

# U.S. Math Textbooks in the Common Core Era: *A First Look*

## *Presentation 1*

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### About the Paper

- Concerns the implementation of Common Core State Standards for Mathematics
- 2010 Surveys identified 2 key implementation issues
  - Coverage of the standards in the classroom
  - the coverage in available textbooks
- Report on some of the preliminary findings

## About Presentation 1

- Focus on ways to measure curriculum
  - Using CCSS Math as the framework
  - Comparing textbook coverage to the Common Core standards
  - Comparing teacher coverage to the Common Core standards
  - Putting the analysis into an international context: Relating CCSS to the 1995 TIMSS Framework

## Data Collection

- Textbook Coding
  - 36 textbook series currently in use
- Teacher daily logs
  - 400 K-12 Teachers in 8 districts
  - Individual Reports for Teacher
  - Aggregated Reports for District
- Side Benefit: Teacher access to information on the CCSS coverage in the textbook

## Textbook Coding - Recruitment

- **Coders**
  - **Must have extensive mathematics background**
  - **Include:**
    - High school teachers
    - Post-secondary mathematics teachers
    - Doctoral students in mathematics or math education

## Textbook Coding - Training the Coders

- **Group Training**
  - **Review Coding Standards**
    - TIMSS Mathematics Framework
    - CCSS in Mathematics
  - **work through examples with feedback from trainer**
- **The trainee then codes individually**
  - **The coding is reviewed by the trainer - This process is repeated until at least 80% agreement is reached**
- **Coders then work independently**

## Textbook Coding – Quality Control

- The coding supervisor reviews the coded work by randomly selecting lessons from the coded textbook. If it is consistent the coding is accepted.
- If coding is not consistent it is coded by a different coder and the process is repeated until consistency is achieved.
- To maintain coding consistency, multiple coders code the same selected parts of a textbook periodically to until they reach 80% or more agreement.

## Textbook Coding – What is recorded

- Lesson Description
  - Including goals and objectives
- Common Core Standards coded
- Recommended amount of time to spend for each lesson
- Other recommended supporting materials

## Example of Coded CCSS

| book_id | grade | unit | lesson | standard1 | standard2 | standard3 | standard4 | standard5 | standard6 |
|---------|-------|------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
| 311     | 1     | 1    | 1.1    | K.OA.1    | 1.MP.7    |           |           |           |           |
| 311     | 1     | 1    | 1.2    | K.OA.3    | 1.OA.1    |           |           |           |           |
| 311     | 1     | 1    | 1.3    | K.OA.3    | 1.OA.1    |           |           |           |           |
| 311     | 1     | 1    | 1.4    | K.OA.3    | 1.OA.1    |           |           |           |           |
| 311     | 1     | 1    | 1.5    | 1.OA.1    |           |           |           |           |           |
| 311     | 1     | 1    | 1.6    | 1.OA.1    |           |           |           |           |           |
| 311     | 1     | 1    | 1.7    | 1.OA.3    |           |           |           |           |           |
| 311     | 1     | 1    | 1.8    | 1.OA.1    | 1.MP.1    | 1.MP.5    |           |           |           |
| 311     | 1     | 2    | 2.1    | 1.OA.8    | 1.OA.4    |           |           |           |           |
| 311     | 1     | 2    | 2.2    | 1.OA.8    | 1.OA.4    | K.OA.3    |           |           |           |
| 311     | 1     | 2    | 2.3    | 1.OA.8    | 1.OA.4    | K.OA.3    |           |           |           |
| 311     | 1     | 2    | 2.4    | 1.OA.1    |           |           |           |           |           |
| 311     | 1     | 2    | 2.5    | 1.OA.1    |           |           |           |           |           |
| 311     | 1     | 2    | 2.6    | 1.OA.1    |           |           |           |           |           |
| 311     | 1     | 2    | 2.7    | 1.OA.8    | 1.OA.4    |           |           |           |           |
| 311     | 1     | 2    | 2.8    | 1.OA.1    |           |           |           |           |           |
| 311     | 1     | 2    | 2.9    | 1.OA.6    |           |           |           |           |           |
| 311     | 1     | 2    | 2.10   | 1.OA.7    |           |           |           |           |           |
| 311     | 1     | 2    | 2.11   | 1.OA.1    | 1.MP.1    |           |           |           |           |

