Looking at Student Work: A powerful practice to promote learning, proficiency, and equity

Scott Hendrickson - Brigham Young University, Mathematics Vision Project

Ted Coe- Achieve

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2.1 Connecting the Dots: Piggies and Pools

A Develop Understanding Task

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Examine the tasks.
What do you notice? What do you wonder?

2.4 Getting Down to Business

A Solidify Understanding Task

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How are these two tasks similar? Different?
Why might these tasks have been selected for the "looking at student work" project?

www.achieve.org/equip

The EQuIP Rubric for Lessons & Units: Mathematics

The Mathematics Task Rubric

The Examples of Instructional Material

The Student Work Analysis Tool

Rubric for Lessons and Units

What do you look for in a good lesson?

Rubric for Lessons and Units

Alignment to the depth of the CCSS	Key shifts in the CCSS	Instructional supports	Assessment

I. Alignment to the Depth of the CCSS	II. Key Shifts in the CCSS	III. Instructional Supports	IV. Assessment
The lesson/unit aligns with the letter and spirit of the CCSS: ○ Targets a set of grade-level CCSS mathematics standard(s) to the full depth of the standards for teaching and learning. ○ Standards for Mathematical Practice that are central to the lesson are identified, handled in a grade-appropriate way, and well connected to the content being addressed. ○ Presents a balance of mathematical procedures and deeper conceptual understanding inherent in the CCSS.	*The lesson/unit reflects evidence of key shifts that are reflected in the CCSS:* ○ **Focus:** Lessons and units targeting the major work of the grade provide an especially in-depth treatment, with especially high expectations. Lessons and units targeting supporting work of the grade have visible connection to the major work of the grade and are sufficiently brief. Lessons and units do not hold students responsible for material from later grades. ○ **Coherence:** The content develops through reasoning about the new concepts on the basis of previous understandings. Where appropriate, provides opportunities for students to connect knowledge and skills within or across clusters, domains and learning progressions. ○ **Rigor:** Requires students to engage with and demonstrate challenging mathematics with appropriate balance among the following: – **Application:** Provides opportunities for students to independently apply mathematical concepts in real-world situations and solve challenging problems with persistence, choosing and applying an appropriate model or strategy to new situations. – **Conceptual Understanding:** Develops students' conceptual understanding through tasks, brief problems, questions, multiple representations and opportunities for students to write and speak about their understanding. – **Procedural Skill and Fluency:** Expects, supports and provides guidelines for procedural skill and fluency with core calculations and mathematical procedures (when called for in the standards for the grade) to be performed quickly and accurately.	*The lesson/unit is responsive to varied student learning needs:* ○ Includes clear and sufficient guidance to support teaching and learning of the targeted standards, including, when appropriate, the use of technology and media. ○ Uses and encourages precise and accurate mathematics, academic language, terminology and concrete or abstract representations (e.g., pictures, symbols, expressions, equations, graphics, models) in the discipline. ○ Engages students in productive struggle through relevant, thought-provoking questions, problems and tasks that stimulate interest and elicit mathematical thinking. ○ Addresses instructional expectations and is easy to understand and use. ○ Provides appropriate level and type of scaffolding, differentiation, intervention and support for a broad range of learners. – Supports diverse cultural and linguistic backgrounds, interests and styles. – Provides extra supports for students working below grade level. – Provides extensions for students with high interest or working above grade level. *A unit or longer lesson should:* ○ Recommend and facilitate a mix of instructional approaches for a variety of learners such as using multiple representations (e.g., including models, using a range of questions, checking for understanding, flexible grouping, pair-share). ○ Gradually remove supports, requiring students to demonstrate their mathematical understanding independently. ○ Demonstrate an effective sequence and a progression of learning where the concepts or skills advance and deepen over time. ○ Expect, support and provide guidelines for procedural skill and fluency with core calculations and mathematical procedures (when called for in the standards for the grade) to be performed quickly and accurately.	*The lesson/unit regularly assesses whether students are mastering standards-based content and skills:* ○ Is designed to elicit direct, observable evidence of the degree to which a student can independently demonstrate the targeted CCSS. ○ Assesses student proficiency using methods that are accessible and unbiased, including the use of grade-level language in student prompts. ○ Includes aligned rubrics, answer keys and scoring guidelines that provide sufficient guidance for interpreting student performance. *A unit or longer lesson should:* ○ Use varied modes of curriculum-embedded assessments that may include pre-, formative, summative and self-assessment measures.
Rating: 3 2 1 0	**Rating: 3 2 1 0**	**Rating: 3 2 1 0**	**Rating: 3 2 1 0**

