



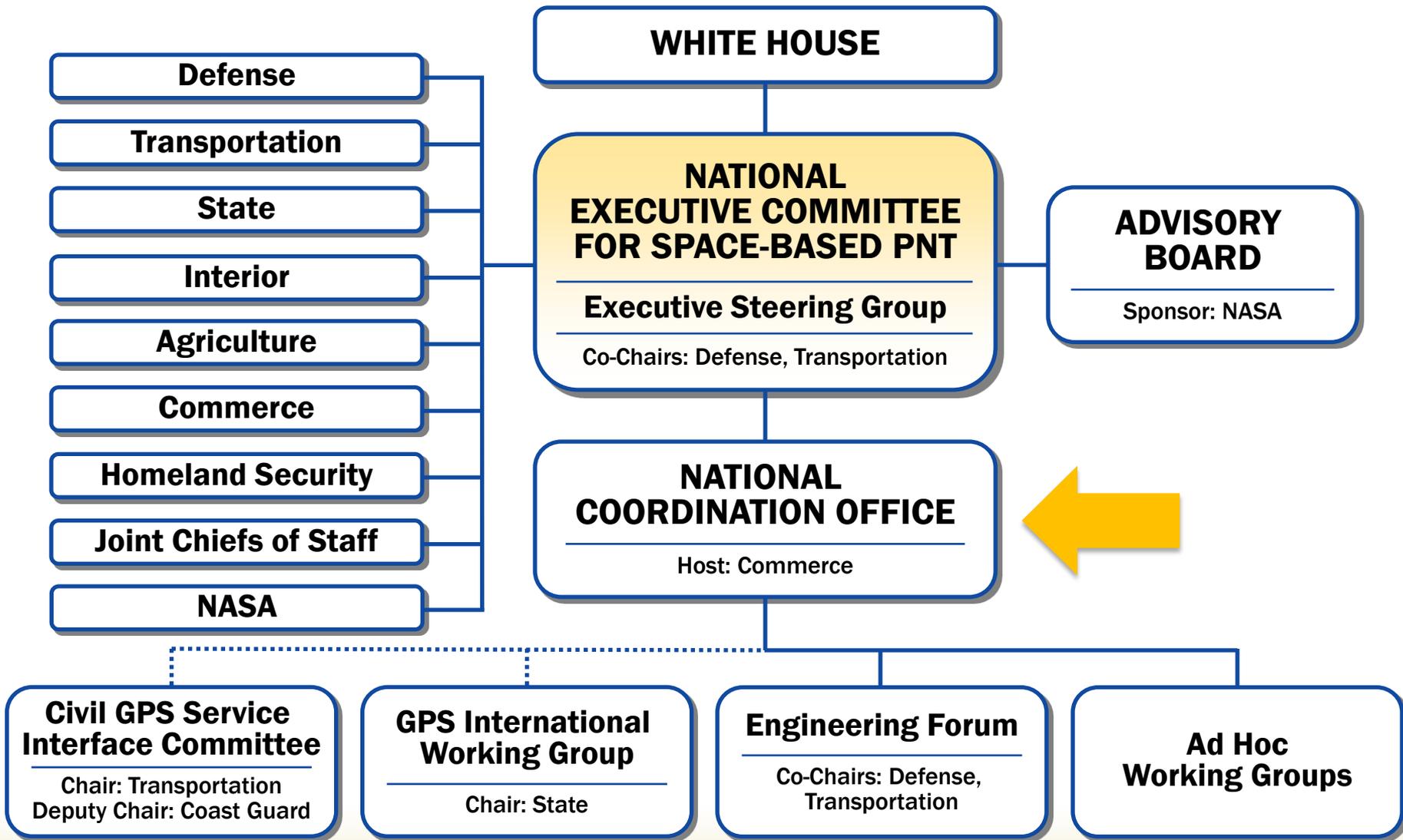
SPACE-BASED POSITIONING
NAVIGATION & TIMING
NATIONAL COORDINATION OFFICE

STEM Education Based on GPS

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**Civil GPS Service Interface Committee
Miami, Florida – September 25, 2018**

National Management Structure for GPS





EXCOM Strategic Focus Areas



- **GPS Sustainment and Modernization**
- **International Cooperation**
- **Spectrum Management**
- **Critical Infrastructure**
- **PNT Resilience**
- **Outreach**





National Space Policy



- **Develop and Retain Space Professionals.**
...Departments and agencies also shall promote and expand public-private partnerships to foster educational achievement in Science, Technology, Engineering, and Mathematics (STEM) programs, supported by targeted investments in such initiatives.