## Teacher Logs

- **Teacher Journal**
  - Multi-platform Web-based entry tool
  - Entries are confidential
  - Less than 2 minutes daily to complete
- **Reported:**
  - Common Core Standards Covered
  - Classroom Activities
  - Materials used
  - How well academically prepared?
- **Reports**
  - Individual Reports for Teacher
  - Aggregated Reports for District

# Daily Entry - Select Standards

Journal

Logout Refresh

Back to calendar (New info NOT SAVED)

Input: 8th Grade Math on 03/20/2014

Time on Less... 45

Lesson Activiti... Develop/illustrate concepts

Framework Grade : Eighth Grade

Textbook:\* Data About Us - Connected Math

Pages:\* 89-97

Other Materials:

Common Core Standards:\* (Hide) Non CCSS Math Taught No Math Taught

8.G.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. 50%

Math Practices:\* 6. Attend to precision.

How well academically prepare... are to teach this standard(s)? :\*

Good

Comments:

Submit

Delete

Journal

Report

Profile

Help

The Number System

Expressions and Equations

Geometry

Statistics and Probabilities

Functions

# Daily Entry – Additional Items

Journal

Logout Refresh

Back to calendar (New info NOT SAVED)

Input: 8th Grade Math on 03/20/2014

Time on Lesson:\* 30

Lesson Activities:\* -select lesson activities-

Textbook:\* -select textbook-

Pages:\*

Other Materials:

Common Core Standards:\* (Show) Non CCSS Ma

Math Practices:\*

How well academically prepared do you feel you are to teach this standard(s)? :\*

Comments:

Submit

Delete

Journal

Report

Profile

Help

Introduction

Develop/Illustrate concepts

Review

Assess

1. Make sense of problems and persevere in solving them.

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning...

4. Model with mathematics.

5. Use appropriate tools strategically. ✓

Very Good

Good

Fair

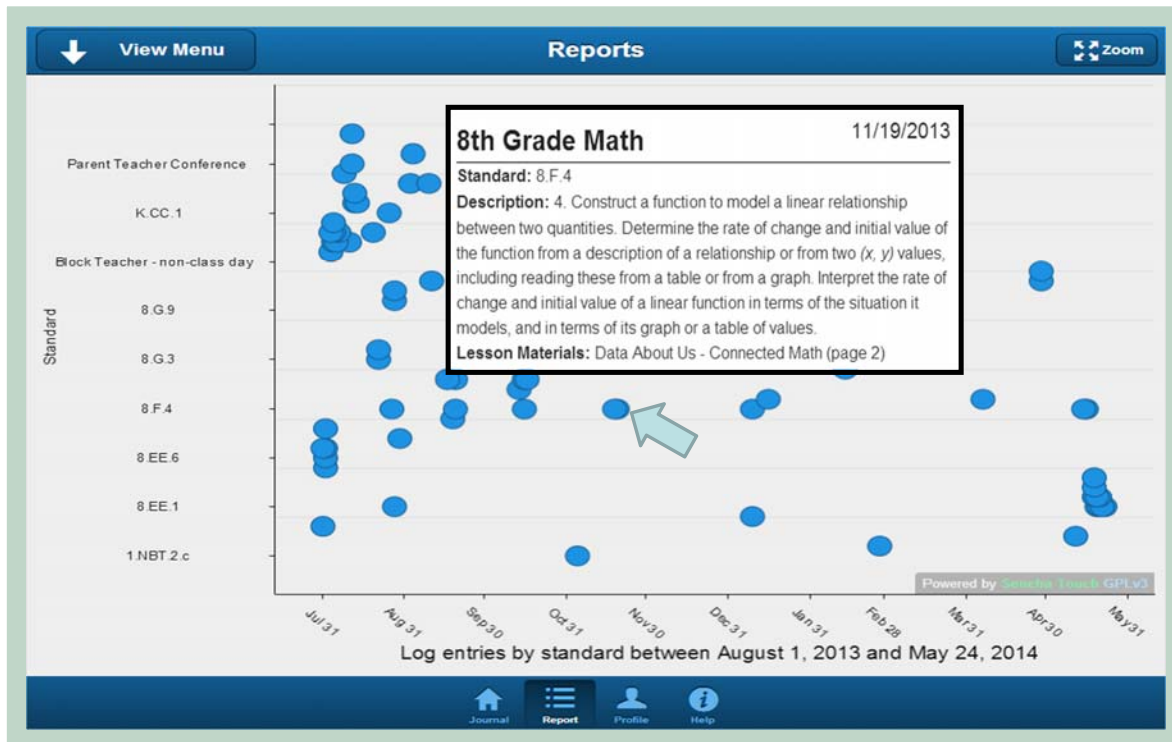
Weak

to precision.

