

THE NATIONAL SCIENCE DIGITAL LIBRARY

# Understanding Impact: Results from a District-Wide Field Trial of the NSDL Curriculum Customization Service



Holly Devaul and Tamara Sumner  
Digital Learning Sciences



[devaul@ucar.edu](mailto:devaul@ucar.edu), [sumner@colorado.edu](mailto:sumner@colorado.edu)



# 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

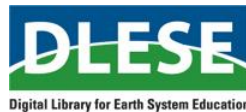
# Curriculum Customization Service

- Supports teachers to mix and match materials
  - Customize instruction for diverse learners
  - Engage digital learners
  - Meet district and state learning goals
- Provide integrated access to materials teachers need and use
- Support professional development and collegiality through sharing of materials, pedagogy, practice

# 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”



DPS Grade 9 Earth Science Curriculum

Unit 1: Understanding Your Environment

- [Bedrock Geology](#)

Units of Study » Unit 1: Understanding Your Environment: Bedrock Geology

## Bedrock Geology

► **Big Idea**

### Key Concepts

**a. Geologic Maps**

Geologic maps show the surface geology of an area, region or a larger land area. They are constructed using a variety of methods and contain generalizations.

- [Activity 2: Igneous Rocks and the Geologic History of Your Community](#)
- [Activity 3: Metamorphic Rocks and Your Community](#)
- [Activity 4: Rock Units and Your Community\\*](#)

**b. Rock Types**

There are three types of rocks: sedimentary, igneous and metamorphic and the rock cycle explains the relationships that can occur between them.

- [Activity 1: Sedimentary Rocks and the](#)

**d. 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+](#)

**e. Land Use & Geology**

Different regions in the United States have different land uses based on the underlying geology.

- [Activity 1: Sedimentary Rocks and the Geologic History of Your Community](#)
- [Activity 7: Geology of the United States\\*](#)

## Forces and Faults

EarthComm  
Activities

Interactive  
Resources

Education  
Standards

My Stuff for  
this Concept

Shared Stuff for  
this Concept

Activity 5 +

# 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 teachers
- 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, comPADRE

# Curriculum Customization Service: Demo

The screenshot shows a Mozilla Firefox browser window displaying the 'Plate Tectonics' page. The page title is 'Plate Tectonics > Plate Boundaries - Mozilla Firefox'. The browser's address bar shows the URL: <http://www.ccs-dev.dls.ucar.edu/home>. The page content includes a navigation menu with 'Volcanoes', 'Plate Tectonics', and 'Earthquakes'. The main content area is titled 'Plate Boundaries' and features a sidebar with 'Key Concepts' (a. GPS Technology, b. Modern Theory, c. Plate Boundaries, d. Earth's Layers, e. Plate Motion, f. Interactions of Plates, g. Wegener Hypothesis) and a main section with 'Plate Boundaries' sub-sections: 'EarthComm Activities', 'Interactive Resources', 'Education Standards', and 'Lesson Plans'. The 'Interactive Resources' sub-section is active, showing 'Top Picks: 4' and a list of resources including 'Tectonic Plates and Plate Boundaries' and 'Exploring Earth: Visualization of Plate Boundary Processes'. The page also includes a 'Welcome tammy | Logout | Home' message in the top right corner.

<http://ccs-dev.dls.ucar.edu/home>

# Concept-focused planning tool

## Unit 1: Understanding Your Environment

Lynne Davis (lynne) | [Logout](#) | [My profile](#) | [Find people](#) | [Units of Study](#)

### 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.

### Bedrock Geology

[Units of Study](#) » [Unit 1: Understanding Your Environment: Bedrock Geology](#) » [Forces and Faults](#)

[View All Stuff](#)

### Key Concepts

[a. Geologic Maps](#)

[b. Rock Types](#)

[c. Interpretation Principles](#)

**[d. 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).

[e. Land Use & Geology](#)

### Forces and Faults

EarthComm  
Activities

Interactive  
Resources

Education  
Standards

My Stuff for  
this Concept

Shared Stuff for  
this Concept

Activity 5 +

#### Bedrock Geology: Activity 5: Structural Geology and Your Community

[http://ccs.dls.ucar.edu/dps/protected/iat/bedrock\\_geology/ch](http://ccs.dls.ucar.edu/dps/protected/iat/bedrock_geology/ch)

[Opens full text](#)

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

- ▶ [My Stuff for this Activity](#)
- ▶ [Shared Stuff for this Activity](#)
- ▶ [Key Concepts for this Activity \(1\)](#)
- ▶ [Instructional Support Materials \(5\)](#)
- ▶ [Teaching Tips \(7\)](#)
- ▶ [Student Conceptions \(1\)](#)
- ▶ [Embedded Assessments \(5\)](#)

### Activity 5

### Structural Geology



#### Goals

In this activity you will:

- Describe the relationship between fault movement and the forces that cause this motion.

#### Think about It

Marble is metamorphosed from limestone. It has nearly horizontal layers.

- What would happen if...



