

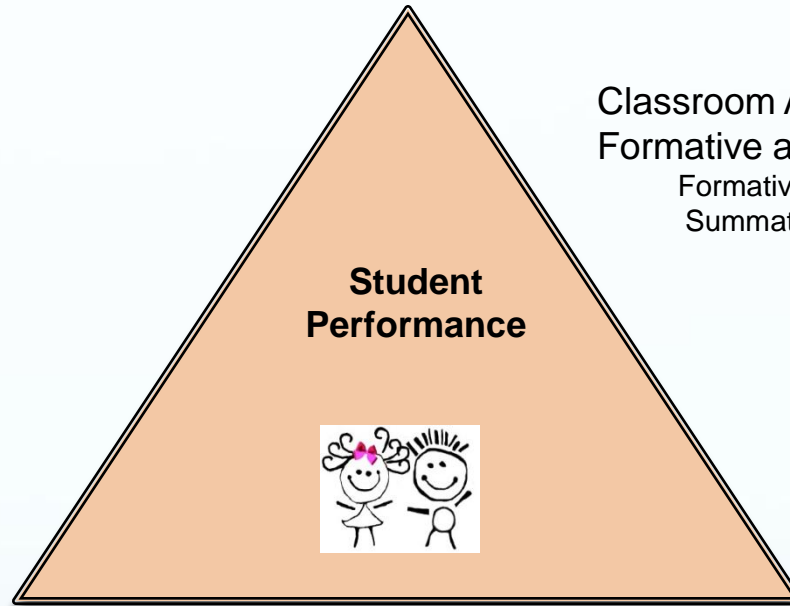
# Science NECAP Presentation

School Board

November 15, 2011

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# Triangulate: Assessment of Student Performance



## Classroom Assessments: Formative and Summative

Formative - frequent, ongoing, direct feedback  
Summative – cumulative, end-of-unit