http://achieve.org/files/EQuIPmathrubric-06-17-13_1.pdf

Examples of Instructional Material

In an effort to identify and shine a spotlight on emerging examples, Achieve established a process to select and train the EQuIP Peer Review Panel, a group of experienced reviewers to evaluate the quality and alignment of lessons and units to the CCSS. The EQuIP Peer Review Panel is using the EQuIP Rubrics and quality review process to evaluate the instructional materials for CCSS-alignment and quality. The objective is not to endorse a particular curriculum, product or template, but rather to identify lessons and units that best illustrate the cognitive demands of the CCSS. Below is the list of instructional materials that have been submitted to the EQuIP Peer Review Panel and evaluated as "Example" or "Example if Improved." Each lesson or unit is available to download and use in classrooms. In addition to the materials there is a copy of the EQuIP quality review feedback from the EQuIP Peer Review Panel. Please review the feedback to gain a sense of the materials' purpose, strengths and areas that would benefit from revisions. Please contact Teresa Eliopoulos at teliopoulos@achieve.org if you have any questions regarding the materials or the EQuIP Peer Review Panel feedback.

Please click on the grade bands, content area, and type of instructional material you are interested in viewing, then click apply.

GRADE

TYPE

CONTENT AREA

Apply

Algebra I - Describing Variability - Example

Algebra I - Exponential Relationships - Example if Improved

Algebra I - Transformations of Functions - Example

Geometry - Let's Reflect On This... - Example

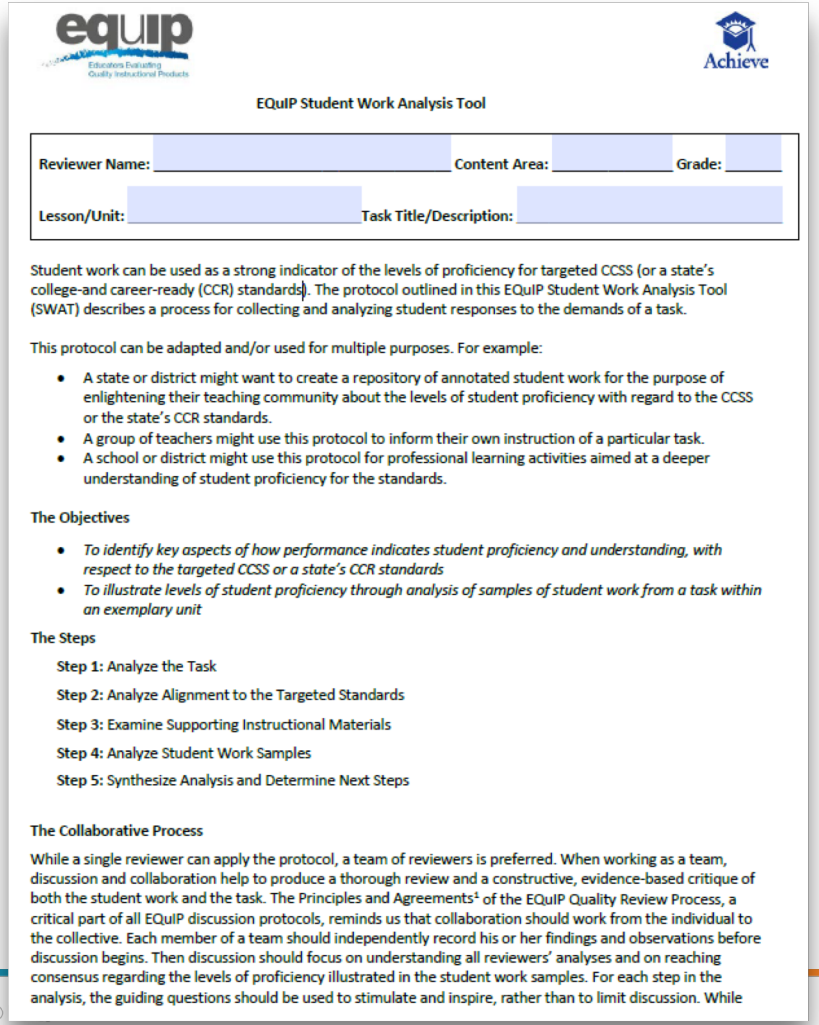
Grade 10 - Congruence, Proof, and Constructions - Example if Improved