GPS Outreach & Education



GPS.gov Official U.S. government information about the Global Positioning System (GPS) and related topics

Home What's New Systems Applications Governance Multimedia Support

Home • For Students & Teachers

GPS Educational Resources

For Students and Teachers

INFORMATION FOR STUDENTS

What is GPS?

The Global Positioning System is a U.S.-owned utility that provides users with positioning, navigation, and timing services.

- Overview
- Space Segment
- Control Segment
- User Segment

Who Uses GPS?

GPS is an essential element of the global information infrastructure. The technology is in everything from cell phones and wristwatches to bulldozers, shipping containers, and ATMs.

- Recreation
- Roads & Highways
- Space
- Surveying & Mapping
- Timing
- Public Safety & Disaster Relief
- Rail

RESOURCES FOR TEACHERS

NEW GPS-Based STEM Curriculum

The U.S. government has released a new curriculum that uses GPS concepts and activities to stimulate student interest in science, technology, engineering, and mathematics (STEM). The curriculum is designed for the middle/high school level and tied to the Next Generation Science Standards (NGSS).

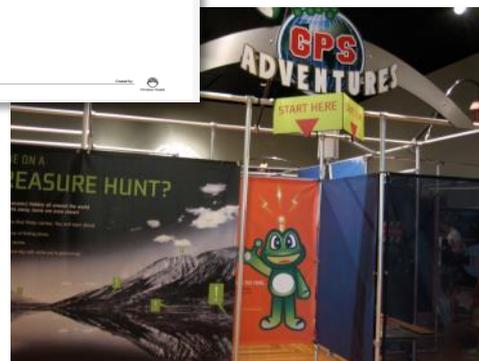
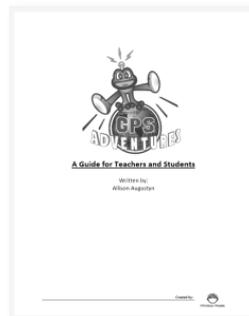
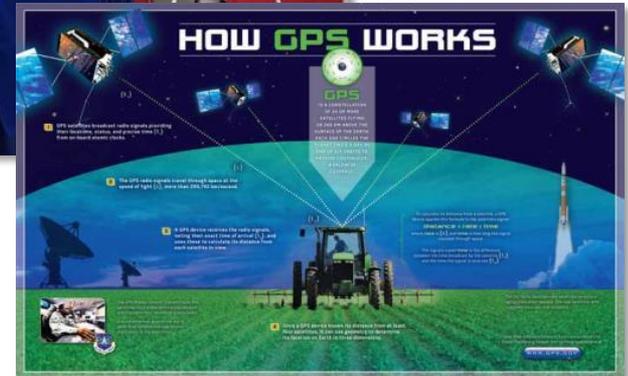
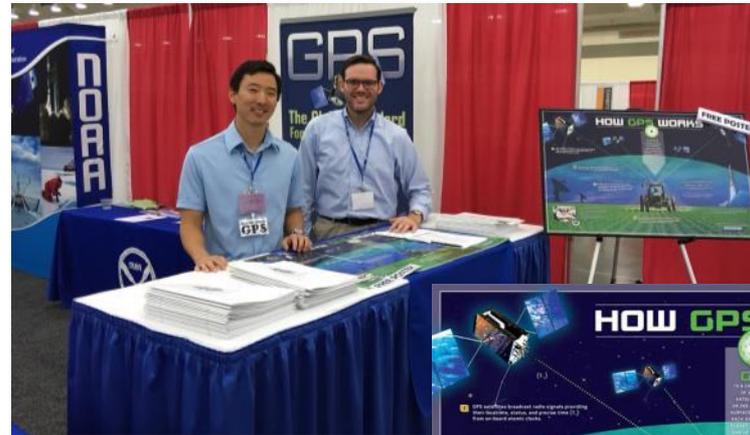
Thanks to all the educators who helped us test the lesson plans in classrooms to see how students respond to the material. Your feedback improved the curriculum prior to its finalization.