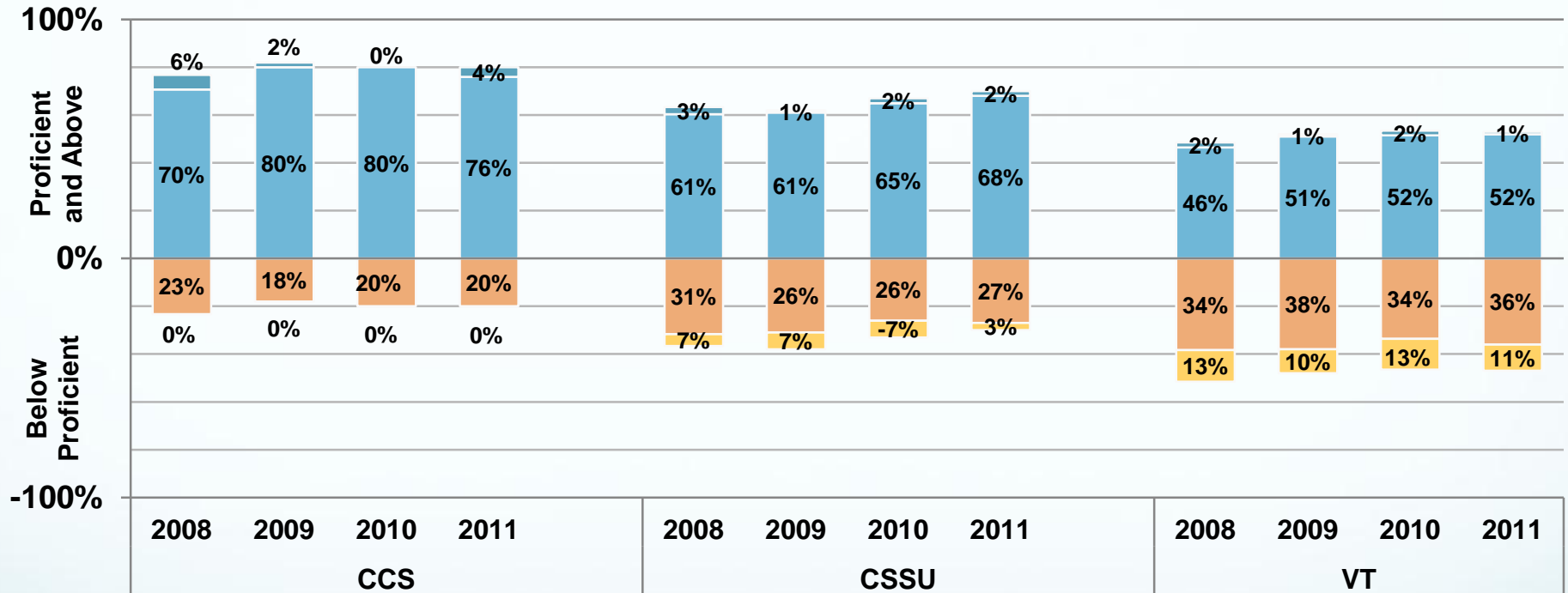
## Common CSSU Assessments

*Science Inquiry Tasks* –  
Formative year 2 pilot

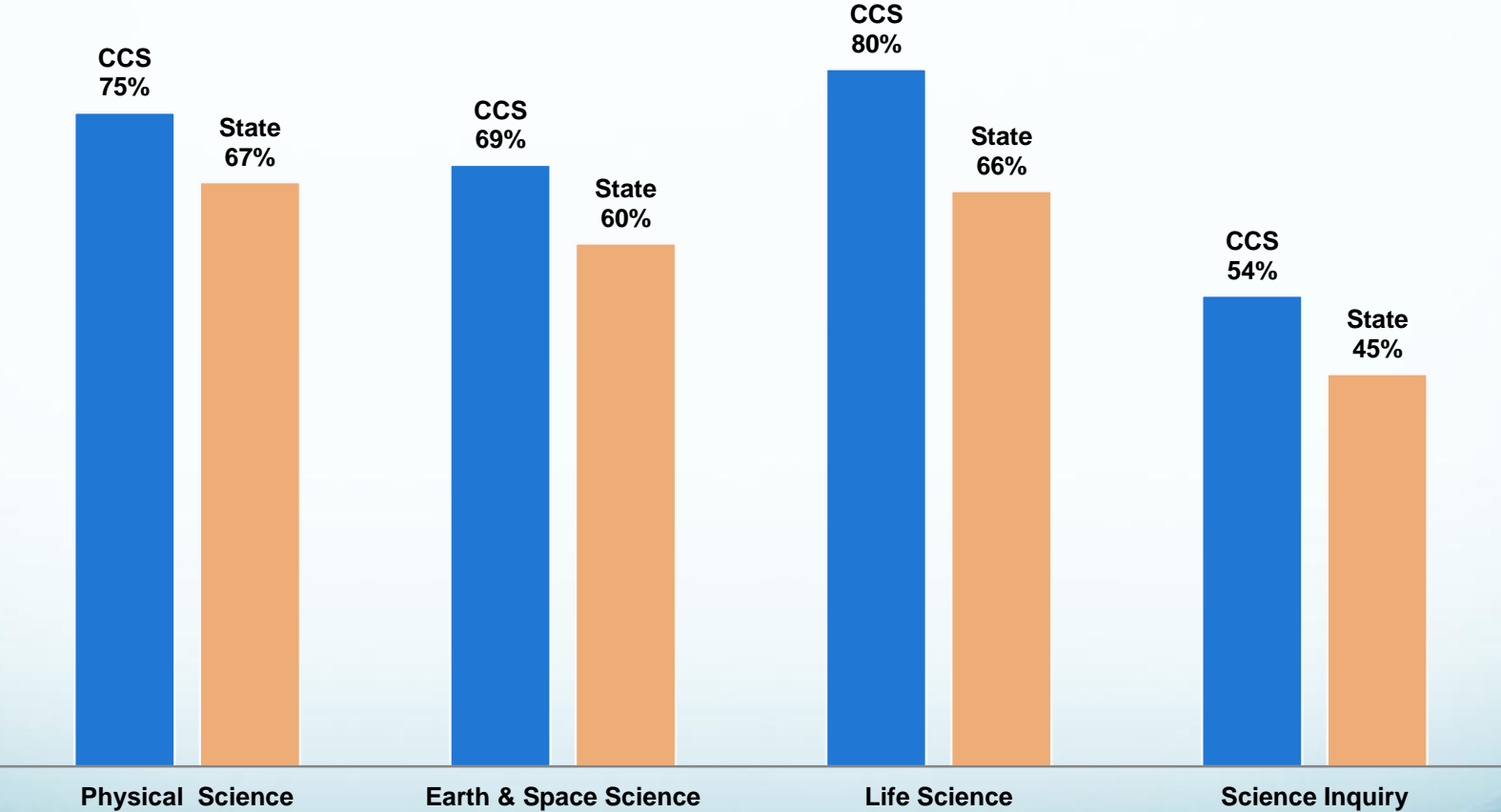