Grade 9 - Expressions, Functions, and Linear Models - Example

https://achieve.org/equip/examples

Student Work Analysis Tool

1. Analyze the Task
1. Analyze Alignment to the Targeted Standards
1. Examine Supporting Instructional Materials
1. Analyze Student Work Samples
1. Synthesize Analysis and Determine Next Steps



EQuIP Student Work Analysis Tool

Reviewer Name: _____ Content Area: _____ Grade: _____

Lesson/Unit: _____ Task Title/Description: _____

Student work can be used as a strong indicator of the levels of proficiency for targeted CCSS (or a state's college-and career-ready (CCR) standards). The protocol outlined in this EQuIP Student Work Analysis Tool (SWAT) describes a process for collecting and analyzing student responses to the demands of a task.

This protocol can be adapted and/or used for multiple purposes. For example:

- A state or district might want to create a repository of annotated student work for the purpose of enlightening their teaching community about the levels of student proficiency with regard to the CCSS or the state's CCR standards.
- A group of teachers might use this protocol to inform their own instruction of a particular task.
- A school or district might use this protocol for professional learning activities aimed at a deeper understanding of student proficiency for the standards.

The Objectives

- *To identify key aspects of how performance indicates student proficiency and understanding, with respect to the targeted CCSS or a state's CCR standards*
- *To illustrate levels of student proficiency through analysis of samples of student work from a task within an exemplary unit*

The Steps

Step 1: Analyze the Task

Step 2: Analyze Alignment to the Targeted Standards

Step 3: Examine Supporting Instructional Materials

Step 4: Analyze Student Work Samples

Step 5: Synthesize Analysis and Determine Next Steps

The Collaborative Process

While a single reviewer can apply the protocol, a team of reviewers is preferred. When working as a team, discussion and collaboration help to produce a thorough review and a constructive, evidence-based critique of both the student work and the task. The Principles and Agreements[1] of the EQuIP Quality Review Process, a critical part of all EQuIP discussion protocols, reminds us that collaboration should work from the individual to the collective. Each member of a team should independently record his or her findings and observations before discussion begins. Then discussion should focus on understanding all reviewers' analyses and on reaching consensus regarding the levels of proficiency illustrated in the student work samples. For each step in the analysis, the guiding questions should be used to stimulate and inspire, rather than to limit discussion. While

1. Analyze the task - just the task.

- What seems to be the content and performance demands? (What standard(s) do you think the authors targeted?)

- Ponder the intended purpose and goals.

- Consider if the task reflects the practices.

From the authors:

- Students can distinguish between situations that can be modeled with linear functions and with exponential functions **(HSF-LE.A.1)**.
- Students can construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs—including reading these from a table **(HSF-LE.A.2)**.
- Students observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity growing linearly **(HSF-LE.A.3)**. (Business)
- Students interpret the parameters in a linear or exponential function in terms of a context **(HSF-LE.B.5)**. (Business)
- Students look for and make use of structure **(SMP.7)**.

2. Analyze alignment to the targeted standards.

- Did the task address the targeted standard(s)?
- What should proficiency with the standard look like?
- What should proficiency with the *task* look like?

3. Examine supporting materials

- Examine the surrounding content, organization, and placement.
- Examine the answer keys/rubrics.
- Look at the instructional supports.