# DPS Implementation Guide - online

EarthComm		Grades		Recorded Formative Assessments	
Bedrock Geology	4	5	6	7	8
Activity 1	X	X	X	X	X
Activity 2	X	X	X	X	X
Activity 3	X	X	X	X	X
Activity 4	X	X	X	X	X
Activity 5	X	X	X	X	X
Activity 6	X	X	X	X	X
Activity 7	X	X	X	X	X
Activity 8	X	X	X	X	X
Activity 9	X	X	X	X	X
Activity 10	X	X	X	X	X
Activity 11	X	X	X	X	X
Activity 12	X	X	X	X	X
Activity 13	X	X	X	X	X
Activity 14	X	X	X	X	X
Activity 15	X	X	X	X	X
Activity 16	X	X	X	X	X
Activity 17	X	X	X	X	X
Activity 18	X	X	X	X	X
Activity 19	X	X	X	X	X
Activity 20	X	X	X	X	X
Activity 21	X	X	X	X	X
Activity 22	X	X	X	X	X
Activity 23	X	X	X	X	X
Activity 24	X	X	X	X	X
Activity 25	X	X	X	X	X
Activity 26	X	X	X	X	X
Activity 27	X	X	X	X	X
Activity 28	X	X	X	X	X
Activity 29	X	X	X	X	X
Activity 30	X	X	X	X	X
Activity 31	X	X	X	X	X
Activity 32	X	X	X	X	X
Activity 33	X	X	X	X	X
Activity 34	X	X	X	X	X
Activity 35	X	X	X	X	X
Activity 36	X	X	X	X	X
Activity 37	X	X	X	X	X
Activity 38	X	X	X	X	X
Activity 39	X	X	X	X	X
Activity 40	X	X	X	X	X
Activity 41	X	X	X	X	X
Activity 42	X	X	X	X	X
Activity 43	X	X	X	X	X
Activity 44	X	X	X	X	X
Activity 45	X	X	X	X	X
Activity 46	X	X	X	X	X
Activity 47	X	X	X	X	X
Activity 48	X	X	X	X	X
Activity 49	X	X	X	X	X
Activity 50	X	X	X	X	X
Activity 51	X	X	X	X	X
Activity 52	X	X	X	X	X
Activity 53	X	X	X	X	X
Activity 54	X	X	X	X	X
Activity 55	X	X	X	X	X
Activity 56	X	X	X	X	X
Activity 57	X	X	X	X	X
Activity 58	X	X	X	X	X
Activity 59	X	X	X	X	X
Activity 60	X	X	X	X	X
Activity 61	X	X	X	X	X
Activity 62	X	X	X	X	X
Activity 63	X	X	X	X	X
Activity 64	X	X	X	X	X
Activity 65	X	X	X	X	X
Activity 66	X	X	X	X	X
Activity 67	X	X	X	X	X
Activity 68	X	X	X	X	X
Activity 69	X	X	X	X	X
Activity 70	X	X	X	X	X
Activity 71	X	X	X	X	X
Activity 72	X	X	X	X	X
Activity 73	X	X	X	X	X
Activity 74	X	X	X	X	X
Activity 75	X	X	X	X	X
Activity 76	X	X	X	X	X
Activity 77	X	X	X	X	X
Activity 78	X	X	X	X	X
Activity 79	X	X	X	X	X
Activity 80	X	X	X	X	X
Activity 81	X	X	X	X	X
Activity 82	X	X	X	X	X
Activity 83	X	X	X	X	X
Activity 84	X	X	X	X	X
Activity 85	X	X	X	X	X
Activity 86	X	X	X	X	X
Activity 87	X	X	X	X	X
Activity 88	X	X	X	X	X
Activity 89	X	X	X	X	X
Activity 90	X	X	X	X	X
Activity 91	X	X	X	X	X
Activity 92	X	X	X	X	X
Activity 93	X	X	X	X	X
Activity 94	X	X	X	X	X
Activity 95	X	X	X	X	X
Activity 96	X	X	X	X	X
Activity 97	X	X	X	X	X
Activity 98	X	X	X	X	X
Activity 99	X	X	X	X	X
Activity 100	X	X	X	X	X

FIRST SEMESTER		SECOND SEMESTER	
Unit 1: Bedrock Geology (EarthComm Unit II, Chapter 1)	Unit 4: Astronomy (EarthComm Unit V, Chapter 1)	Unit 3: Earth's Dynamic Geosphere (Yellowstone, Plate Tectonics, Earthquakes) (EarthComm Unit I, Chapters 1, 2)	Unit 5: Earth's Fluid Spheres (Oceans, Weather) (EarthComm Unit III, Chapter 1, 2)
Unit 2: Earth's Natural Resources (Energy, Minerals, Water) (EarthComm Unit III, selected activities)	Unit 6: Climate Change (EarthComm Unit V, Chapter 2)	Abilities to do Scientific Inquiry Understanding about the Nature of Science Earth and Solar Systems	
EarthComm: Earth System Science in the Community Developed by the American Geological Institute National Science Foundation			

## Unit 1: Understanding Your Environment Bedrock Geology

The geologic history of the Earth is determined by Earth Science principles at different locations, forces inside the Earth and basic geologic principles.