## **Focus of this presentation**

State Assessment: NECAP  
Science

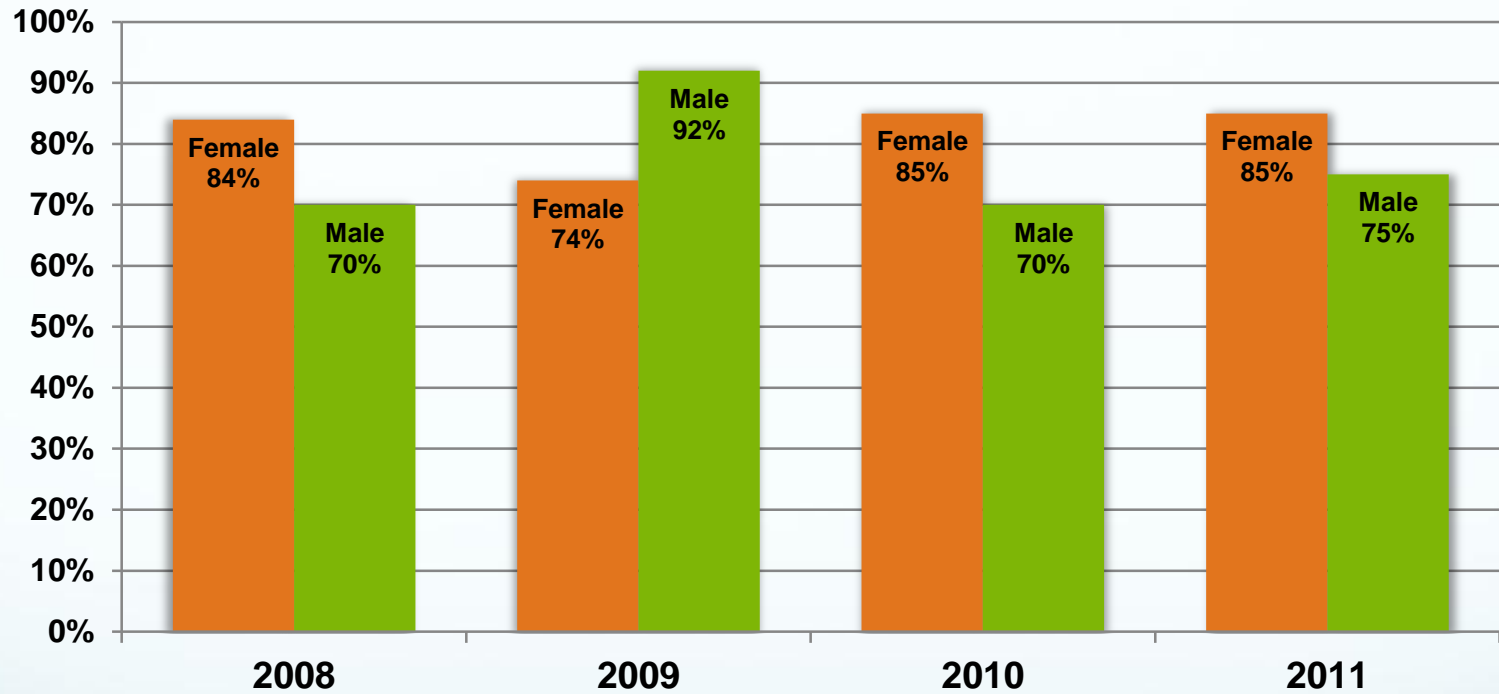
## CCS NECAP - Testing Year Results Grade 4 - Science



