Program Goals

Increase achievement for all students through customized instruction

- Develop a model for customizing instruction using digital libraries
- Embed model in mainstream classroom practice
- Measure impact on teaching and learning
- Scale-up across districts and curricula
Curriculum Customization Service

- Supports teachers to mix and match materials
  - Customize instruction for **diverse** learners
  - Engage **digital** learners
  - Meet district and state learning goals
- Provides one stop-shopping access to materials teachers need and use
- Support professional development and collegiality through sharing of materials, pedagogy, practice
Look familiar?
Planning & Teaching Materials

- Big Ideas, Key Concepts & Benchmarks
- Student Text: IES Investigations
- Teacher Guides
- DPS Curriculum Implementation Guides
- Supporting Web Resources
- Your own stuff, e.g. student worksheets
- Pedagogy for customizing instruction

Customization:
- English Language Acquisition
- Skills development
- Extensions
Curriculum Customization Service

Transforms print materials into interactive, self-directed curriculum guides

- Concept-focused
- Student Activities and Instructional Support Materials
- District scope and sequence information
- Educational Standards
- Interactive digital library resources for differentiation
- Collections of “My Stuff” and “Shared Stuff”
Program History

- Partners: NSF, Denver Public Schools, It’s About Time Publishing, National Science Digital Library
- Developed CCS model through participatory design process with DPS Teacher Advisory Board
- Demonstrate feasibility for middle and high school Earth science: Pilot Study in Fall 2008 – 10 teachers, 10 weeks
- Measured impact in District-wide Field Trial in 2009/2010 – 124 teachers, academic year
- Now – scaling up to new districts and curriculum
  - Douglas County (CO), St. Vrain (CO), Mapleton (CO), Davis (Utah)
  - Middle school physical science
2009/2010 Denver Field Trial

- All middle and high school Earth science teachers (n = 124)
- Initial training session (101 teachers)
- Incentives: projector, standard district hourly compensation for initial training session and evaluation activities
- Research team contact: bi-weekly community updates and support email
Curriculum Customization Service: Demo

http://ccs.dls.ucar.edu
Concept-focused planning tool

Unit 1: Understanding Your Environment
Bedrock Geology

The geologic history of the Earth is determined by Earth Science principles such as differing rocks and sediments in different locations, forces inside the Earth and basic geologic principles.

Key Concepts

- Geologic Maps
- Rock Types
- Interpretation Principles
- Forces and Faults
- Land Use & Geology

Forces and Faults

Forces inside the Earth can create folds or faults over time. Different types of faults (reverse, normal and strike-slip) are formed by different forces (compression, tension or shearing).

Activity 5: Structural Geology and Your Community

Classroom activity

Students use craft clay to model how a real fold looks in map view and in cross-section view. Students use foam blocks to model faults and determine the direction of forces needed to cause normal faults, reverse faults, and strike-slip faults. Students interpret a simple map and cross section that contains folds and faults.

Keywords: Denver Public Schools, fault, fold, compression, tension, shear,
+ essential learning: must grade

From: It's About Time
Unit 1: Understanding Your Environment

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Key Concepts

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b. Rock Types
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d. Forces and Faults

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- Land Use & Geology

Forces and Faults

EarthComm Activities

Interactive Resources

Education Standards

Bedrock Geology: Activity 5: Structural Geology and Your Community

http://cics.dls.ucar.edu/dps/protected/lat/bedrock_geology/chap01/uc/uc2...

Classroom activity

Students use craft clay to model how a real fold looks in map view and cross-section view. Students use foam blocks to model faults and determine the direction of forces needed to cause normal faults, reverse faults, and strike-slip faults. Students interpret a simple map and cross section that contains folds and faults.

Keywords from Denver Public Schools: fault, fold, compression, tension, shear

+ essential learning: must grade

* May skip
Teacher’s Guide is built-in

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Forces and Faults

EarthComm Activities
Interactive Resources
Education Standards
My Stuff for this Concept
Shared Stuff for this Concept

Bedrock Geology: Activity 5: Structural Geology and Your Community
http://ccs.dts.ucar.edu/dps/protected/iat/bedrock_geology/chap01/ec_u2...

Classroom activity
Students use craft clay to model how a real fold looks in map view and in cross-section view. Students use foam blocks to model faults and determine the direction of forces needed to cause normal faults, reverse faults, and strike-slip faults. Students interpret a simple map and cross section that contains folds and faults.

Keywords from Denver Public Schools: fault, fold, compression, tension, shear
+ essential learning: must grade
From: It’s About Time
Bedrock Geology Activity 5: Investigate Part C 1c

(c) Were the faults produced by compression (pushing forces), tension (pulling forces), or shear (sideways forces) in the rock layers? Explain.