Units of Study » Unit 1: Understanding Your Environment: Bedrock Geology » Forces and Faults

### Key Concepts

- a. Geologic Maps
- b. Rock Types
- c. Interpretation Principles

### d. 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).

### e. Land Use & Geology

### Forces and Faults

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

Activity 5 +

### Bedrock Geology: Activity 5: Structural Geology and Your Community

[http://ccs.dls.ucar.edu/dps/protected/ia/bedrock\\_geology/chap01/ec\\_u2...](http://ccs.dls.ucar.edu/dps/protected/ia/bedrock_geology/chap01/ec_u2...)

Page: U 39  
Number of periods: 2

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

- **My Stuff for this Activity**
- **Shared Stuff for this Activity**
- **Key Concepts for this Activity (1)**
- **Instructional Support Materials (5)**
- **Teaching Tips (7)**
- **Student Conceptions (1)**
- **Embedded Assessments (5)**

- Key concepts and standards
- Keywords from DPS
- Page number from student text
- Pacing guidance
- Essential learning indicator
- + Must grade
- \* May skip



# Teacher's Guide is built-in

**Unit 1: Understanding Your Environment** Lynne Davis (lynne) | [Logout](#) | [My profile](#) | [Find people](#) | [Units of Study](#)

## 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.

**Bedrock Geology**

[Units of Study](#) » [Unit 1: Understanding Your Environment: Bedrock Geology](#) » [Forces and Faults](#) ▶ [View All Stuff](#)

### Key Concepts

- a. [Geologic Maps](#)
- b. [Rock Types](#)
- c. [Interpretation Principles](#)
- d. 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).
- e. [Land Use & Geology](#)


### Forces and Faults

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

Activity 5 +

**Bedrock Geology: Activity 5: Structural Geology and Your Community** Page: U 39  
[http://ccs.dls.ucar.edu/dps/protected/iat/bedrock\\_geology/chap01/ec\\_u2...](http://ccs.dls.ucar.edu/dps/protected/iat/bedrock_geology/chap01/ec_u2...) Number of periods: 2

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

- ▶ [My Stuff for this Activity](#)
- ~~▶ [Shared Stuff for this Activity](#)~~
- ▶ [Key Concepts for this Activity \(1\)](#)
- ▶ [Instructional Support Materials \(5\)](#)
- ▶ [Teaching Tips \(7\)](#)
- ▶ [Student Conceptions \(1\)](#)
- ▶ [Embedded Assessments \(5\)](#)

- ▶ [Key Concepts for this Activity \(1\)](#)
- ▶ [Instructional Support Materials \(5\)](#)
- ▶ [Teaching Tips \(7\)](#)
- ▶ [Student Conceptions \(1\)](#)
- ▶ [Embedded Assessments \(5\)](#)

# Embedded Assessments

## Key Concepts

a. [Geologic Maps](#)

b. [Rock Types](#)

c. [Interpretation Principles](#)

d. **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).

e. [Land Use & Geology](#)

## Forces and Faults

EarthComm  
Activities

Interactive  
Resources

Education  
Standards

My Stuff for  
this Concept

Shared Stu  
this Conc

Activity 5 +

**Bedrock Geology: Activity 5: Structural Geology and Your Community**

[http://ccs.dls.ucar.edu/dps/protected/iat/bedrock\\_geology/chap01/ec\\_u](http://ccs.dls.ucar.edu/dps/protected/iat/bedrock_geology/chap01/ec_u)

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

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

+ essential learning: must grade

From: It's About Time

► [My Stuff for this Activity](#)

► [Shared Stuff for this Activity](#)

► [Key Concepts for this Activity \(1\)](#)

► [Instructional Support Materials \(5\)](#)

► [Teaching Tips \(7\)](#)

► [Student Conceptions \(1\)](#)

► [Embedded Assessments \(5\)](#)

### 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](#)

EarthComm: It's About Time, Inc. American Geological Institute

▼ [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

## Unit 1: Understanding Your Environment

Lynne Davis (lynne) | [Logout](#) | [My profile](#) | [Find people](#) | [Units of Study](#)

### 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.

**Bedrock Geology**

[Units of Study](#) » [Unit 1: Understanding Your Environment: Bedrock Geology](#) » [Forces and Faults](#)

[View All Stuff](#)

### Key Concepts

a. [Geologic Maps](#)

b. [Rock Types](#)

c. [Interpretation Principles](#)

**d. 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).

e. [Land Use & Geology](#)

### Forces and Faults

EarthComm  
Activities

**Interactive  
Resources**

Education  
Standards

My Stuff for  
this Concept

Shared Stuff for  
this Concept

Top  
Picks (4)

Images /  
Visuals

Animations

Inquiry With  
Data

#### Forces in the Earth

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

Save

Classroom activity

Scientific  
visualization

Reference

Rating:

\* \* \* \* \*

Saved by 0 users

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)