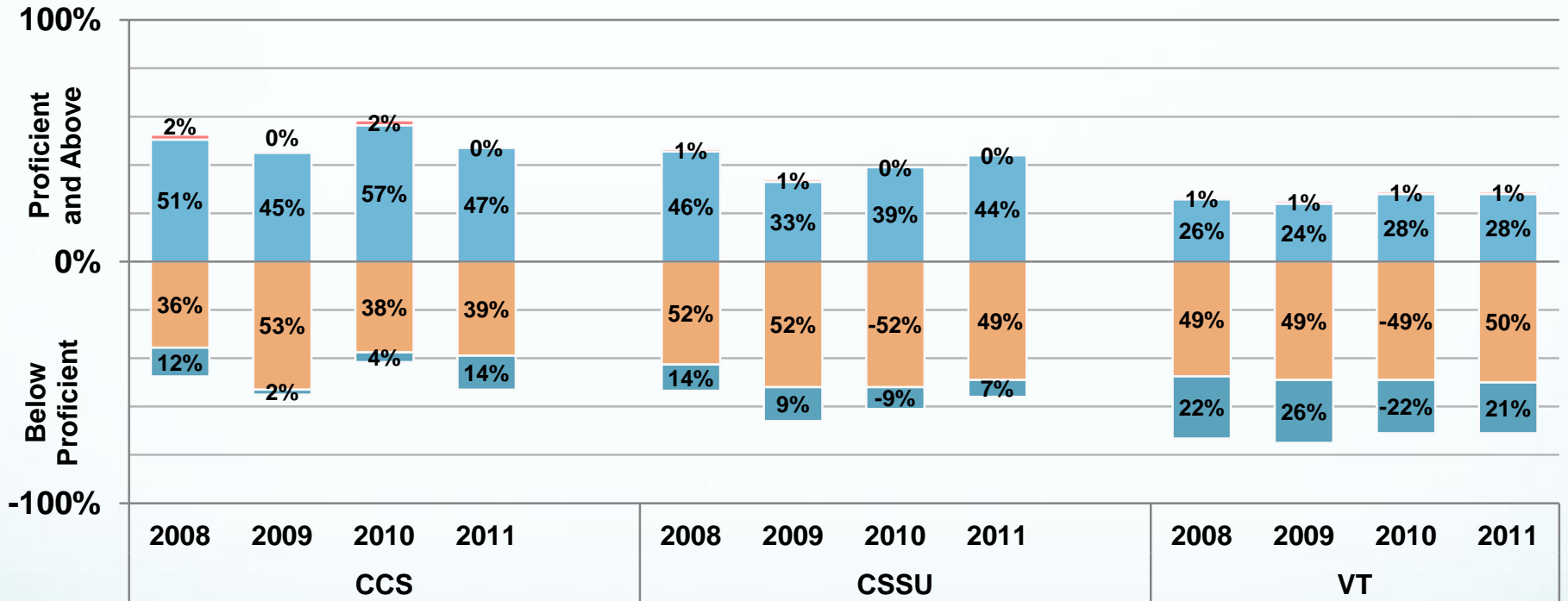
# Science NECAP Grade 4 Domain Results



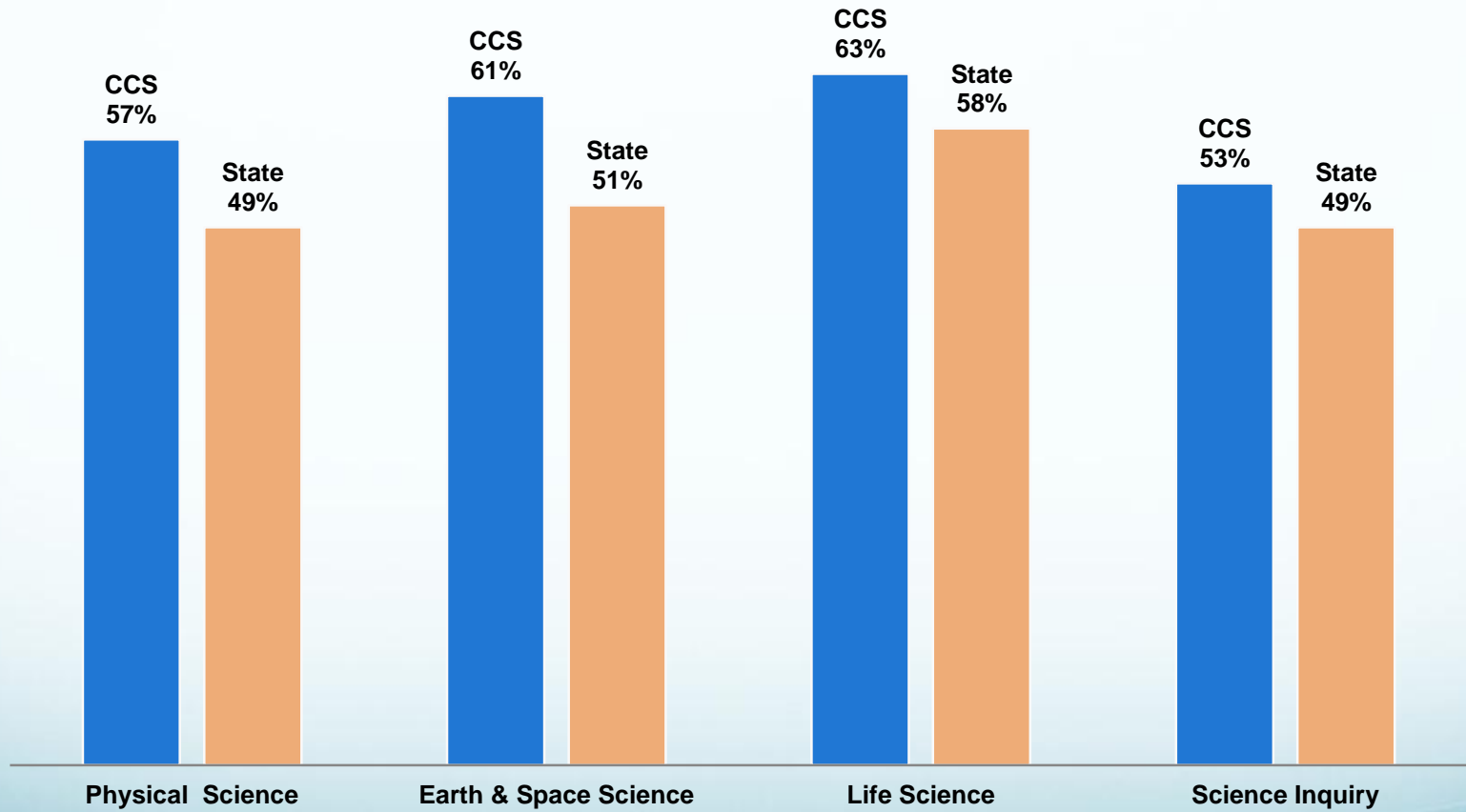
## CCS Science NECAP Grade 4 Proficient & Above - Gender



