**EXTreme Differentiation**

In the Math Classroom

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Welcome and Introduction

- Goals of Workshop
- Introductions
- Typical Unit Structure
- Differentiation of Instructional Methods
- Differentiation of Assessment
- Wrap Up
Goal of this Workshop

- To learn/experience some methods of differentiated instruction in mathematics
- To learn/experience some methods of differentiated assessment
Who Am I?

Dawn Crane
Francis W. Parker Charter Essential School

- Currently teaching Division 2 (9th/10th) grade Math
- Have taught Division 1 (7th/8th) and Division 3 (11th/12th)

- School Philosophy (10 common principles)
What Do I Call It EXTREME Differentiation?

- **Current Program Structure**
  - Students spend ~2 years in a “Division”.
  - Class contains 1\textsuperscript{st} and 2\textsuperscript{nd} year students
  - Variety of skill levels even within the 1\textsuperscript{st} and 2\textsuperscript{nd} year.
  - When needed, students who are in 11\textsuperscript{th} grade or 3\textsuperscript{rd} year continue in Division.
  - Occasionally an 8\textsuperscript{th} grader will advance to Division 2 early
  - Overall, the class could contain 8\textsuperscript{th}-11\textsuperscript{th} graders, each at different levels of previous knowledge and pace of learning.
  - Classes are heterogeneously grouped...no tracking
  - The majority of students on an IEP are included in the general education classroom.
Who Is In the Room?

- Name
- School
- What are you hoping to gain from this workshop today?
Think of Your Students

**Student 1**
- Often struggles with the material
- The pace can be too fast and would benefit from more practice
- Critical thinking skills are not as strong as many of his/her peers.

**Student 2**
- Doing just fine.
- Gets the work done & shows a reasonable understanding
- Pace is usually about right.
- Might need some extra help occasionally, but understands the material with moderate support.

**Student 3**
- Feels like the work can be mundane.
- Finishes “early” and accurately
  
  or
  
- Is always looking for a challenge and wants to have to think more deeply.
• **Hook**...whole class activity to peak students’ curiosity and interest

• **Initial Learning**...whole class activities done in table groups

• Students are provided a **Unit Expectations Overview** that tells them the skills they will learn and the options they have for learning and sometimes demonstrating that proficiency

• **Understanding Check**...students hand in class work...teacher reviews and groups students accordingly

• **Practice**...once basic concepts are introduced, students practice...self-paced (with teacher guidance)

• On-going formative assessment while practicing informs need for reinstruction and going further work.

• **Summative Assessment**...1 or 2 per unit, focusing on 1 or more “skill” areas
Forms of Differentiation for Instruction & Practice

- How far a student completes and assignment (adjusting quantity)
- Having extensions available that encourage more critical thinking
- Grouping and regrouping based on need
- Allowing/encouraging group conversation about the work
- Using exit slips and formative assessment to group and regroup and decide on when to provide reinstruction and to whom
- Having simplified and more complex versions of problems
- Providing some choice
- Minimizing homework...moving work into the classroom so students can receive more guidance and prompting.
Differentiation of Instructional Methods

- Introduction of Several Instructional Methods
- Participants work as students with stations, video instruction, IXL, Desmos
- While you are working on any particular “method” be thinking of your 3 students and how they would do, how each could benefit from this method, what might be hard, etc.
- Discussion/Debrief of activities and how different student profiles would enter and exit the work.
Differentiation of Instructional Methods

- Discussion/Debrief of activities and how different student profiles would enter and exit the work.
Next Up:
Differentiated Assessment
Differentiation of Assessment

- Ways to Differentiate Assessment
- Introduce Nesting Dolls Assessment
- Participants Do the Assessment
- Share Out-methods of approach/solutions
- Discussion/Debrief: How would different profiles of students approach the problem?
- Video of students working in these settings.
- Examine Student Work
- Discussion: Supports
Forms of Differentiating for Assessment

- Providing alternate ways to demonstrate understanding of concepts.
  - Quizzes, IXL, oral revision, on the spot working of problems
- Providing “complexity” options within the assignment
- Providing problems with multiple entry and exit points
- Giving options for how the work is presented
- Providing options based on interest.
Nesting Dolls
The Russian Nesting Doll is an intriguing toy for all ages. In this challenge you will determine if your nesting dolls are best modeled with an exponential function or a linear function (or some other function) and make a convincing argument for your choice.

**Expectations:**
- You will work with one set of nesting dolls.
- Collect data on the dolls.
- Determine which type of function would best model the growth/decay of your set of dolls.
- Create a function that models the growth/decay of your set of dolls.
- Provide EVIDENCE that your dolls are best modeled with this type of function and this function in particular.
- Your EVIDENCE should include things like graphs, tables, equations, diagrams and you should use these representations to SHOW the reader why you believe that your claim is best.

*There are no further specific guidelines. This is a pretty open ended assignment and your job is basically to convince me and do so by clearly communicating and supporting your claims.*
So how did WE go about solving this problem?
What Do Students Look Like Working on This Challenge?
Looking At Student Work
What techniques you might try when you return to your classrooms or create your next unit.
You can find the resources from THIS workshop at:
www.theparkerschool.org/pages/Francis_W_Parker_Charter_Esse/Classes/D2MST60

Other On-Line Resources:
IXL www.ixl.com
Desmos teacher.desmos.com (NO www.)
student.desmos.com

Dan Meyer http://blog.mrmeyer.com
Geogebra www.geogebra.com
What You Will Find on My Website

- **Hook**
  - 1a, 1b, 1c
- **Initial Learning**
  - 2a, 2b
- **Unit Expectations Overview**
  - 4a
- **Understanding Check**
  - 8a
- **Practice**
  - 5a, 5b, 6a, 6b, 7a-f (*instruction with practice*)
- **On-going formative assessment**
  - 5c, 6c
- **Summative Assessment**
  - A2, A3