INTRODUCTION TO THE LHC
UNIT OVERVIEW

A general overview of LHC physics, accelerator and detector design, and how data inform claims and reasoning begins with an exploration of the "Big Questions" that physicists plan to address at CERN. Teachers explore classroom activities and resources in a three-day workshop designed and presented by the LHC fellows and mentors at QuarkNet centers.

ENDURING UNDERSTANDINGS
- Basic research is a journey—not an event.
- The Standard Model is the current framework for our understanding of matter.
- LHC and the detectors are designed to address fundamental questions not explained by the Standard Model

UNIT OBJECTIVES
- List the building blocks of matter and the interactions between them.
- Describe fundamental questions not explained by the Standard Model that the LHC and its experiments are designed to address.
- Interpret operations of the LHC accelerators and observed events using introductory physics concepts.
- Summarize design characteristics of the LHC experiments (ATLAS, CMS, ALICE, LHC-b) and how those characteristics can yield information that may answer the fundamental questions.
- Explain how LHC physicists select reliable data and provide evidence-based conclusions that first replicate previous findings and then lead to new knowledge.
- Track the "journey" as physicists approach new physics.

ALIGNMENT WITH NATIONAL SCIENCE EDUCATION STANDARDS: This unit
demonstrates some elements of the following:
Teaching Standards:
- A: Plan an inquiry-based science program.
- B: Guide and facilitate learning.
- E: Develop communities of science learners.

Assessment Standards:
- B: Achievement and opportunity to learn science
- C: Quality of data matched to decisions and actions taken

Content Standards:
- A: Science as inquiry
- B: Physical science
- E: Science and technology

Program Standards:
- A: Consistent with other standards
- B: Developmentally appropriate, interesting, and relevant
- D: Access to appropriate and sufficient resources

Developed by the LHC fellows, a group of QuarkNet teacher-leaders.