# CCS NECAP - Testing Year Results Grade 8 - Science



## Science NECAP Grade 8 Domain Results

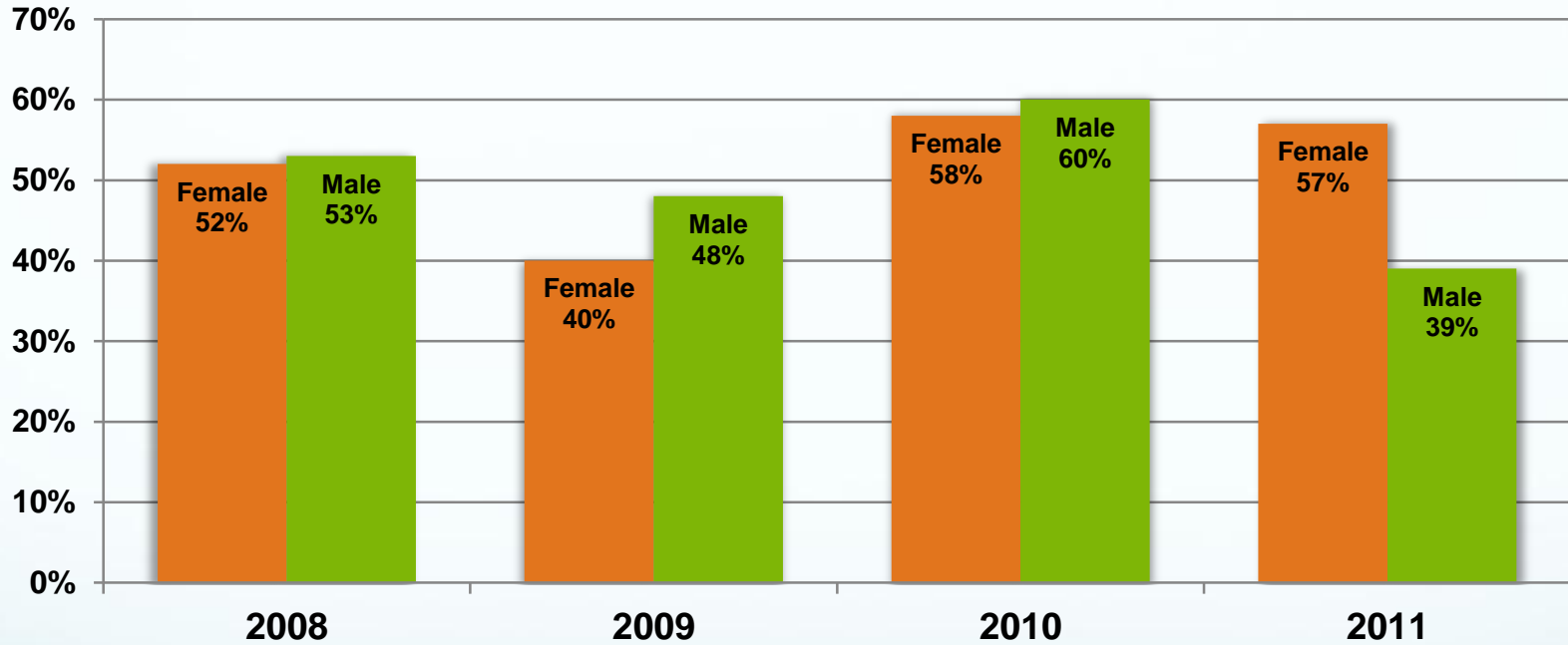


# Why the Difference Between 4<sup>th</sup> and 8<sup>th</sup> Grade Scores at CCS, CSSU and the State?

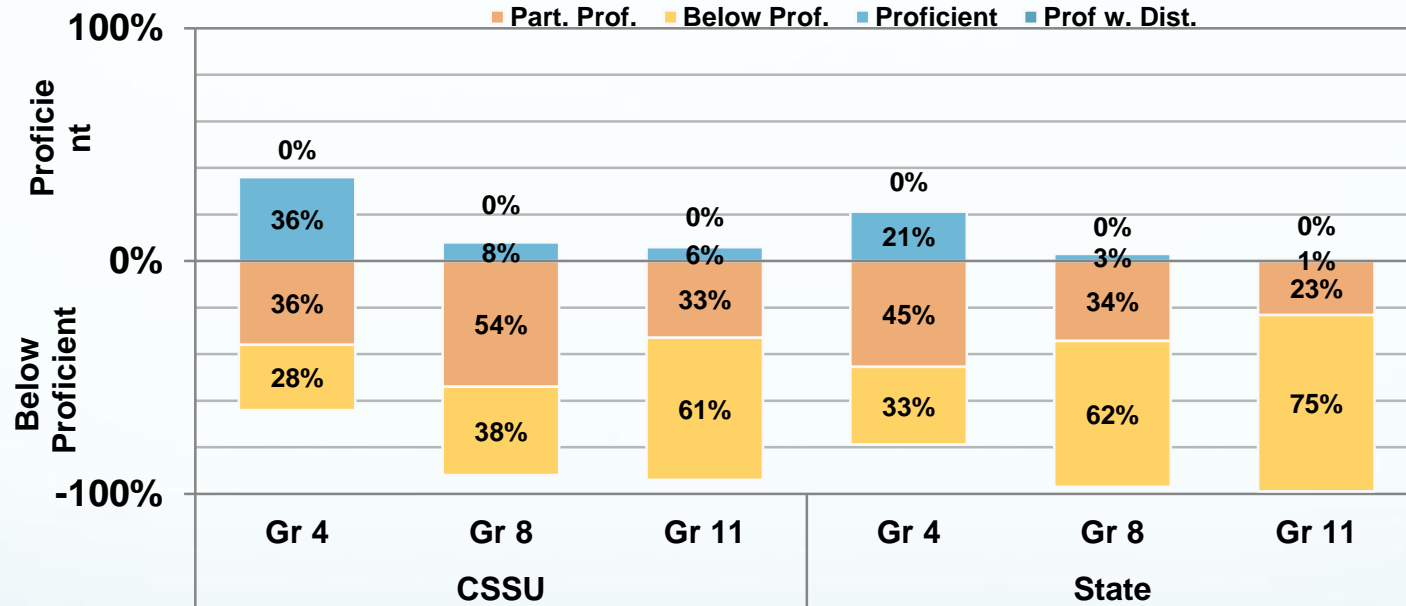
## Possible Reasons:

- **Difficulty of questions increases:** The percent of GE's eligible for a Depth of Knowledge level 3 jumps from 14% at 4<sup>th</sup> grade to 47% at 8<sup>th</sup> grade
- **More GE's are assessed:** Number of Science GE's increase from 28 to 38 from 4<sup>th</sup> to 8<sup>th</sup> grade
- **Same GE's are not taught each year:** The 8<sup>th</sup> grade test assesses this increased number of GE's, some of which may not have been taught since their 5<sup>th</sup> grade year
- **Science Skills are specific to domains:** Science skills do not proceed in a linear fashion like math or literacy. There is domain specific information that is not reinforced as you move to new topics.

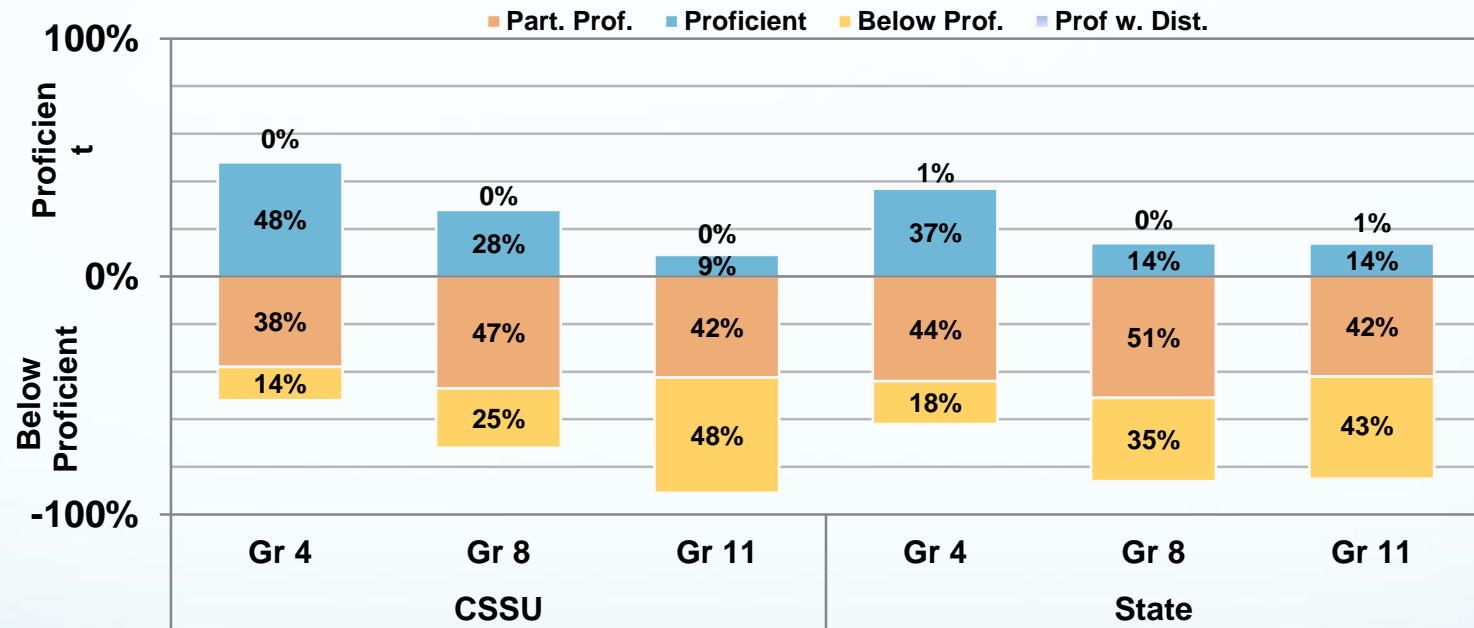
## CCS Science NECAP Grade 8 Proficient & Above - Gender



