



QUIZ STUDY GUIDE

StellarXplorers Qualification Round 1 (QR1)

In each of the Qualifying Rounds of competition, teams can earn up to 20 points based on their completion of an online academic quiz. The quiz is taken as a team (not individually) and must be completed within the team's 6-hour competition window. There is no time limit on the quiz itself. The quiz is 20 questions (multiple choice, true/false, and/or matching) and each correct answer is worth 1 point. All questions are based on topics covered in **Nova Space's StellarXplorers Space Foundations course**.

Study guides are provided for each quiz to help teams prepare and maximize their quiz scores. The QR1 quiz covers the topics in the Rocket Science and Space Launch Foundational Module:

Rocket Science and Space Launch Foundational Module

Physics Primer

- Four Forces of Flight
- Bernoulli's Principle
- Functions of rocket systems
- Newton's Laws of Motion
- Momentum Equation
- Conservation of Linear Momentum
- Total Energy and the Conservation of Energy Principle
- Thermodynamics and fluid dynamics
- Ideal gas law
- Venturi Effect
- Specific Enthalpy
- Mass Flow Rate

Rocket Science

- Thrust
- Payload
- Orbiting
- Deceleration
- Acceleration
- Simply Put
- Conservation of Momentum
- Rocket Equation

Basic Rocket Design

- Combustion chamber
- Nozzle design and function
- Pressure
- Efficiency

Propulsion Systems

- Types of propulsion systems
- Propulsion basics
- Thermodynamic Rockets
- Electric Rockets

Launch Vehicles

- Launch Vehicle Subsystems
- Launch Vehicle Staging

Satellite Launch

- Vernal Equinox
- Solar Day
- Sidereal Day
- Orbital Plane
- Launch Windows
- Launch Equation
- Geographic Considerations