Data Enriched Place-based Education

From Pennsylvania Creeks to Virginia Streams

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Data Enriched Place-based Education

Data enriches place-based education:

• teaches scientific concepts by actively engaging students in collecting data that connects them to issues in their local environment
• connects students to the larger data sets from the scientific community

Teen Shale Network – Pennsylvania surface water quality
Difficult Run – Virginia streams and the Chesapeake Bay
Place-based education (PBE)

- Offers hands-on, authentic learning experiences
- Enhances natural appreciation of the world
- Connects students to community
- Fosters active, serving citizenship

David Sobel (2004)
Pairing PBE and STEM

Image: Sharon Dykhoff

Image: www.wm.edu/research/ideation/stem-outreach/stem-education-alliance7498.php
## Pairing PBE and STEM

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Secondary data enriches PBE

Sources of secondary data include:

• NOAA
• USGS
• Critical Zone Observatories
• Stroud Water Research Center
• CUAHSI Hydrologic Information System
USGS stream gage data for temperature and dissolved oxygen
CUAHSI: Consortium of Universities for the Advancement of Hydrologic Sciences, Inc.

A map-based, desktop tool for finding hydrologic data.
HydroDesktop has over 100 sources of water data, including CZO data.

Boulder Creek
Christina River
Catalina/
Jemez River
Luquillo
Southern Sierra
Susquehanna Shale Hills

Image: criticalzone.org
Finding Hydrologic Data with HydroDesktop

Data searches specified by:
- Geographic region
- Keywords (variables)
- Time frame
- Data source

Download at his.cuahsi.org
Geographic location

Data source: CUAHSI-HIS HydroDesktop SSH CZO
Data source: CUAHSI-HIS HydroDesktop SSH CZO
Keyword variables and dates

Data source: CUAHSI-HIS HydroDesktop SSH CZO
Sites with data

Data source: CUAHSI-HIS HydroDesktop SSH CZO
Data source: CUAHSI-HIS HydroDesktop SSH CZO
Excel graph made with data from HydroDesktop

Precipitation Shale Hills CZO August 2010-2011

Data source: CUAHSI-HIS HydroDesktop SSH CZO
Search by keywords, in multiple databases
Search in multiple databases

Data sources: CUAHSI-HIS HydroDesktop CR CZO, NWISDV, EPA Storet
Enriching place with data

Teen Shale Network at Black Moshannon Creek

Images: Sharon Dykhoff
Shale Network
Pennsylvania data, 2005-2015

Data source: CUAHSI-HIS HydroDesktop Shale Network
Black Moshannon Creek sites
Clearfield & Centre Counties

Data source: CUAHSI-HIS HydroDesktop Shale Network
Enriching place with data

Stream Studies
Difficult Run Watershed, Virginia

Images: Sharon Dykhoff
USGS stream gage data
Fairfax County, Virginia
USGS stream gage data
Fairfax County, Virginia

Data source: HydroDesktop NWISDV
Next Generation Science Standards
National Research Council’s *Framework for K-12 Education*, 2011

- **Core knowledge**
- **Cross-cutting concepts**
- **Practices**

“Engaging in the practices of science helps students understand how scientific knowledge develops; such direct involvement gives them an appreciation of the wide range of approaches that are used to investigate, model, and explain the world.”

(NGSS Lead States, Appendix F, p. 1)
References


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