Check out the curriculum at [GPS-STEM.com](https://www.gps.gov/gps-stem)

Classroom Poster

Teachers, order a free copy of the "How GPS Works" poster for your classroom today. Or download and print it yourself.

Learn more





GPS-Based STEM Curriculum



- **Uses GPS concepts & applications to stimulate student interest in STEM**
- **Designed for middle school**
- **Highlights STEM careers and diversity**
- **Low/no-cost classroom activities**
- **Maps to Next Generation Science Standards (NGSS) and Common CORE**
- **Inquiry based learning using stories, videos, etc.**



Inquiry Based Learning – IDEA



Inquire: Present an event for inquiry

Discuss: Open discussion

Explain: Mini lecture

Apply: Exercise



Curriculum Structure



Courses	Lessons (3 Per Course)		
Earth	Are we there Yet? Mapping it out with Longitude & Latitude	Do you read me? Radio, Magnets & Information Transfer	I'm on my way! Navigation & Global Positioning System
Space	Launching Explorations Satellites & Orbits	Living Weightless: International Space Station	Orbital Rendezvous: Calculating Resupply for ISS
Life	Baby is it Cold Outside? Weather Forecasting	Saving Mother Nature: Environmental Conservation	Feed the World: Agriculture & Precision Farming
Movement	Up Up & Away! Aviation Moves Us	Networks of Power: Energy & Information	Global Supply Chain: Planes, Trains & Automobiles



Sample Materials



Are We There Yet?!

Get 3 classmates and plan a trip from here to Orlando, FL...you're going to Disney World!

To plan your trip, what will your team need to determine?



- What are your Longitude and Latitude right now?
- What are the Longitude and Latitude of Orlando, FL?
- How long will you drive before taking a break? Where will that be?
- Using your map and a ruler, calculate the number of miles that you will need to drive to get to Orlando
- Given that ***Distance = Time x Speed***, how long will it take to drive there if you travel an average of 60 miles per hour when driving (remember your breaks!)?

Version 1.0



Sample Materials



GEOID & ELLIPSOIDS:

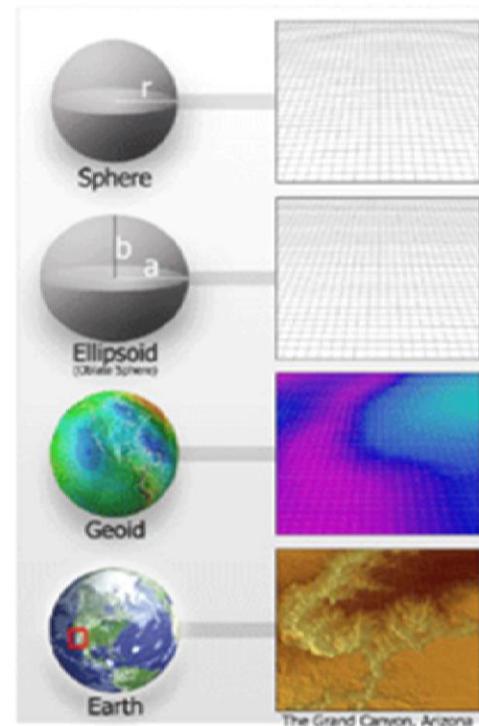
The Earth is an imperfect sphere

-It is Nearly Impossible to measure the surface of the Earth due to the irregularities such as mountains or valleys; and the rise and fall of the ocean tides

-To compensate, scientists use theoretical models: Geoids and Ellipsoids

Let's do an exercise...
Punching out the globe!