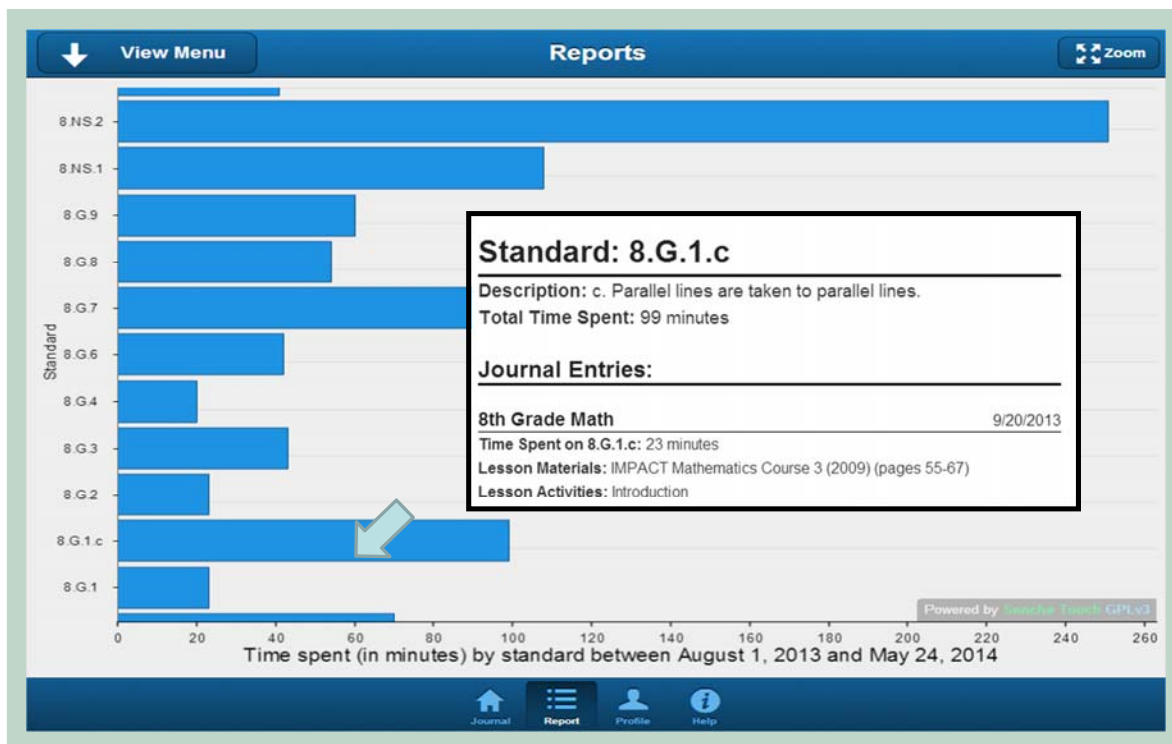
and make use of structure. ✓

and express regularity in repeated reasoning.

# Teacher Report – Coverage



# Teacher Report – Time Spent (Close-up)





# District Summary

Demo District

2nd Grade Math

Start Date: 2013-09-01

End Date: 2014-05-01

Completion %: 75

Update Table

## Control Panel

Selects subset of teachers for summary.

|                      |  |
|----------------------|--|
| <b>District</b>      | (Admin version only) Selecting district retrieves Course/Grade selector        |
| <b>Course/Grade</b>  | Selects course or grade for summary  |
| <b>Start Date</b>    | Selects start date for period of interest                                      |
| <b>End Date</b>      | Selects end date for period of interest  |
| <b>Completion %</b>  | Set the minimum criterion of the percent of days reported (excluding weekends) |
| <b>Update Tables</b> | Retrieve the summary according to the panel settings                           |