#### Faults

<http://scign.jpl.nasa.gov/learn/plate6.htm>

Save

Glossary

Reference

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

Units of Study » Unit 1: Understanding Your Environment: Bedrock Geology » Forces and Faults ▶ [View All Stuff](#)

**Key Concepts**

a. [Geologic Maps](#)

b. [Rock Types](#)

c. [Interpretation Principles](#)

**d. 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).

e. [Land Use & Geology](#)

**Forces and Faults**

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

Activity 5 +

**Bedrock Geology: Activity 5: Structural Geology and Your Community** Page: U 39  
[http://ccs.dls.ucar.edu/dps/protected/iat/bedrock\\_geology/chap01/ec\\_u2...](http://ccs.dls.ucar.edu/dps/protected/iat/bedrock_geology/chap01/ec_u2...) Number of periods: 2

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

▶ **My Stuff for this Activity**

All resources  Search

Resources 1 - 1 out of 1

**Fault Motion**  
<http://www.iris.washington.edu/gifs/anim...>

Scientific illustration This collection of animations provide intended for simple demonstrations. reverse), strike-slip faults, and obliqu

Rating: ★ ★ ★ ★ ★

Saved by 2 users

Tags: ELA (2) At grade 9 (2) 5-15 min. (2)

» [more](#)

IRIS (1)


My notes: Good basic animation, simple but

My tags: ELA, IRIS  
 Grade fit: At grade 9  
 Time required: 5-15 min.

▶ **Shared Stuff for this Activity**

▶ **Key Concepts for this Activity (1)**

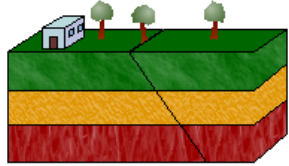
▶ **Instructional Support Materials (5)**

 site map contact search

introduction members programs publications earthquakes seismic monitor data software

**Fault Motion**

These animations are very elementary examples of fault motion demonstrations. For more about faults see the NOAA slide show 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

# Technical underpinnings

- NSDL EduPak tools
  - NSDL Collection System (NCS)
  - Digital Discovery System (DDS)
- NSDL learning resources
- Service Oriented Architecture
  - Web services used to implement the CCS

# Curriculum Customization Logic Model

## Nat'l Need and Prior Research

Effective instruction builds on learners' current knowledge and background

Classrooms are becoming increasingly diverse

Large differences in teachers' abilities to tailor instruction to learner needs

Extensive and purposeful planning is a hallmark of effective teaching

## Inputs

High quality DL resources aligned to learning goals and curriculum

DL technologies enabling scalable access, use, and sharing

School Districts:

- Curriculum Guides
- Teacher PD processes and incentives
- Technical infrastructure

## CCS Intervention

Learning Goals integrate:

- Core curriculum
- DL resources
- Assessments
- Common student conceptions
- User-contributed content

CCS supports instructional planning, customization, and professional learning

District PD incentives encourage CCS use and customization, and recognize contributions / sharing

## Anticipated Outcomes

Teachers customize instruction to meet learner needs and to improve learner engagement

Teachers integrate DL resources into their instruction with greater confidence and frequency

Teachers share customizations and other contributions online

Teachers use the CCS to support their own professional learning in informal and formal settings

Customizations support curricular coherence and use high quality DL resources

## Impacts

Increases in student learning

Customization is widespread and instruction is improved

Use of the CCS for ongoing professional learning is widespread

Teachers develop improved skills and knowledge for making pedagogically sound customizations

# 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



# 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

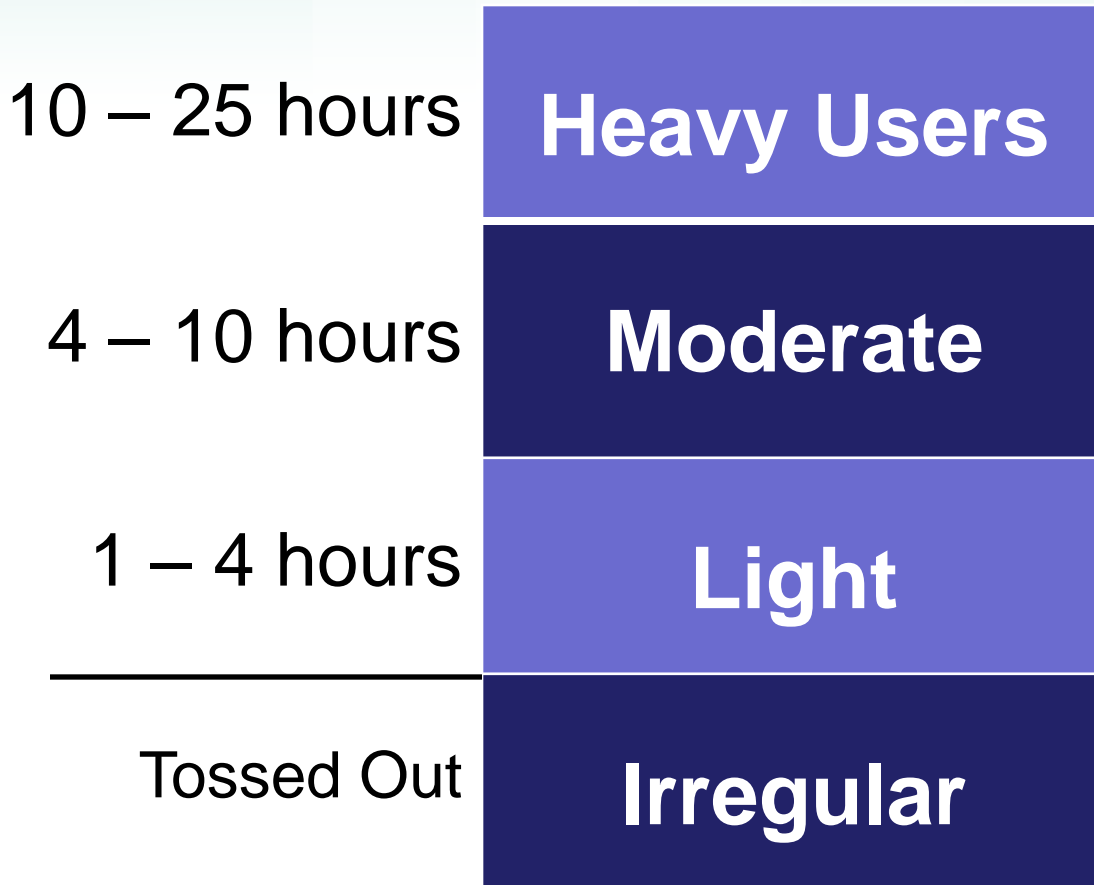
- District-wide, student assessments administered by DPS