MVP Curriculum Framework

In the MVP framework, ***develop understanding*** tasks are designed to surface student thinking about key ideas, strategies, and representations of the module; ***solidify understanding*** tasks examine and extend those emerging ways of thinking; and ***practice understanding*** tasks refine those ideas for fluency and transfer to other contexts and applications.

MODULE 2 - TABLE OF CONTENTS

LINEAR AND EXPONENTIAL FUNCTIONS

2.1 Piggies and Pools – A Develop Understanding Task

Introducing continuous linear and exponential functions (F.IF.3)

READY, SET, GO Homework: Linear and Exponential Functions 2.1

2.2 Shh! Please Be Discreet (Discrete!) – A Solidify Understanding Task

Connecting context with domain and distinctions between discrete and continuous functions (F.IF.3, F.BF.1a, F.LE.1, F.LE.2)

READY, SET, GO Homework: Linear and Exponential Functions 2.2

2.3 Linear Exponential or Neither – A Practice Understanding Task

Distinguishing between linear and exponential functions using various representations (F.LE.3, F.LE.5)

READY, SET, GO Homework: Linear and Exponential Functions 2.3

2.4 Getting Down to Business – A Solidify Understanding Task

Comparing growth of linear and exponential models (F.LE.2, F.LE.3, F.LE.5, F.IF.7, F.BF.2)

READY, SET, GO Homework: Linear and Exponential Functions 2.4

4. Look at student work samples

- Think about the provided questions and fill in the table.
- Describe student responses that provide evidence for levels of proficiency.
- Discuss.

	What does the student's work demonstrate about his/her proficiency with the requirements of the standard(s) targeted by the task?	What might the student's work demonstrate about the depth of his/her understanding and reasoning ability?	What does the student's work demonstrate about … ELA: … their comprehension of grade-level text (R.10)? Math: … their ability to apply a particular Mathematical Practice?	How do the task's prompts, directions, information, and/or materials in the lesson or unit designed to support the task, contribute to an understanding of the individual student's proficiency?	What implications for instruction of the task are evident in the individual student work sample?
Student #_____					

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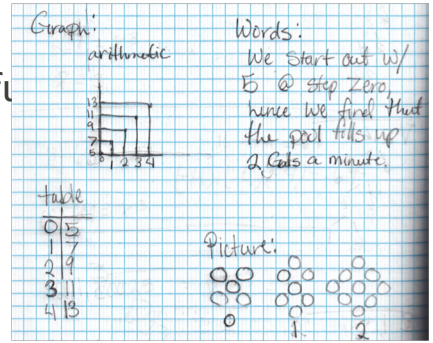
Student #_____					

1. Proficiency with targeted standards

   LE.A.1 Distinguish between linear and exponential fu

   LE.A.2 Construct linear and exponential functions.