## Science NECAP Spring 2011 - IEP

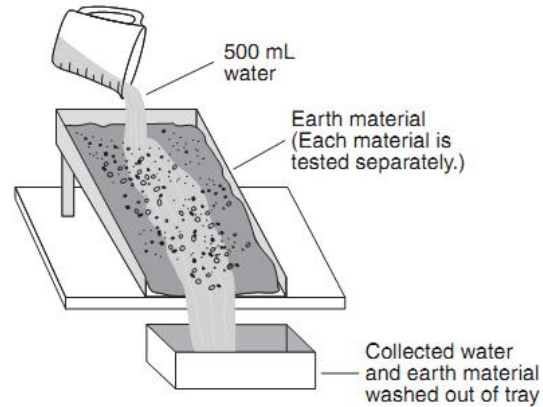


## Science NECAP Spring 2011 - SES

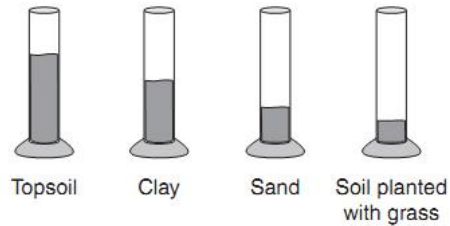


## 2011 Released Item –Grade 4

- 4 A student investigates erosion using four kinds of earth material: topsoil, clay, sand, and soil planted with grass. The setup for the investigation is shown below.



Water is separated from the earth material with a filter. The pictures below show the amounts of earth material that were collected.



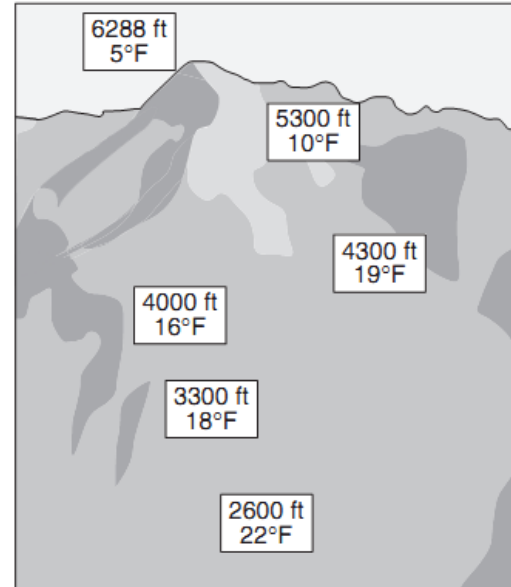
The results of this investigation **best** support which conclusion?

- A. Topsoil is easily eroded.
- B. Sand has a coarse texture.
- C. Water travels fastest through soil planted with grass.
- D. Water drains most quickly through clay.

2011 Released Item –Grade  
4

- 6 On a February morning, scientists recorded the temperature on Mount Washington at different heights. The temperature data are shown in the diagram below.

Mount Washington Data



Which statement describes the weather **pattern** shown in the diagram?

- A. The temperature at 4300 feet is colder than the temperature at 3300 feet.
- B. The temperature in the morning is colder than the temperature in the afternoon.
- C. The greater heights are colder than the lower heights.
- D. The greater heights have deeper snow than the lower heights.

## 2011 Released Inquiry Item—Grade 4

### Soil and Water Story

A fourth-grade science class decided to grow plants for a project.

The students wondered what kind of soil to grow the plants in. They learned in class that some kinds of soil hold more water than other kinds of soil. Soil that cannot hold much water dries out quickly after the plant is watered. Soil that can hold a lot of water stays wet for a long time after the plant is watered.

The teacher explained that plants use their roots to take in water from the soil. If the soil is too dry, the plants will die. Then the teacher explained that most plants do not grow well if their roots stay wet.

Some students said they should use soil that holds a lot of water, so the plants do not dry up and die. Other students said they should use soil that does not hold much water, so the plant roots do not stay wet.

The teacher explained that most kinds of soil are made up of particles of rock. Each soil has different sized particles. She also explained that the different-sized particles affect the amount of water the soil can hold. The students decided to investigate the following research question:

#### **How does increasing soil particle size affect the amount of water soil holds?**

During the investigation, the students tested three kinds of soil.