# Three On-line Surveys

- September, December, May
- 80-84 respondents each time (overlap  $n=50$ )
- Multiple choice and free text
- Attitudes and beliefs regarding educational technology in general, use of CCS, customizing instruction
- Longitudinal analysis in progress – final survey reused 24 items

# Adoption Rate – Fall 2009

84 out of 124 logged in

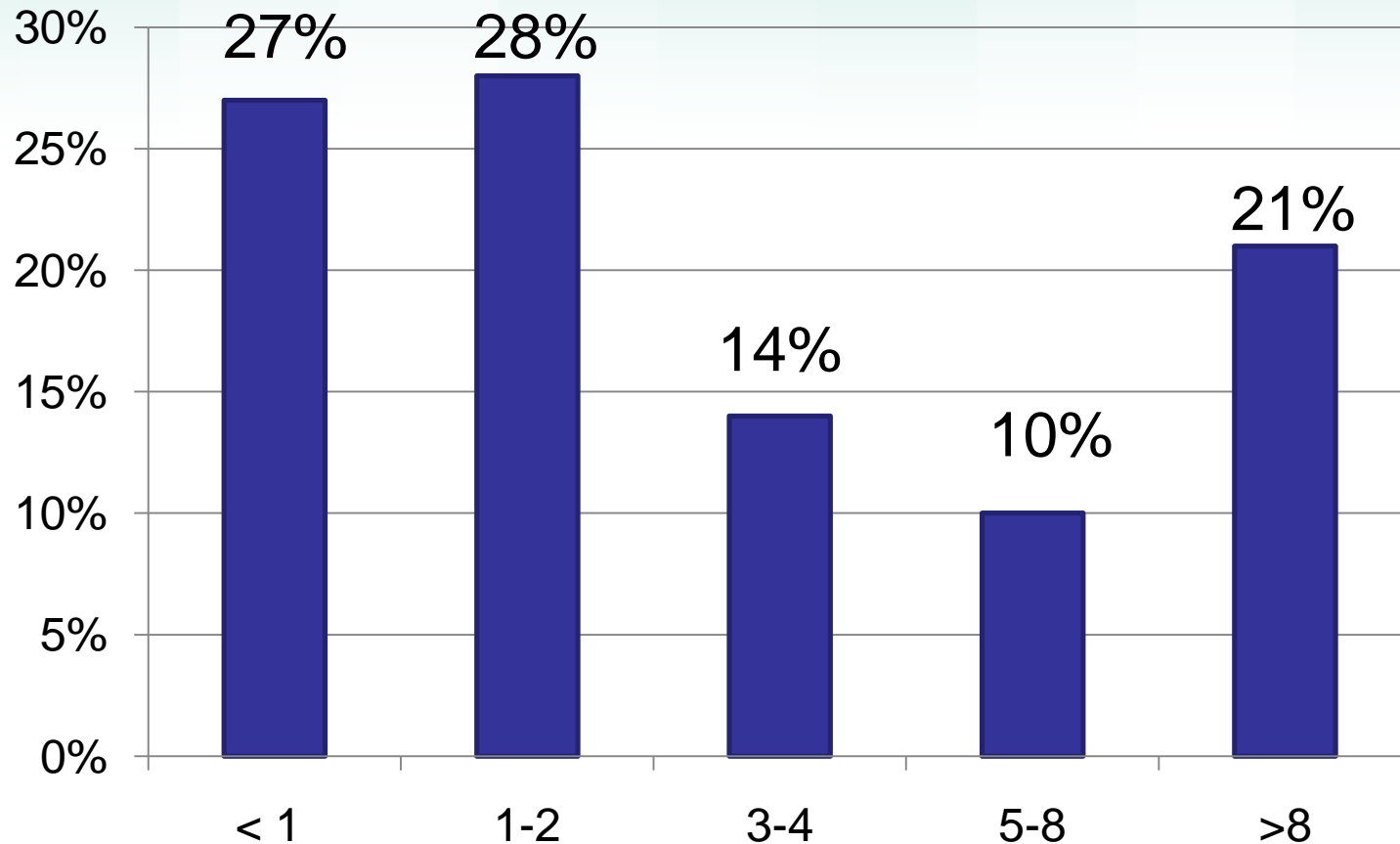


Web logs:  
51% Adoption rate  
(63 out of 124)

Surveys:  
57% Rely on CCS  
69% Use it frequently

# Usage and Adoption: Sept – June

## # sessions per month



# Qualitative data: interviews and classroom observations

Teachers report 2 main uses of the CCS:

