metodo punta – coda; differenza tra vettori, prodotto di un vettore con uno scalare, scomposizione di un vettore e sue componenti; Il seno e coseno di un angolo. Prodotto scalare e vettoriale; regola mano destra

Forza elastica-legge di Hooke; Grandezze direttamente proporzionali : definizione, caratteristiche e grafici

Laboratorio 2 : moto rettilineo uniforme, moto uniformemente accelerato, pressione con campana a vuoto;

Scomposizione di un vettore su un piano inclinato; forza di attrito statico. condizioni di equilibrio su un piano inclinato con attrito. esercizi su piano inclinato con molla e attrito.

La docente Gli studenti