## Summary for 44 Teachers (174 reporting days)

| < Comp. % | Included | Earliest   | Latest     |
|-----------|----------|------------|------------|
| 19        | 25       | 2013-09-02 | 2014-04-30 |

## Summary of Teachers

|                    |   |
|--------------------|---|
| <b>Title</b>       | Shows number of participating teachers in the selected grade. <i>Reporting Days</i> is the number of days between <i>Start Date</i> and <i>End Date</i> excluding weekends. |
| <b>&lt; Comp %</b> | Number of teachers not meeting the selected <i>Completion %</i>   |
| <b>Included</b>    | Number of Teachers meeting the selected <i>Completion %</i>   |
| <b>Earliest</b>    | The earliest date that at least one teachers reported data.   |
| <b>Latest</b>      | The latest date that at least one teachers reported data.   |

# Teacher by Teacher Summary


## Summary by Teacher for 174 reporting days

|    | Days      | Math Days | Avg Class Dur. | Num Stds | < Grade | = Grade   | > Grade | Non-CCSSM | Unreported |
|----|-----------|-----------|----------------|----------|---------|-----------|---------|-----------|------------|
| 1  | 169 (97%) | 81 (48%)  | 61             | 10       | (0%)    | 10 (92%)  | (0%)    | (1%)      | (7%)       |
| 2  | 168 (97%) | 97 (58%)  | 29             | 12       | (0%)    | 12 (98%)  | (0%)    | (0%)      | (2%)       |
| 3  | 135 (78%) | 123 (91%) | 58             | 15       | (0%)    | 15 (100%) | (0%)    | (0%)      | (0%)       |
| 4  | 172 (99%) | 142 (83%) | 48             | 11       | (0%)    | 11 (89%)  | (0%)    | (0%)      | (11%)      |
| 5  | 159 (91%) | 145 (91%) | 63             | 23       | (0%)    | 23 (100%) | (0%)    | (0%)      | (0%)       |
| 6  | 152 (87%) | 142 (93%) | 44             | 13       | (0%)    | 13 (100%) | (0%)    | (0%)      | (0%)       |
| 7  | 162 (93%) | 118 (73%) | 57             | 13       | (0%)    | 13 (99%)  | (0%)    | (1%)      | (0%)       |
| 8  | 156 (90%) | 111 (71%) | 50             | 10       | (0%)    | 10 (92%)  | (0%)    | (0%)      | (8%)       |
| 9  | 171 (98%) | 121 (71%) | 46             | 10       | (0%)    | 10 (96%)  | (0%)    | (3%)      | (1%)       |
| 10 | 173 (99%) | 99 (57%)  | 59             | 13       | (0%)    | 13 (75%)  | (0%)    | (0%)      | (25%)      |
| 11 | 171 (98%) | 136 (80%) | 67             | 15       | (0%)    | 15 (74%)  | (0%)    | (1%)      | (25%)      |
| 12 | 172 (99%) | 118 (69%) | 57             | 15       |         |           |         |           |            |
| 13 | 169 (97%) | 121 (72%) | 55             | 15       |         |           |         |           |            |
| 14 | 172 (99%) | 119 (69%) | 50             | 19       |         |           |         |           |            |
| 15 | 171 (98%) | 81 (47%)  | 30             | 13       |         |           |         |           |            |
| 16 | 168 (97%) | 121 (72%) | 48             | 9        |         |           |         |           |            |
| 17 | 152 (87%) | 125 (82%) | 47             | 12       |         |           |         |           |            |
| 18 | 149 (86%) | 104 (70%) | 36             | 7        |         |           |         |           |            |
| 19 | 154 (89%) | 125 (81%) | 54             | 14       |         |           |         |           |            |
| 20 | 153 (88%) | 109 (71%) | 51             | 14       |         |           |         |           |            |
| 21 | 172 (99%) | 129 (75%) | 57             | 7        |         |           |         |           |            |
| 22 | 173 (99%) | 121 (70%) | 50             | 17       |         |           |         |           |            |
| 23 | 144 (83%) | 88 (61%)  | 53             | 16       |         |           |         |           |            |
| 24 | 139 (80%) | 95 (68%)  | 52             | 15       |         |           |         |           |            |
| 25 | 145 (83%) | 80 (55%)  | 52             | 10       |         |           |         |           |            |
|    | 4 (7%)    | 6 (70%)   |                |          |         |           |         |           | (23%)      |