- supplement or customize curriculum

*“It [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”.*

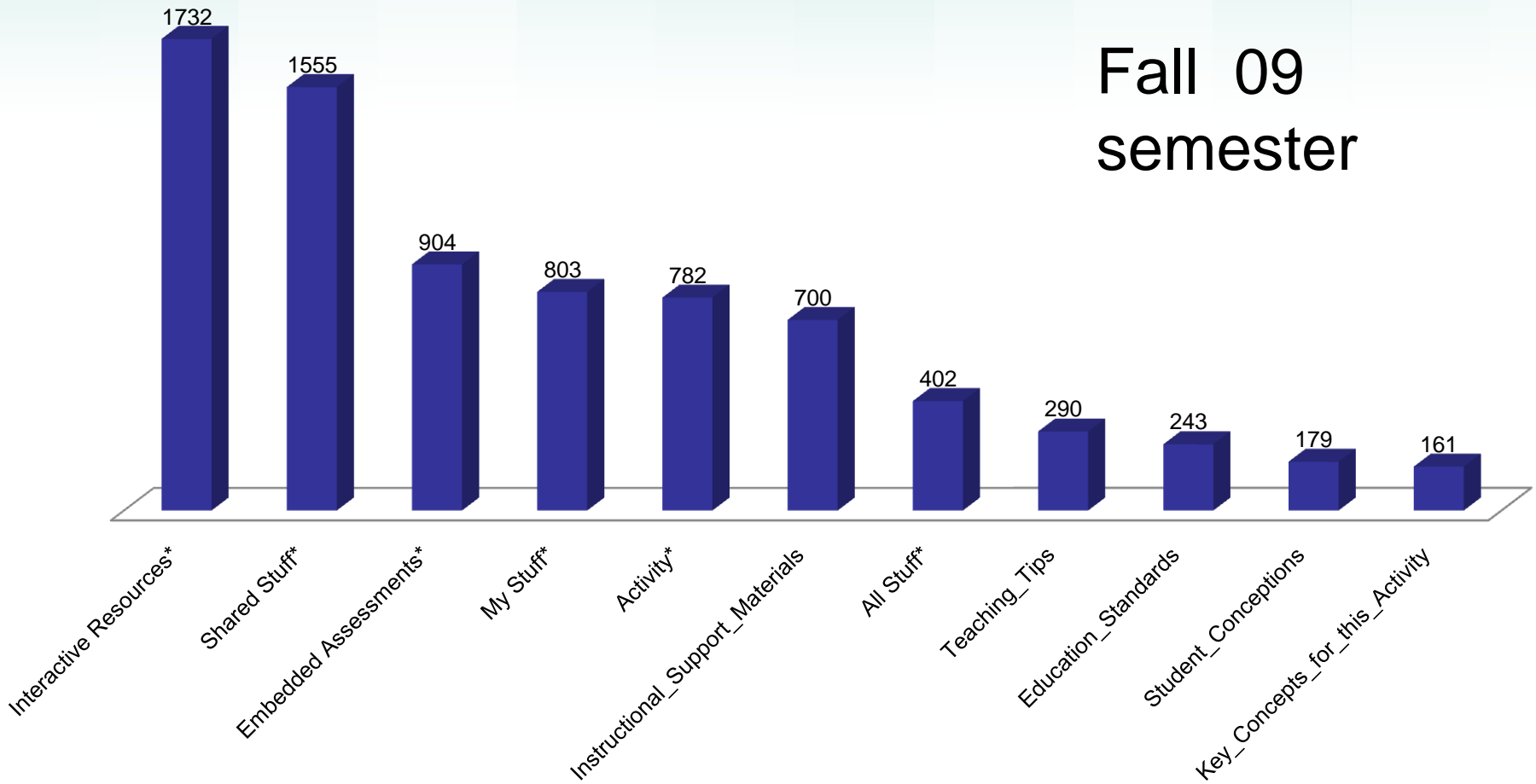
# Customizing Instruction

- 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

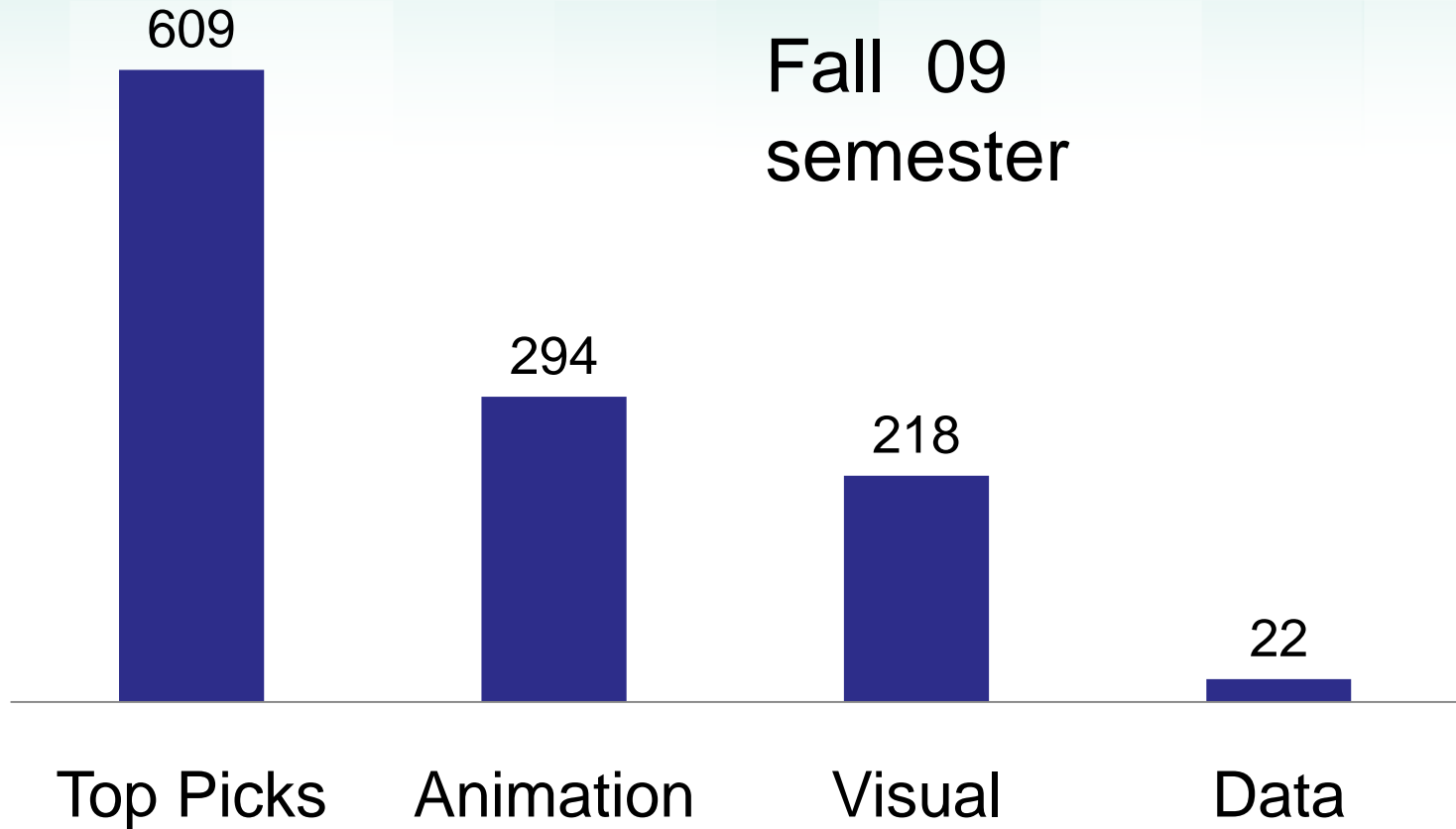
23995 total click actions logged

Fall 09  
semester

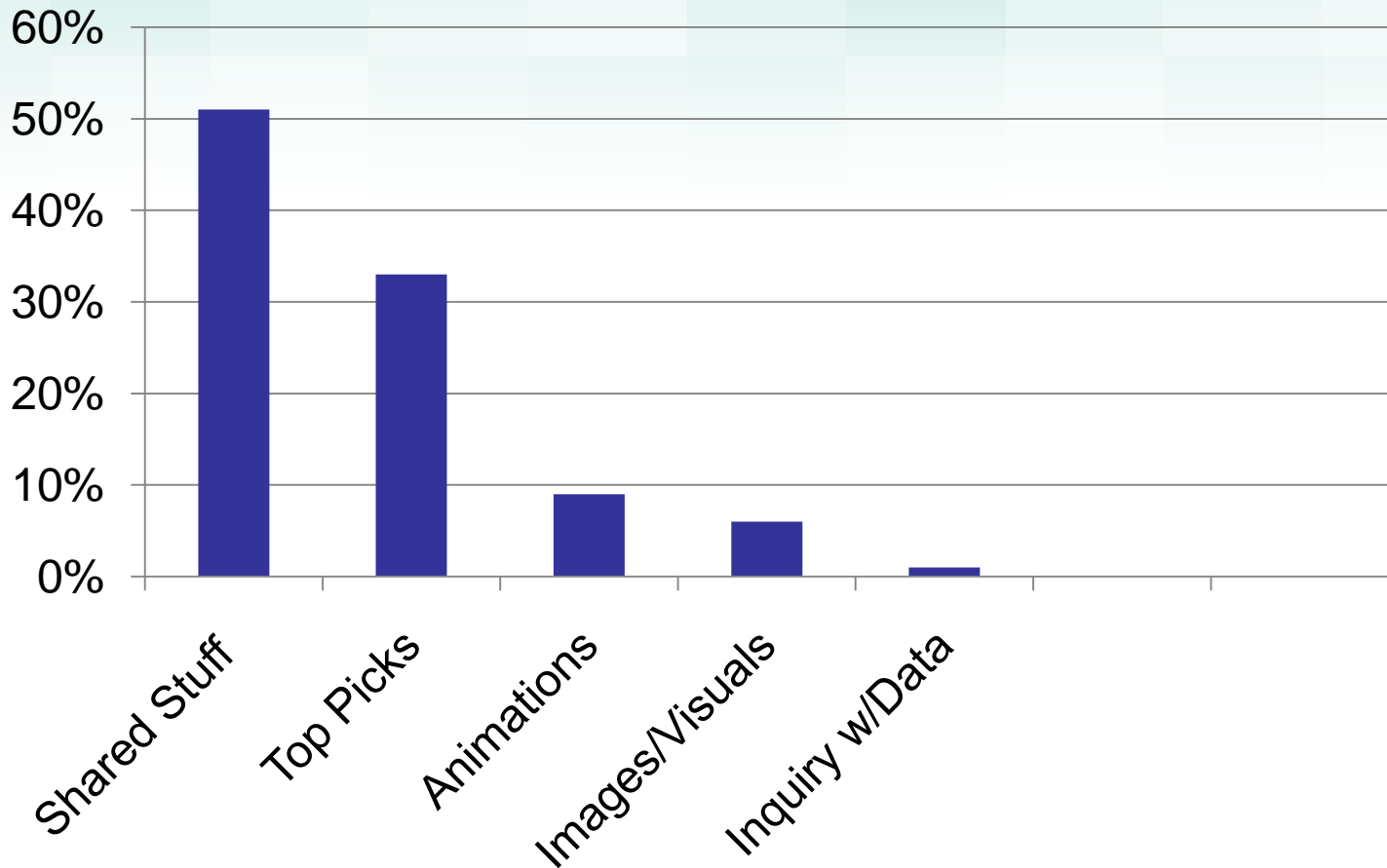




# Interactive Resources



# What is being “saved” to My Stuff? From where?



# 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.*

# Support for Professional Learning

- The CCS has supported my own professional learning about Earth science and how to teach it (80%)
- The CCS has increased my awareness of other teachers' practices. (59%)
- The CCS has helped me become a more active member of the DPS professional learning community (50%)
- DPS, on their own, integrated the CCS into their ongoing professional development (“New Users Workshop”)

