Q.U.I.N.N.

Quantum Understanding and Interactive Navigation for Newbies

Junior physics worksheet – teacher notes

Introduction

The Standard Model explains physical properties of matter including mass and charge. Learning about the properties and interactions of the elementary particles of The Standard Model is feasible for junior secondary students and is a critical gateway to understanding developments in modern physics.

The purpose of the worksheet is to provide an introduction to The Standard Model for years 7-10 students. Students can complete this worksheet in consultation with the digital interactive standard model and/or a paper copy. Access to the Internet is essential for student research. A practical lesson is a good format for students to ask experiment design questions and receive immediate feedback. Additional resources include PhET Interactive Simulations and CERN Education Resources.

Learning objectives - students will:	Success criteria - students should be able to:
• identify basic subatomic particles and their properties • connect particle physics to everyday phenomena • develop scientific inquiry skills • understand the nature of scientific discovery.	• name and describe basic particles • explain at least one fundamental force • design and describe a simple investigation • connect particle physics to daily life • ask relevant scientific questions • work collaboratively in investigations.

Differentiation strategies

Entry level support	Extension activities
• provide visual or tactile aids • use analogies to everyday objects • encourage collaborative work • supply structured investigation templates.	• independent research projects • peer teaching opportunities • complex pattern identification • open-ended investigations.

Cross-Curricular Connections

- **Mathematics:** calculations and proportions
- **History:** scientific discoveries timeline
- **English:** scientific communication
- **Digital Technologies:** research skills and presentations
- **Art:** particle visualisation and modelling.

Community engagement

- share online resources for family exploration
- connect to local science centres or universities
- organise virtual meetings with scientists.

EQUS Australian Research Council Centre of Excellence for Engineered Quantum Systems

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