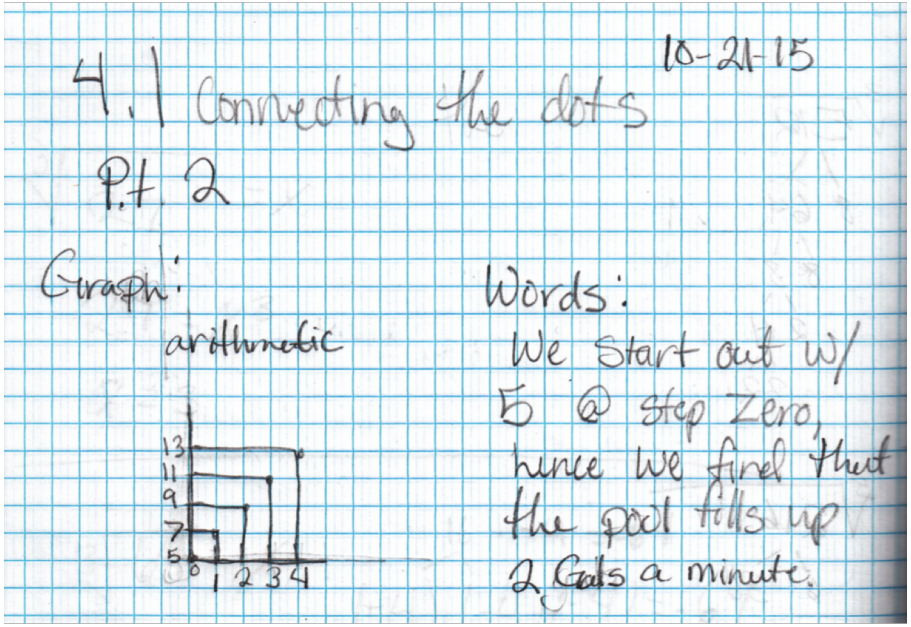


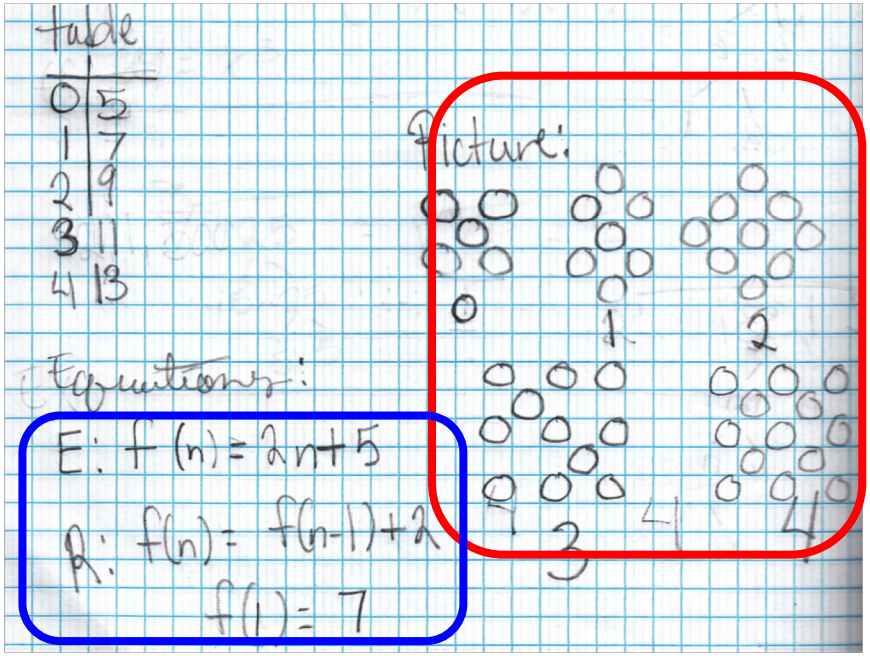
1. Depth of understanding
2. Ability to apply a Mathematical Practice

   SMP.7 Look for and make use of structure

1. How task supports/contributes to student understanding
2. Implications for instruction

2.1 Connecting the Dots, problem 1





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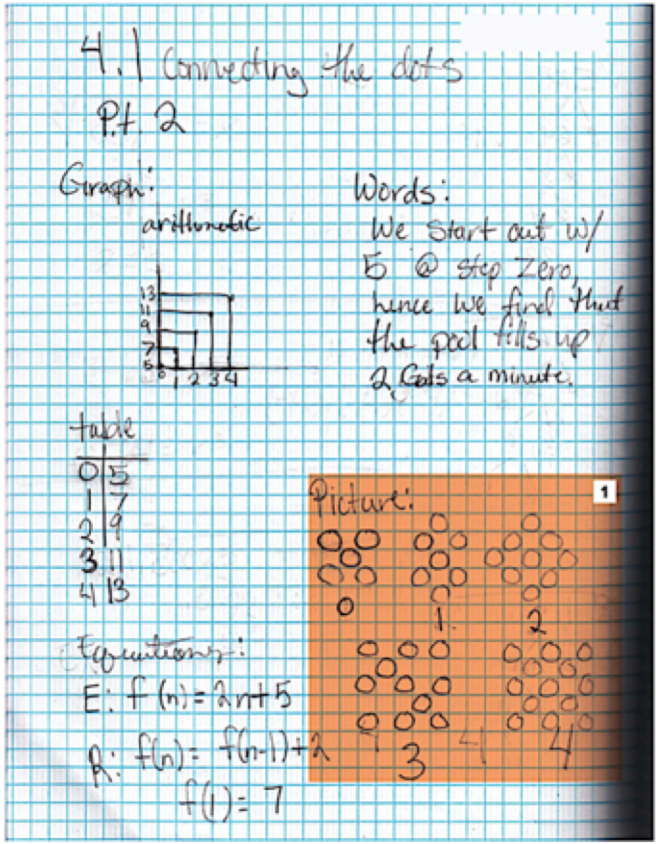
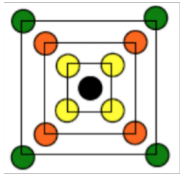
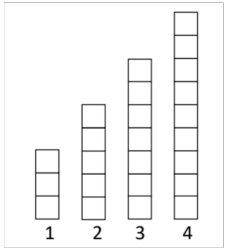


