

# Junior Solar Sprint

# JSS and STEM Standards



Twenty-six states and their broad-based teams developed the Next Generation Science Standards (NGSS). Junior Solar Sprint is a great tool to integrate into existing curricula to enhance lessons with motivating, hands-on activities.

JSS supports the following STEM standards:

## SCIENCE CONTENT STANDARDS

### SCIENCE AS INQUIRY

Students should develop the following:

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

### PHYSICAL SCIENCE

Students should develop an understanding of the following:

- Properties and changes of properties in matter
- Motions and forces
- Transfer of energy

### SCIENCE AND TECHNOLOGY

Students should develop the following:

- Abilities of technological design
- Understandings about science and technology

*Excerpted from: National Science Education Standards, 1995 by the National Academy of Sciences.*

## TECHNOLOGY CONTENT STANDARDS

### STANDARD 1

Students will develop an understanding of the characteristics and scope of technology.

### STANDARD 2

Students will develop an understanding of the core concepts of technology.

### STANDARD 3

Students will develop an understanding of the relationships among technologies and the connections between technologies and other fields of study.

### STANDARD 5

Students will develop an understanding of the effects of technology on the environment.

### STANDARD 8

Students will develop an understanding of the attributes of design.

### STANDARD 9

Students will develop an understanding of engineering design.

### STANDARD 10

Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

### STANDARD 11

Students will develop the abilities to apply the design process.

### STANDARD 12

Students will develop the abilities to use and maintain technological products and systems.

### STANDARD 13

Students will develop the abilities to assess the impact of products and systems.

### STANDARD 16

Students will develop an understanding of and be able to select and use energy and power technologies.

*Excerpted from: Standards for Technological Literacy: Content for the Study of Technology (ITEEA (formerly ITEA), 2000/2002/2007)*

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## ENGINEERING CONTENT STANDARDS

All Americans will:

- Apply a structured approach to solving problems including: defining a problem, brainstorming, researching and generating ideas, identifying criteria and constraints exploring possibilities, making a model or prototype, evaluating the design using specifications, and communicating results.
- Ask questions and make observations to help figure out how things work.
- Learn that all products and systems are subject to failure and that many products and systems can be fixed.
- Troubleshoot as a way of finding out why something does not work so that it can be fixed.
- Analyze and break down complex systems into their component parts and explain the relationship and interdependency of the part and the system.

*Excerpted from: The Corporate Member Council – K–12 STEM Guidelines for All Americans*

## MATHEMATICS CONTENT STANDARDS

### NUMBERS AND OPERATIONS

- Understand numbers, ways of representing numbers, relationships among numbers and number systems
- Understand meanings of operations and how they relate to one another
- Compute fluently and make reasonable estimates

### GEOMETRY

- Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships
- Specify locations and describe spatial relationships using coordinate geometry and other representational systems
- Apply transformations and use symmetry to analyze mathematical situations
- Use visualization, spatial reasoning and geometric modeling to solve problems

### MEASUREMENT

- Understand measurable attributes of objects and the units, systems and processes of measurement
- Apply appropriate techniques, tools and formulas to determine measurements

### DATA ANALYSIS AND PROBABILITY

- Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them
- Select and use appropriate statistical methods to analyze data
- Develop and evaluate inferences and predictions that are based on data
- Understand and apply basic concepts of probability

### PROBLEM SOLVING

- Build new mathematical knowledge through problem solving
- Solve problems that arise in mathematics and in other contexts
- Apply and adapt a variety of appropriate strategies to solve problems
- Monitor and reflect on the process of mathematical problem solving

### REASONING AND PROOF

- Recognize reasoning and proof as fundamental aspects of mathematics
- Make and investigate mathematical conjectures
- Develop and evaluate mathematical arguments and proofs
- Select and use various types of reasoning and methods of proof connections
- Recognize and use connections among mathematical ideas
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole
- Recognize and apply mathematics in contexts outside of mathematics

*Excerpted from Principles and Standards for School Mathematics, © 2000 by the National Council of Teachers of Mathematics (NCTM).*