|                      |  |
|----------------------|--|
| <b>Days</b>          | Number of days with journal entry (% of <i>reporting days</i> with reports.)       |
| <b>Math Days</b>     | Number of days with reported math activity (% of reported days with math activity) |
| <b>Avg Class Dur</b> | Average class period length in minutes   |
| <b>Num Stds</b>      | Number of CCSSM standards covered  |
| <b>&lt; Grade</b>    | Number of CCSSM standards below class grade (% of teaching time)                   |
| <b>= Grade</b>       | Number of CCSSM standards at class grade (% of teaching time)                      |
| <b>&gt; Grade</b>    | Number of CCSSM standards above class grade (% of teaching time)                   |
| <b>Non-CCSSM</b>     | (% of teaching time on math topics not in CCSSM)                                   |
| <b>Unreported</b>    | (% of teaching time without reported math activity)                                |



# Standard Summary


| Grade Level Summary  |  |   |               |
|---|--|---|---------------|
| Code                 | # Teachers  | Avg %  | Range of Days |
| Other Math Topics   | 12   | 1.79%   | 1 - 9         |
| K.CC.1  | 1  | 4.86%   | 41 - 41       |
| K.CC.2  | 1  | 5.97%   | 49 - 49       |
| K.CC.3  | 1  | 9.46%   | 45 - 45       |
| K.CC.4  | 1  | 13.56%  | 50 - 50       |
| K.CC.4.a  | 1  | 0.10%   | 1 - 1         |
| K.CC.4.b  | 1  | 0.10%   | 1 - 1         |
| K.CC.5  | 1  | 0.21%   | 1 - 1         |
| K.CC.6  | 2  | 0.92%   | 1 - 2         |
| K.CC.7  | 1  | 1.25%   |               |
| K.OA.1  | 1  | 0.87%   |               |
| K.OA.2  | 1  | 1.25%   |               |
| K.OA.5  | 1  | 49.29%  |               |
| K.NBT.1   | 1  | 2.74%   |               |
| 1.OA.1  | 1  | 2.26%   |               |
| 1.OA.2  | 1  | 0.69%   | 2 - 2         |
| 1.OA.7  | 1  | 0.74%   | 1 - 1         |
| 1.NBT.2   | 1  | 4.46%   | 5 - 5         |
| 1.NBT.2.b   | 1  | 0.36%   | 1 - 1         |
| 1.NBT.2.c   | 1  | 0.81%   | 1 - 1         |
| 2.OA.1  | 24   | 12.83%  | 1 - 38        |
| 2.OA.2  | 24   | 16.81%  | 8 - 80        |
| 2.OA.3  | 15   | 2.04%   | 1 - 10        |
| 2.OA.4  | 1  | 1.32%   | 2 - 2         |
| 2.NBT.1   | 24   | 8.13%   | 4 - 36        |
| 2.NBT.1.a   | 4  | 0.77%   | 1 - 5         |

**Code** The CCSSM Code covered by at least one teacher

**# Teachers** Number of teachers covering the standard

**Avg %** Average % of teaching time devoted to the standard

**Range of Days** Minimum and maximum days standard was addressed

Sort on any column by clicking  or 

# Navigating through a Textbook

Navigator .95 beta 

Grade/Course Selected: 8th Grade Math 

8th Grade Math

1. TextBook Series: -select textbook series- 

Textbook Series Selected: Connected Mathematics 2 (2009) 

2. Under Construction - Future Selections 

After selecting 1. Textbook Series, select Lesson Nav tab or Standards Nav tab

 Lessons Nav

 Standards Nav

 No Links List

 Output Report

 Help

 Navigator Filters

 Lessons Nav

 Standards Nav

 No Links List

 Output Report

 Help

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## Lesson Nav – Lesson → Standard

The screenshot shows the 'Lesson Nav' interface. At the top, there's a header 'Select by Lesson Get Standard' with a 'Refresh' button. Below the header, on the left, is a 'Clear Lesson History' button and a 'List of Selections' section containing '- Grade: 8th Grade Math -' and '- Textbook: Connected Mathematics 2 (2009) -'. On the right, there's a 'Lessons' list. The list includes: 3.4 Solving Quadratic Equations, 1.1 Staking a Claim, 1.3 Writing an Equation, 2.1 Trading Land, 2.2 Changing One Dimension, 2.3 Changing Both Dimensions, 2.4 Factoring Quadratic Expressions (highlighted with a red circle), 2.5 A Closer Look at Parabolas, 3.1 Exploring Triangular Numbers, 3.2 Counting Handshakes, 3.3 Examining Patterns of Change, 4.1 Tracking a Ball, 4.2 Measuring Jumps, and 4.3 Putting It All Together. At the bottom, there's a navigation bar with icons for Lessons Nav, Standards Nav, No Links List, Output Report, and Help.