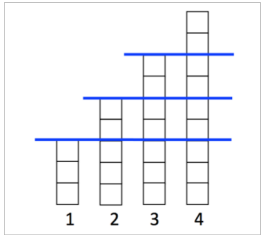
NOTE:
This sample of student work was selected from a special education classroom.

1. Comprehension & Application
SMP.7: Look for and make use of structure.

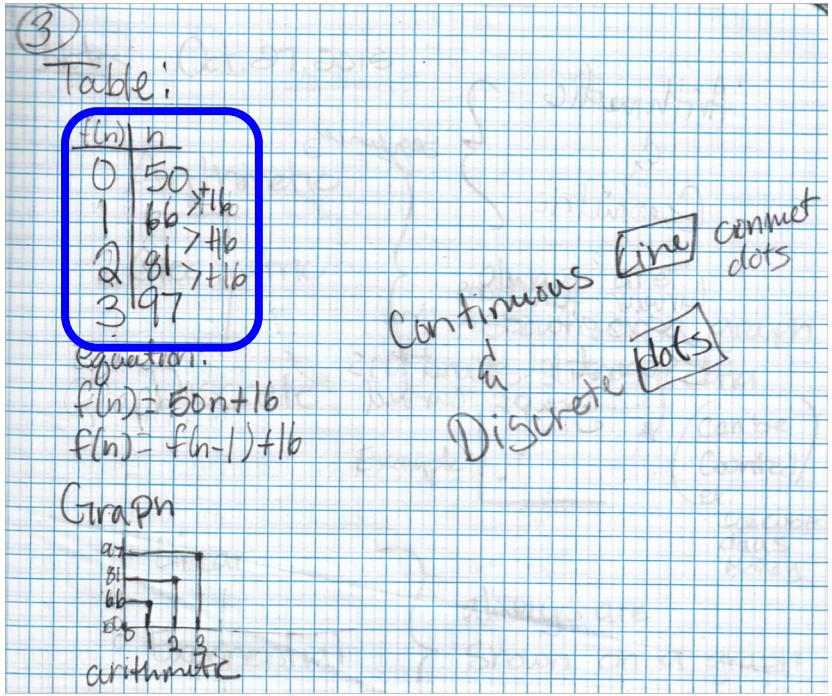
Although the student has seen some well-structured diagrams in previous modules, the student is struggling to create a visual picture to model this situation, since the picture does not show the constant starting amount and the constant rate of growth in a meaningful way. The student can, however, use a discrete linear table to represent the rate of change and the starting amount from a context.