They looked closely at each soil to compare the particle sizes and particle shapes. Then the students placed the soils in order from the soil with the smallest particle size to the soil with the largest particle size.

Finally, the students found the amount of water each soil held. To do this, they put soil in a cup that had small holes in the bottom. Then they poured water into the cup and measured how much water came out in one minute. To learn the amount of water the soil still held, the students found the difference between the amount of water poured into the cup and the amount of water that came out. This amount was recorded as the amount of water that soil holds.

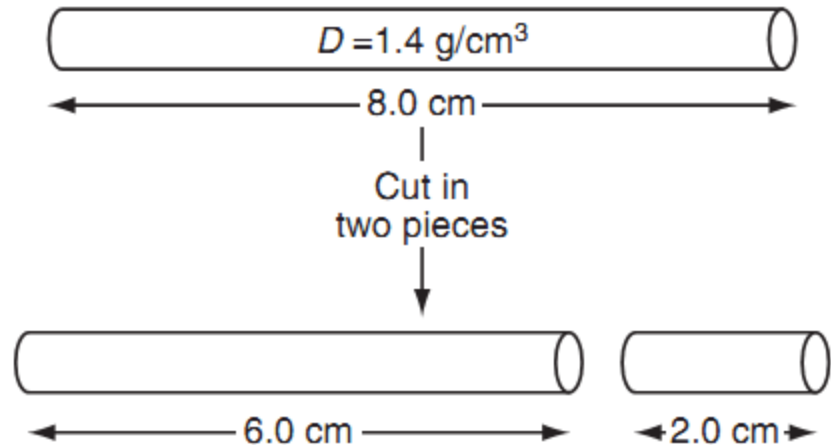
You will do a similar investigation.

- 1 The table below shows characteristics of a solid, cylindrical rod.

**Characteristics of Cylindrical Rod**

Mass (g)	Volume (cm <sup>3</sup> )	Density (g/cm <sup>3</sup> )
14.0	10.0	1.4

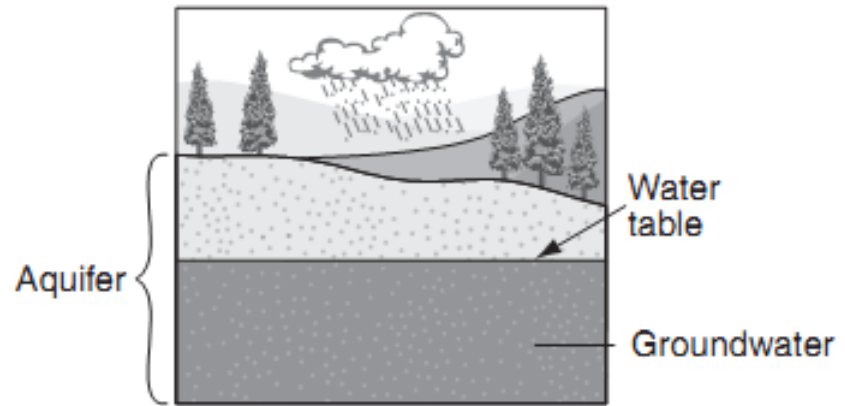
The rod is cut into two pieces, as shown in the diagram below.



What is the density of the piece of the rod that is  $2.0 \text{ cm}$  long?

- A.  $0.7 \text{ g/cm}^3$
- B.  $1.4 \text{ g/cm}^3$
- C.  $2.0 \text{ g/cm}^3$
- D.  $2.8 \text{ g/cm}^3$

4 The diagram below shows an aquifer.



Which statement is **best** supported by the information shown in the diagram?

- A. The water table will rise if there is an increase in rain.
- B. The water table will fall if the slope of the land changes.
- C. The amount of groundwater in the aquifer will decrease if more trees grow.
- D. The amount of groundwater in the aquifer will remain constant if there is a decrease in rain.

## 2011 Inquiry Released Item—Grade 8

### Fox and Rabbits

A science class is learning how factors cause changes in ecosystems. The class watched a video of a fox hunting rabbits in a New England ecosystem. The students noticed that the rabbits ran into the shrubs when they saw the fox approaching. The teacher pointed out that the shrubs were thorny bushes. The students wondered if the size of the shrubs in the ecosystem affected the number of rabbits caught by the fox. The students decided to investigate the following research question:

**What effect does the size of the shrubs in an ecosystem have on the number of rabbits caught by a fox?**

The teacher told the students that they could not go outside and observe an ecosystem with a fox and rabbit population over an extended period of time, so they used a model of an ecosystem instead.

The teacher explained that the model represented a stable population of rabbits and shrubs in an ecosystem. The students used the model to show if the size of shrubs in the ecosystem affected the number of rabbits caught by a fox. The students tested four conditions: no shrubs, small shrubs, medium shrubs, and large shrubs. The teacher said that for each condition, there is the same number of shrubs and they are in approximately the same locations.

For the model, the students used a sheet of paper with rabbits printed on it to represent the rabbit population and three transparencies with small, medium, and large shrubs printed on them to represent the shrubs in each ecosystem. The students used five clear plastic circles to represent the fox's hunting areas.

The students gently dropped the plastic circles in random places on the sheet of paper with rabbits printed on it. The students counted the rabbits under or partially under the circles as caught by the fox.

To test the ecosystems with small, medium, or large shrubs, the students laid one of the transparencies with shrubs printed on them over the sheet of paper with rabbits. The students then repeated the process for each shrub size using the other transparencies. The students conducted three trials for each condition.

The inquiry task you will be doing is very similar to the process the students in the story followed.

