ARMY EDUCATIONAL OUTREACH PROGRAM

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Implement Junior Solar Sprint (JSS) at your U.S. Army base

Junior Solar Sprint

July 18, 2023

What is JSS?

- Junior Solar Sprint (JSS) is a program administered by the Technology Student Association (TSA) through a grant awarded by the Army Educational Outreach Program (AEOP).
- Within the JSS program, students develop teamwork and problem-solving abilities, investigate environmental issues, and gain hands-on STEM skills as they construct the fastest, most interesting, and best crafted solar vehicle.

Who can participate in JSS?

- Eligibility
  - 5th-8th graders on teams of 2-4 students.
  - Students must actively be enrolled in K-12 public, private, or home-school.
  - US Citizens or US Permanent Legal Residents.
    - *US Permanent Legal Residents may be required to show proof of eligibility.*
  - Participants must be members of a TSA chapter or participate at an Army site hosting a JSS event.

How do I start a JSS program in my Army Base?

- What are the requirements to launch a JSS program?
  - The sponsoring Army research organization must formally appoint a JSS POC who will facilitate successful program planning, execution and reporting of JSS at the respective Army laboratory.
  - Registration process for JSS participants must be conducted through a centralized AEOP application. In addition, all POC's will be responsible for tracking number of teams, participants and volunteers participating in the JSS event. This information will be submitted to the JSS Program Manager.
  - JSS Army-hosted Regional competitions should take place between March and May and participation should take place on-site at the designated Army research laboratory or engineering center.

How do I start a JSS program in my Army Base?

- What are the requirements to launch a JSS program?
  - JSS sites should submit pictures, press releases, “stories” of those participants involved in the JSS event.
  - JSS participants or their parents/legal guardians (if under 18 years old) must be informed that participants will be asked to participate in an evaluation/research process, that responses are voluntary and that assessment tools are not anonymous but that all results will be kept strictly confidential. This statement will also be clearly stated in the registration process.
  - JSS POC will be responsible for having all mentors and volunteers complete the post event evaluation (evaluation will be distributed by EDC).

How do I start a JSS program in my Army Base?

- What does the process entail?
  - Outreach to schools (priority populations and military connected is preferred)
  - Provide required Ideal-Logic registration links to teachers, and volunteers leading the effort in schools
  - Host a JSS event with participating teams
  - Winning team of the event is provided funding to attend the national JSS event held at the national TSA conference in late June each year

How do I start a JSS program in my Army Base?

Timeline

September- April

- Registration opens
- Online resources available
- Begin planning for JSS implementation in classrooms or as afterschool activities

December - April

- Use online resources to begin planning for design and build of solar car
- Create design sketches and compile information for portfolio
- Obtain solar panel kits

February -May

- Participate in TSA state conferences and U.S. Army-hosted JSS events

Late June - Early July

- National JSS Competition at the National TSA Conference

*The timeline can be modified to fit your schedule

Sample Lesson Plan

Week 1: JSS Program Introduction and Basics of Vehicle Design

- Discuss hands-on and design process
- JSS schedule
- Discuss vehicle design, define goals, and constraints
- Discuss vehicle components

Week 2: Wheels, Axles, Bearings, and Chassis

- Form teams of three students
- Weekly design review
- Friction labs
- Investigating materials

Week 3: Motors, Transmissions and Solar Panels

- Demonstrations and discussions
- Class experiments
- Makeworkingdrawing (actual size) of vehicle and bill of materials (spreadsheet)

Week 4: Select Overall Vehicle Design and Plan/Begin Construction

- Vehicle construction demonstrations, part one
- Correct working drawing (actual size) of vehicle and bill of materials (spreadsheet)
- Weekly design review

*Note: this is a sample lesson plan that can be adjusted to your schedule
Lesson plans and resources are provided for each week

Sample Lesson Plan

- Vehicle construction demonstrations, part two
- Weekly design review
- Teacher guidance
- Build vehicles

Week 5: Demonstrations and Vehicle Construction

Week 6: Constructions of Vehicles

- Check progress of cars
- Choose recyclable materials

- Check progress of cars
- Prepare for school race

Week 7: Complete construction of vehicles and begin testing

Week 8: Optimize vehicles

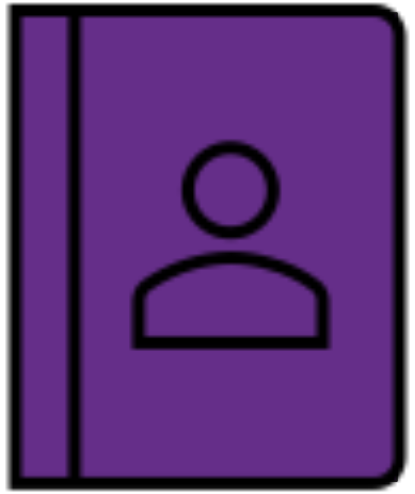
- Discuss performance measures from rules
- Student work: optimize vehicle
- In-class race
- Disassemble vehicles / determine fate of materials
- Debrief (lessons learned)

*Note: this is a sample lesson plan that can be adjusted to your schedule
Lesson plans and resources are provided for each week

Materials and Resources

- What can I expect?
  - Resources and materials for implementation of JSS are available online and include the national JSS event guidelines.
  - Online resources and materials for how to host an event are available online.
  - Ideal-Logic registration is REQUIRED of all participants, volunteers and teachers (link will be provided).
  - Participating JSS sites receive ongoing support from the JSS program IPA (Sue King).
  - Basic solar kits (motors, wires and panel) are provided to participating teams.

Who should I contact for more information or support throughout the process?



Sue King
sking@tsaweb.org

Benefits of JSS

- Not only is it FUN but JSS will have your students actively engaged in STEM learning!
- The program offers resources that empower teachers, mentors, and other community members to engage middle school students in designing, building, and racing model solar cars.

Benefits of JSS

- Students develop teamwork and problem-solving abilities, investigate environmental issues, and gain hands-on STEM skills as they construct the fastest, most interesting, and best crafted vehicle possible.
- As you teach them about solar-powered cars, you can discuss emerging environmental challenges.

Benefits of JSS

- Aligned to curriculum
  - NGSS
  - STEM standards
- Lesson plans, videos and webinars are available online to registered participants

Junior Solar Sprint and Next Generation Science Standards

ENGINEERING DESIGN PERFORMANCE EXPECTATIONS

Students who demonstrate understanding can:

GRADE 5

3-5-ETS1-1
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3
Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

GRADES 6-8

MS-ETS1-1
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4
Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Next Generation Science Standards: www.nextgenscience.org

Program Locations