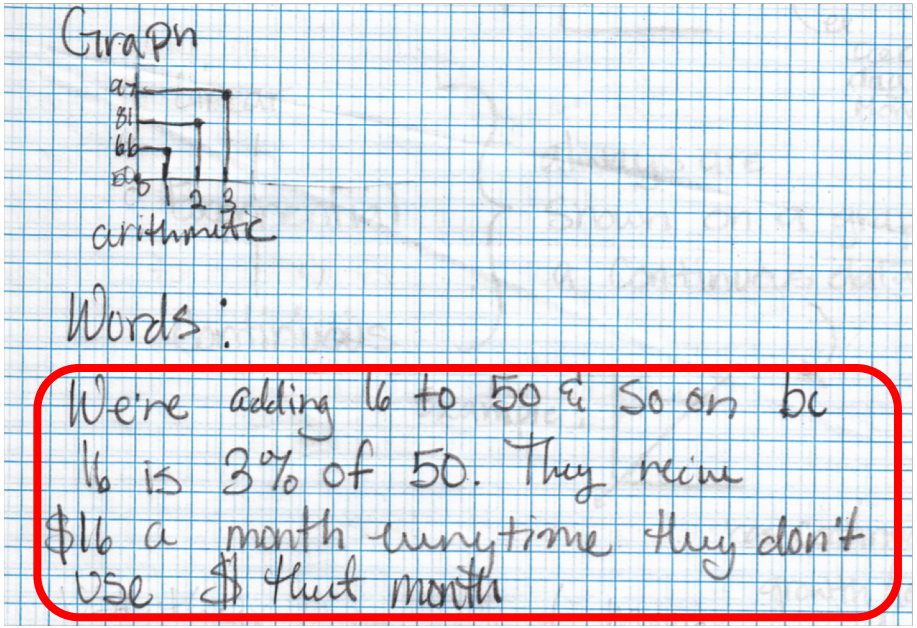






2.1 Connecting the Dots, problem 3





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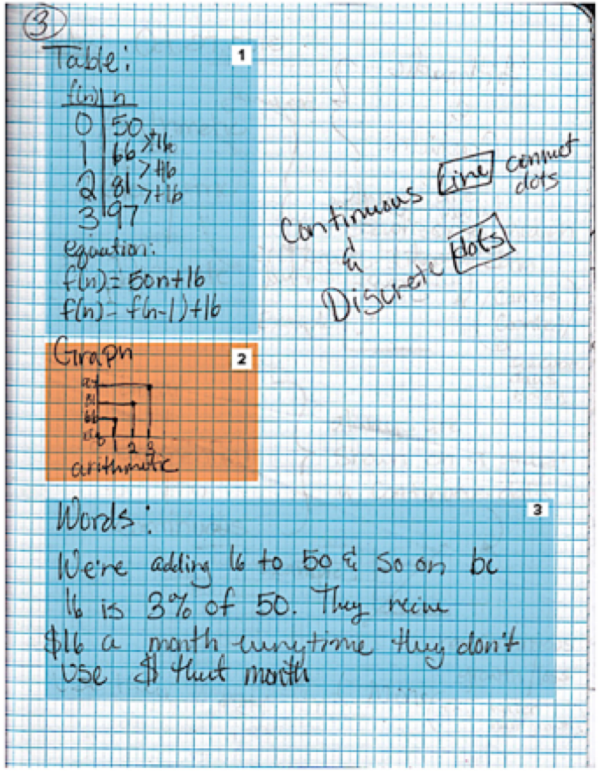


1. CCSS Alignment

The student is not demonstrating proficiency in HSF-LE.A.2. The student can construct recursive equations for linear tables. However, the student is not consistent in writing a correct explicit linear equation from a linear table and graph, as shown in question 3. Although the student incorrectly decides that question 3 is a linear situation, the student does not write a correct explicit linear equation to match the table. Because the student incorrectly identifies the situation in question 3 as linear, there is no evidence that the student can write an exponential equation.

Standard referenced:

HSF-LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

2. Comprehension & Application

SMP.7: Look for and make use of structure.

In the two linear graphs in question 1 and 3, it appears that all linear graphs pass through the origin, since the student labels the y-coordinate of the origin with the value of the starting amount. This is problematic in distinguishing linear situations that are proportional to linear situations that are not proportional. The student uses the graph to show the mapping between the input and output values of the function, relating the structure of the graph to the structure of the table.