## Lesson Nav – Lesson → Standard

The screenshot shows the 'Lesson Nav' interface with the 'Lessons' tab selected. The 'Lessons' list now shows '2.4 Factoring Quadra...'. Below it, the standard 'A-SSE.3.a' is displayed. A modal window titled 'Common Core Standards' is open, showing the code 'A-SSE.3.a' and the description: 'a. Factor a quadratic expression to reveal the zeros of the function it defines.' The modal window has an 'OK' button. The navigation bar at the bottom remains the same.

## Standard Nav – Standard → Lessons

Select by Standard Get Lesson Refresh

**Clear Standard History**

**List of Selections**

- Grade: 8th Grade Math -
- Textbook: Connected Mathematics 2 (2009) -

**Standards**

- 8.G.4
- 8.NS.1
- 8.EE.1
- 8.EE.2
- 8.EE.3
- 8.EE.4
- 8.EE.5
- 8.EE.6
- 8.EE.7
- 8.EE.7.a
- 8.EE.7.b
- 8.EE.8
- 8.EE.8.a
- 8.EE.8.b

Lessons Nav Standards Nav No Links List Output Report Help

## Standard Nav – Standard → Lessons

Select by Standard Get Lesson Refresh

**Clear Standard History**

**List of Selections**

- Grade: 8th Grade Math -
- Textbook: Connected Mathematics 2 (2009) -

**Standards** 8.EE.8.b

- 2.2 Crossing Lines
- 2.3 Comparing Costs
- 2.4 Connecting Tables, Graphs, and Equations
- 3.3: Intersections of Lines
- 4.1: The  $y=mx+b$  Case
- 4.2: The  $ax+by=c$  Case
- 4.3: Solving Systems of Linear Equations by Substitution
- 4.4: Solving Systems of Linear Equations by Combination
- 3.1 Solving Linear Equations

**Lessons**

Title: 4.1: The  $y=mx+b$  Case

Description: Addresses the familiar and simplest case in which both equations express  $y$  as a function of  $x$  the solution results from setting those two expressions equal to each other and solving the single variable equation.

OK

Lessons Nav Standards Nav No Links List Output Report Help

# No Link Reports

The screenshot shows the 'Navigator No Links Lists' interface. On the left, there are two red buttons: 'Show any Lesson Without a Standard' and 'Show any Standard Without a Lesson'. In the center, a modal titled 'Lessons with No Standards' is displayed, showing the following text: '8th Grade Math', 'Connected Mathematics 2 (2009)', '2.3 Using Square to Find Lengths', and '1.1 Making Ballots'. An 'OK' button is at the bottom of the modal. On the right, a list of standards is shown, with '8.G.1.c' circled in red and an arrow pointing to it. The standards list includes: 8.NS.1, 8.NS.2, 8.EE.1, 8.EE.3, 8.EE.4, 8.EE.7.b, 8.EE.8.c, 8.G.1.a, 8.G.1.b, 8.G.1.c, 8.SP.4, 8.F.1, 8.F.3, and 8.F.4. A 'Refresh' button is in the top right corner. The bottom navigation bar includes icons for Lessons View, Standards View, No Links List (active), Output Report, and Help.

# Click a Standard to See Lesson Options

The screenshot shows the 'Navigator No Links Lists' interface with the 'Standards No Lessons' view selected. The breadcrumb path at the top right is 'Standards No Lessons > 8.G.1.c'. Below this, the text 'null' is displayed. On the left, the same two red buttons are present. A text box on the right contains the message: 'The district-approved lesson options may be made available here for teachers to review and select.' The bottom navigation bar is the same as in the previous screenshot.

## Presentation 2

# Presentation 2