[POTENTIAL BREAKPOINT FOR CLASS SESSION AFTER THE EXERCISE]



Version 1.0



Sample Materials



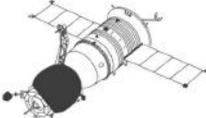
The screenshot shows a web browser window displaying the PBS LearningMedia page for "GPS/GIS Technology: Training & Careers". The page features a main video player with a man speaking, a "You May Also Like" section with four video thumbnails, and a "Curriculum" section. The browser address bar shows the URL: <https://mpt.pbslearningmedia.org/resource/ates12.sci.ptintrogps/gpsgis-technology-training-careers#.Wi7IC0qnHD5>. The page includes navigation menus for "Subjects", "Grades", and "Standards", a search bar, and a "Sign In/Up" button. The main content area has a title "GPS/GIS Technology: Training & Careers" and a subtitle "Collection: Advanced Technological Education". The video player has a "WGBH" logo in the bottom right corner. Below the video player are tabs for "About", "Support Materials", "Standards", and "Download". The "About" tab is active, showing a description: "In this video adapted from *Pathways to Technology*, you'll learn how geographic information systems (GIS) and global positioning systems (GPS) are changing the ways professionals, in many fields, make decisions about their businesses. GPS/GIS technology is used". To the right of the description is a logo for "pathways to technology" and a "Permitted use" section with the text "Stream. Download and". The "You May Also Like" section contains four video thumbnails with titles: "Agricultural Technology Student: Farming &...", "Agricultural Technology Student: Water...", "Why Study GIS? | Geospatial Revolution", and "GPS: Where in the World Are You?". The "Curriculum" section is partially visible at the bottom.



Sample Materials



 **SPACE-BASED POSITIONING
NAVIGATION & TIMING**
NATIONAL COORDINATION OFFICE

Certificate of Completion

Presented to

for Completing the Lesson

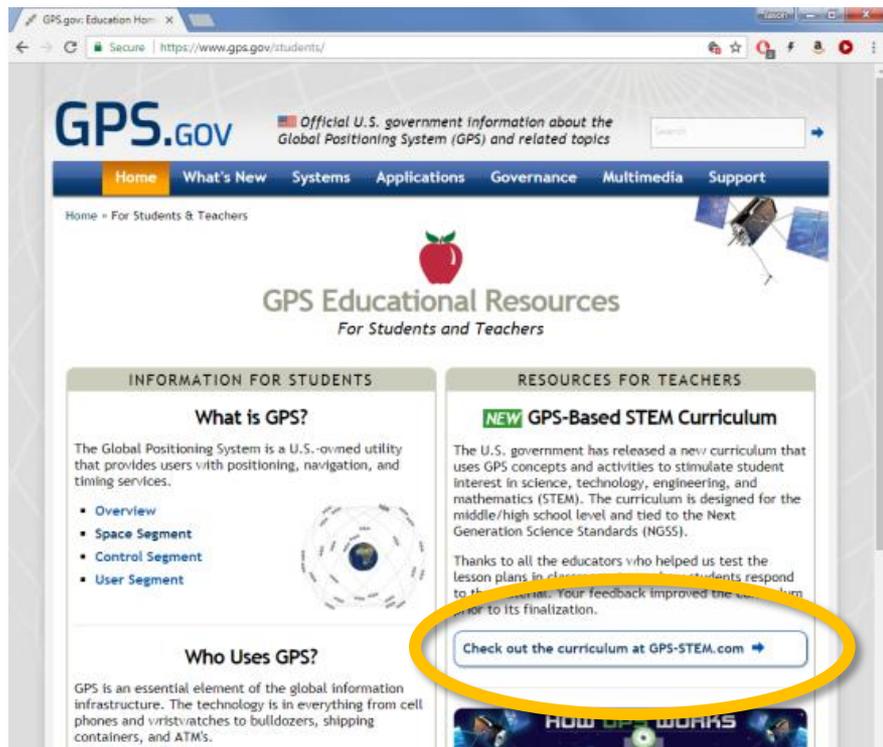
Earth, Lesson 3: I'm on my way! Navigation & Global Positioning System

John Superteacher *at* Brad Parkinson Middle School

<https://www.gps.gov/students/curriculum/>



Check It Out!



GPS.gov/students



**GPS-STEM.com
(temporary URL)**