Answer

There are two faults. The fault on the left was produced by pulling forces. It is a normal fault and cannot be created by compression. The fault on the right was formed by pushing forces. It is a reverse fault and cannot be created by tension or pulling.
Interactive Resources to enhance instruction and support differentiation

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Forces and Faults

Forces in the Earth

http://scign.jpl.nasa.gov/learn/plate5.htm

- Classroom activity
- Scientific visualization
- Reference

Rating: ★ ★ ★ ★ ★

Saved by 0 users

Faults


- Glossary
- Reference

This page discusses the three main forces (compression, tension, and shear) that drive deformation within the Earth. Students can click on an animation to see illustrations of each type. Links to a glossary are embedded in the text.

From: DLESE Community Collection (DCC)

This site explains the three types of faults that result from plate movement. Animated diagrams are used to demonstrate strike-slip faults, normal faults, and reverse faults. There are also four photographs that show the results of actual earthquakes.
My Stuff and Shared Stuff: Ability to Save, Upload, and Share

Key Concepts
- a. Geologic Maps
- b. Rock Types
- c. Interpretation Principles
- d. Forces and Faults
- e. Land Use & Geology

Forces and Faults

Bedrock Geology: Activity 5: Structural Geology and Your Community

Fault Motion

These animations are very elementary examples of fault motion demonstrations. For more about faults see the NOAA slide show, a rich source of images and textual information.

1) DIP-SLIP FAULTS
   a) Normal Fault
   In a normal fault, the block moves down relative to the other block. This fault motion...
How does CCS organize, improve, and expedite my planning:

- One stop shop for all of my curriculum planning materials
- Hundreds of RELIABLE interactive resources already found by other educators and researchers
- Access to lesson plans, activities, and supplements provided by other educators
How does CCS increase student achievement?
Mixed Methods Research Design

Teacher Usage, Attitudes, and Behaviors
- Demographic data
- Usage instrumentation
- Series of three surveys
- Adoption interviews
- Classroom Observations
- Artifact Analysis

Teacher Learning
- Cognitive interviews

Student Learning
- District-wide, student assessments administered by DPS
Usage and Adoption: Sept – June
# sessions per month

- < 1: 27%
- 1-2: 28%
- 3-4: 14%
- 5-8: 10%
- >8: 21%
Qualitative data: interviews and classroom observations

Teachers report 2 main uses of the CCS:
• supplement or customize curriculum

“[the CCS] is a space for me to save my materials on that won’t be erased…it’s a centralized location where I can find that extra material that I know is going to be, nine times out of ten, useful for me. It actually has cut down on [my] random searching on the Internet." 

“Looking at the Shared Stuff uploaded by other users gives me ideas about how I can present particular concepts in my classroom.”
Customizing Instruction

- CCS has made it easier to use formative assessments (84%)
- The CCS has helped me integrate interactive digital resources, such as videos and animations, into my instruction with greater confidence and frequency (84% of respondents agreed)
- The CCS has helped me to include more alternate representations of science phenomena into my teaching (88% of respondents agreed)
Overall CCS Feature Usage

23995 total click actions logged

Fall 09 semester
Interactive Resources

Fall 09 semester

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Picks</td>
<td>609</td>
</tr>
<tr>
<td>Animation</td>
<td>294</td>
</tr>
<tr>
<td>Visual</td>
<td>218</td>
</tr>
<tr>
<td>Data</td>
<td>22</td>
</tr>
</tbody>
</table>
What is being “saved” to My Stuff? From where?

Shared Stuff: 50%
Top Picks: 30%
Animations: 10%
Images/Visuals: 7%
Inquiry w/Data: 3%
Sharing Contributions Online

SharedStuff – very highly used area (usage logs)

- I look at SharedStuff for new ideas (96%)
- Ability to upload and share is very useful (84%)
- The CCS has resulted in DPS teachers sharing resources with one another more than ever before (48%)

I've learned that there are a variety of perspectives that you can approach these [Earth science] concepts with, and that my idea of how to teach [is] only one of many. It's challenged me to see my learners from different perspectives and respond accordingly.
Suggested Feature Enhancements

- Include a lesson planning/creation feature to organize progression of lessons
- Include Science Assessment Frameworks from CDE in Standards tab
- Create a space for teacher dialogue/blogging
- Student access to interactive resources
- Improved organization options for My/Shared Stuff resources
Project expansion plans

- High school Earth science
  - Douglas County
  - St. Vrain Valley
  - Mapleton (Adams 1)
  - Davis County, Utah
  - Aurora (pending)

- Middle school Earth science
  - Clark County, Nevada (pending)

- Middle school physical science
  - InterActions in Physical Science (IAT)
  - Denver Public School

- High school biology
  - Collaboration with BSCS under discussion
Questions?

For more information:
ccshelp@dls.ucar.edu