# Curricular Coherence

- CCS has made it easier for me to find interactive resources that support the DPS key concepts [for the Earth science curriculum] **(90%)**
- CCS has helped me teach EarthComm/Investigating Earth Systems more effectively. **(78%)**
- Artifact analysis will provide more specific information on this

# Cognitive Interviews

- Focused on teachers approaches to and knowledge of pedagogical strategies in science instruction, differentiation and customization, and science concepts.
- Two interviews, 11 high school teachers, early and late in the school year
- Analysis in progress
  - change over time with respect to shallow vs. deep knowledge
  - correlations to CCS use

# Teacher Knowledge: Preliminary Results

- All teachers engage in more “deep” talk overall:
  - pedagogical strategies ( $p < .01$ )
  - science knowledge ( $p < .07$ )
- However, teachers tend to increase their talk about deep science knowledge by interview 2 ( $p < .09$ ).
  - Teachers do not increase the depth with which they talk about pedagogical strategies from interview 1 to 2 ( $p > .10$ )



# Barriers

- Adoption – Lack of Time and Technology Support
- Use – Still a lot of information to process, sift through and organize – we need improved ways to manage MyStuff and SharedStuff

# Reflections

- Partnerships with districts, NSDL and publishers key to supporting such a comprehensive evaluation effort
- The CCS model is one model to put NSDL resources in the hands of teachers during the course of their daily work- it has to be “freakishly easy”
- An example of utilizing “learning app ready” collections
- Is it replicable?

# Many thanks to the CCS team !

- Kirsten Butcher
- Lynne Davis
- Katy Ginger
- Loretta Melhado
- Jonathan Ostwald
- John Weatherley
- Mike Wright
- DPS Advisory Board
- James Foster
- Keith Maull
- MG Saldivar
- Natalie Harris
- Kimberly Myers
- Ashley Crockett Mazal
- Adriana Lopez