

# NATIONAL RESOURCES

Links to these resources and many others can be found at:  
<http://www.globe.gov/web/from-learning-to-research/overview/teacher-developed-products/pbl-brochure>



EXPLORING the ENVIRONMENT



Project Based Learning  
*Learners creating meaning and reaching understanding*  
 WVE Office of Instruction



## Acknowledgment and Disclaimer

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"Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF)."



# Teacher Checklist

These steps will help get PBL started on the right foot.

## Keep it Simple:

- Focus on a few power standards and one subject rather than several.
- Don't get "tech happy" at first. Master the design and implementation process, technology can be added later.
- Start small, make it a manageable experience.

## Do Your Homework:

- Be armed with knowledge about existing models, lessons and successes to start in a positive direction.
- <http://globe.gov> has a wealth of information about protocols.
- Watch this excellent introductory video on starting PBL. <http://www.youtube.com/watch?v=-OWX6KZQDoE>

## Communication is key!

There are many stakeholders in education quality. Communication with staff, teachers, school administrators, students, parents and community members is critical.



**Don't be afraid to ask for help.**  
 Remember there are people across the GLOBE community who are invested in connecting young people using Project Based Lessons. [help@globe.gov](mailto:help@globe.gov)

## Evaluation and Assessment Plan

Incorporate checkpoints and deadlines along the way to monitor student learning as the project progresses. Rubrics provide a fair way to assess performance.

<http://rubistar.com> and <http://wvde.state.wv.us/teach21/PBLRubrics.html>



## When Disaster Strikes



Unforeseen circumstances happen. When students encounter problems, embrace the teachable moments to help them learn important life lessons about solving problems and overcoming obstacles. Be adaptable and flexible to change goals when necessary.

# Project Based Learning Resource Guide for Educators

Created by Educators



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# Why do Project or Inquiry-Based Learning?



Students work in teams to experience and explore relevant, **real-world problems**, questions, issues and challenges; then create presentations and products to share what they have learned.

## Benefits of PBL

- Authentic Achievement
- Assessment FOR learning as well as assessment OF learning
- Formative (along the way) FOR learning
- Summative (at the end) OF learning
- Adds rigor and relevance
- Causes genuine and relevant inquiry
- Open-ended which generates more questions
- Deal with the levels of depth and knowledge
- Challenge and stimulate new ways of thinking
- Require students to develop a plan and make decisions
- Consistent with standards and frameworks

## Success stories using GLOBE and PBL

*In 1995 I was introduced and trained in GLOBE. It was overwhelming as to how I would integrate all or any of the protocols and informaton presented. For several years we did separate pieces throughout the year. Shortly afterwards I became involved with Earth Systems Science and PBL. Many of the modules that were being used were about topics that were global and not local. So I decided to follow the PBL precepts of having students take ownership by designing a curriculum combining Earth Systems Science, PBL and GLOBE. My goal was to have students make connectons between the different spheres and collect data to see what story they can tell about our local environment. "How Healthy Is Our Watershed?" was born and continues to develop today.*



-Gary Popolkowski, Charters-Houston Jr./Sr. High School, Houston, PA



## NGSS

Next Generation Science Standards (NGSS)  
*Searchable Standards By Performance Expectations*

PBL with GLOBE protocols and activities incorporates the eight NGSS Science and Engineering Practices.

<http://www.nextgenscience.org/search-standards-dci>  
<http://www.globe.gov/teaching-and-learning/learning-standards/next-generation-science-standards>

## Overview of GLOBE Protocols

The GLOBE Program enables you and your class to engage in a collaborative, scientific exploration of the world around you. With schools in over 110 countries, GLOBE facilitates scientist-student-teacher collaboration.



<http://www.globe.gov/teaching-and-learning/overview/overview>

## Learning Activities

Learning activities used with protocols to enhance student understanding of content.

Hydrology:

<http://www.globe.gov/web/hydrology/learning-activities>

Atmosphere:

<http://www.globe.gov/web/atmosphere-climate/learning-activities>

Earth as a System:

<http://www.globe.gov/web/earth-systems/learning-activities>

Land Cover and Biology:

<http://www.globe.gov/web/landcover/learning-activities>

Soil:

<http://www.globe.gov/web/soil/learning-activites>

## Collaboration and Partners



Click the "View Community Map" at the bottom of the page. Get connected to GLOBE teachers and scientists.

<http://www.globe.gov/community/schools/overview>



## Storytelling

Helpful guide to using storytelling in the classroom; a great way to introduce the topic. <https://www.storyarts.org/classroom/index.html>

## Project-Based Inquiry Learning: Science Teaching and Learning for the 21st Century

Develop skills in designing and using project-based inquiry learning (PBIL) to enhance conceptual understanding, critical thinking, scientific reasoning, and problem solving in standards-based classrooms.



## NATIONAL RESOURCES



### National Science Foundation

(NSF): Links to current discoveries made in research sponsored by NSF  
<http://www.nsf.gov/discoveries>

**National Aeronautics and Space Administration (NASA):** Online catalog of NASA Earth and space science resources is for educators of all levels - from elementary to college



<http://nasawavelength.org>



**National Oceanic and Atmospheric Administration (NOAA):** Online portal of NOAA education resources  
<http://www.education.noaa.gov>