Common Core in the Classroom: Math Standards F-IF.4 & 5, S-ID.6 & 8, MP.2, 4, 5, 6, & 7

Understanding Linear Equations

Common Core in the Classroom Series

The *Common Core in the Classroom* series was created to provide educators with actual classroom examples of Common Core practice. Each video features a classroom lesson aligned with one or more Common Core learning targets. In addition to real-life examples of teacher and student engagement, these classroom segments are enriched by excerpts from teacher interviews and reflections.

This guidebook includes the classroom lesson plan provided by the teacher featured in the video and a viewer response form, which helps viewers reflect on the lesson and consider what they might apply to their own practice.

About this Segment

Ms. Carla Parham, a math teacher at Arlington High School in Shelby County, Tennessee, engages her students in a math task that involves graphically representing the historical data of the winning times of the men's 100-meter Olympic sprint. The students then use this information to derive an equation that enables them to predict future race times.

Guidebook Contents

Suggested PD Activities

Opening Activity: Before viewing the video segment, discuss the following prompt with the whole learning group.

What real-world applications of math concepts have you incorporated into your lessons?

Discussion: After watching the video, use the following prompt to facilitate discussion.

(Additional discussion questions can be found online with the resources for this video.)

If you were the instructional coach observing this classroom, what 2-3 strengths in Ms. Parham's lesson could you help her identify? What evidence of critical thinking and problem solving did her students demonstrate? What constructive feedback could you give her?

Reflection/Journal Writing: After the discussion, ask participants to record new learning and ideas in their journals. The following questions can be used to encourage reflection.

(Reflection questions can also be found online with the resources for this video.)

1. How can you apply the effective practices in this lesson to your own teaching?
2. What assessment strategies did Ms. Parham use to monitor student progress during and at the end of the lesson? What encouragement and feedback did she provide her students based on these strategies?
3. How did Ms. Parham structure her lesson to ensure that her students develop both conceptual knowledge and technological competency?

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Common Core Class Session

Viewer Response Form

Filling out this response form will help you analyze the lesson depicted in the video segment. It will also help you evaluate how you might apply techniques or strategies depicted in the video and what you would change or adapt in order to meet the unique needs of your students.

Featured Teacher: _____

Common Core Standard(s): _____

Classroom Observation

Rate the featured teacher's effectiveness (1 not effective; 5 very effective).

1. Student learning targets were clearly communicated.
   1 2 3 4 5
2. Instructional activities led students toward meeting the objectives.
   1 2 3 4 5
3. Teacher differentiated instruction.
   1 2 3 4 5
4. Assessments effectively monitored student progress.
   1 2 3 4 5

Reflection Questions

5. What evidence demonstrated that students were actively engaged and/or driving their own learning?

6. What worked in the lesson?

7. What would you do differently?

Reflections:

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Teacher Lesson Plan

Teacher: Ms. Carla Parham	**Grade Level:** 11
Lesson Date: September 27, 2012	**Content Area:** Math
School Name: Arlington High School	**Location:** Shelby County, Tennessee

Summary/ Overview	Students will analyze data to predict outcomes of the 100-meter dash.
Skill-Based Objectives & Deliverables	I can look at data and decide what type of regression will be its best fit. I can create a scatterplot and estimate the correlation coefficient. I can calculate the predication equation and use it to estimate unknown data.
Standard(s) Addressed	• **F-IF.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. • **F-IF.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. • **S-ID.6** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. • **S-ID.8** Compute (using technology) and interpret the correlation coefficient of a linear fit. • **MP.2, 4, 5, 6, & 7** • **Additional standards: A-CED.2, S-ID.7**
Materials and Resources	Document view camera, computer/PowerPoint with table of values, TI-84 Calculators, white board.
Scaffolding the Learning	Students will work in mixed-ability small groups. Teacher will be asking assessing and advancing questions throughout the lesson.
Extending the Learning	Follow-up discussion questions: Who could use this information? Could it benefit people other than those in the racing community?
Procedures	1. Activator (prep for new learning): Have you ever wanted to participate in the Olympics? If you wanted to compete in swimming, what would you want to know if you wanted to swim for gold?# 2. Given historical data of the winning times of the men's 100-meter Olympic track and field sprint,* students will create a scatter plot and predict the correlation coefficient. 3. Questioning: assessing questions will be asked about their graphs and prediction. 4. Students will work in groups to predict the 2012 race as well as future races, using calculators to check their predictions of the correlation coefficient. 5. Students will complete an exit ticket assessing their progress towards mastery of the standards.
Formative Evaluation & Assessment	Students will complete an exit ticket asking them to calculate the time they would need to run the men's 100-meter sprint to win gold in 2016.

 # Because of the time necessary to adequately represent the main lesson activities, the activator is not featured in the video.

*** This data table, as well as the questions in step 3, are found on the final page of this guidebook.**

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To learn more about this video and the Common Core in the classroom, please visit:

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Fax: 888-566-6888

www.schoolimprovement.com

Resources from School Improvement Network:

"Algebra: A-REI.7, MP.2 & 6 - Systems of Equations: Race Car Task." Common Core in the Classroom video series. CC 360. School Improvement Network. http://www.pd360.com/index.cfm?ContentId=5477

"Mathematics: Translating Parabolas." PD 360 video. This video segment is found in the *No Strings Attached: Technology in Education - Secondary* folder. http://www.pd360.com/index.cfm?ContentId=3299

Other resources available on this topic:

Zordak, Samuel E. "Barbie Bungee Lesson." *Illuminations: Resources for Teaching Math.* National Council of Teachers of Mathematics (NCTM). http://illuminations.nctm.org/LessonDetail.aspx?id=L646

Monroe, Eula. *Math Dictionary: The Easy, Simple, Fun Guide to Help Math Phobics Become Math Lovers*. Boyd Mills Press, 2006.

Common Core State Standards Initiative. National Governors Association & the Council of Chief State School Officers. Web. 25 July 2012. http:www.corestandards.org

Grateful appreciation to

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for sharing their experiences and expertise.

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Appendix: Table of Values for Lesson

Table of Values

A relationship between *t*, the winning time for the men's 100-meter run in the Olympic Games, and *y*, the number of years after 1900, is shown in the table.

Year of Olympic Games	Winning Time, (in seconds)
1900	11.0
1912	10.8
1924	10.6
1936	10.3
1948	10.3
1960	10.2
1972	10.14
1984	9.99
1996	9.84

Organize your data in a graph. Estimate your correlation coefficient.

Questions from the table data:

1. What did you label your axes?

2. What scale did you use?

3. How did you estimate your correlation coefficient?

4. If the trend continues, what is the best prediction for the winning time, in seconds, for the 100-meter run in the 2020 Olympics?

5. What was the winning time of the men's 100-meter sprint in the 2012 Olympics? [9.63 seconds - Usain Bolt]