# Final Conclusions

## ❖ Strengths

- More CCS students are consistently proficient or above at both 4<sup>th</sup> and 8<sup>th</sup> grade levels in comparison to CSSU and the State
- CCS students in grade 4 perform well in Physical and Life Science Domains
- CCS students in grade 8 perform well across the Physical, Earth/Space and Life Science Domains

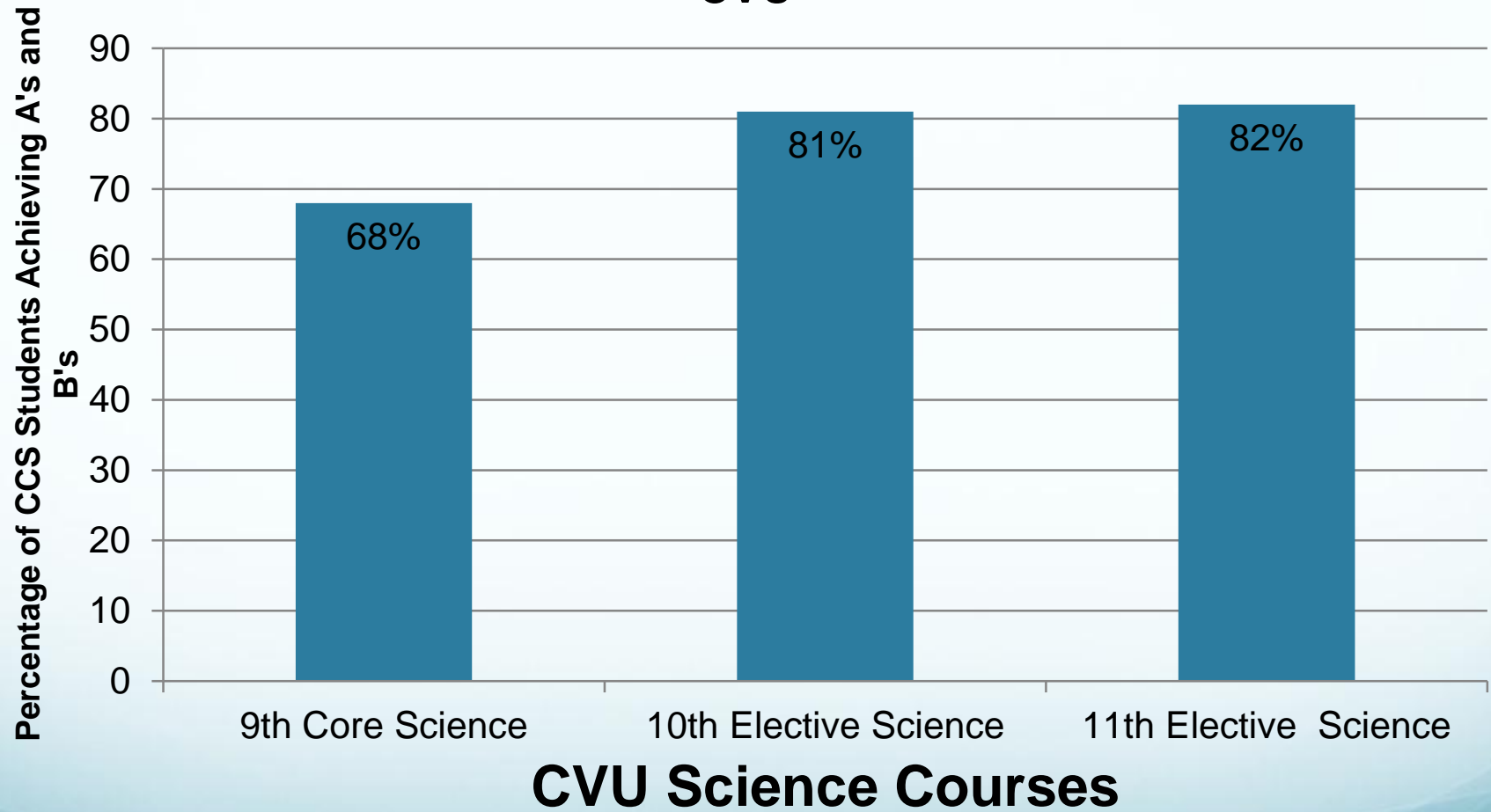
## ❖ Focus Areas

- Grade 4: Earth/Space and Inquiry domains
- Grade 8: Inquiry domain

# A Summary of the Work in Science Instruction at CCS since 2007

- Focused teacher training in VSI Best Practices in Science Instruction course 2008-09
- Incorporation of student science notebooks use: Grades 5-8
- Use of common inquiry science vocabulary: Grades 5-8
- Continued school-wide presentation of 8<sup>th</sup> grade Science Expo
- Collaborative analysis of NECAP Science results to inform instruction: Grades K-8
- Implementation of CSSU Science Inquiry Assessment Pilot to inform future inquiry instruction and assess inquiry skills
- Focus on Differentiated Instruction using the embedded professional development model with consultant, Bill Rich, working with teachers to increase skills in DI

## CCS 2007-08 8th Grade Cohort Science Performance at CVU



# CCS Science Improvement Initiatives

- Continue to use science notebooks grades 5-8 , introduce use of elements of science notebooks 1-4
- Continue and refine use of science probes to assess student learning and identify misconceptions to guide instruction
- Introduce the use of NECAP release tasks to provide students with practice and familiarity with standardized test-taking strategies and formats
- CCS Science Committee will meet regularly to support the implementation of inquiry assessments and best practices in science instruction
- Collaboratively analyze the results of the NECAP science assessment by grade level teams to guide future science instruction
- Continued participation of CCS Science Lead Teachers at CSSU Science Committee to plan and provide ongoing professional development in Science and continue the work of completing the CSSU Inquiry Task Assessment pilot