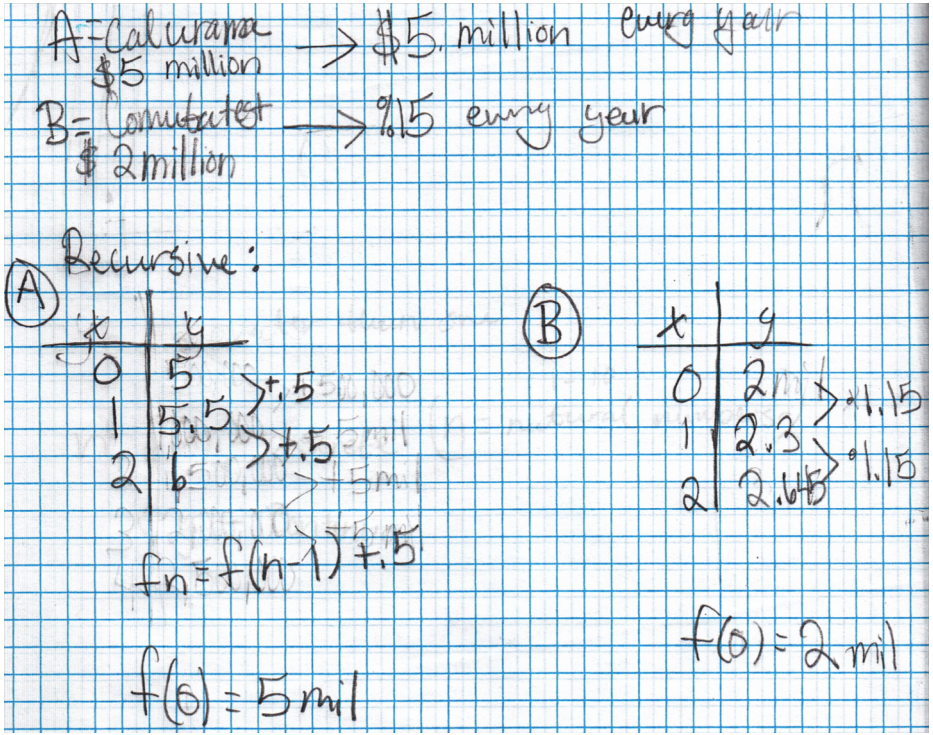
3. CCSS Alignment

The student is below proficient in HSF-LE.A.1. The student is unable to distinguish between linear and exponential contexts.

Standard referenced:

HSF-LE.A.1: Distinguish between situations that can be modeled with linear functions and with exponential functions.

2.4 Getting Down to Business, parts A and B: tables



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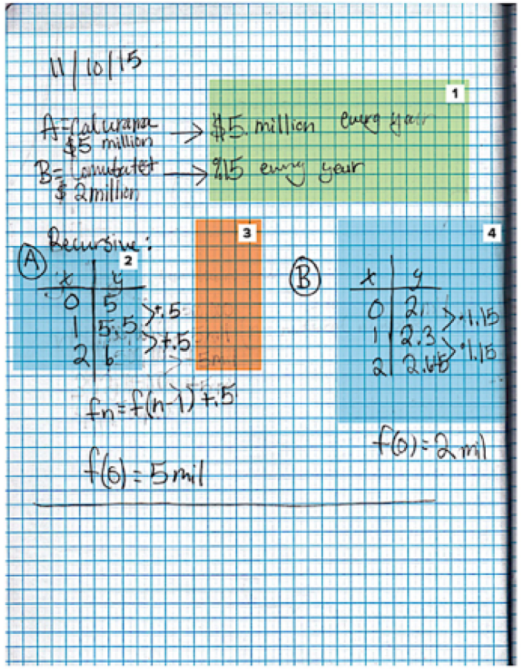


Language Challenges
(Entire page)
Because this is a special education student, when the work is compared to task 1, it appears that number size is obscuring the student's ability to demonstrate proficiency in explicit and recursive equations. There is evidence of this by the erased notations and revisions in the linear table, and the erased explicit equation for the exponential function.

1. Understanding
There is a mathematical language issue with notation for dollars and percent. The percent sign seems to be used as a unit. the same way the dollar sign is used as a unit.

2. CCSS Alignment
The table gives evidence that the student understands the meaning of the parameter in the context.

Standard referenced:
HSF-LE.B.5: Interpret the parameters in a linear or exponential function in terms of a context.

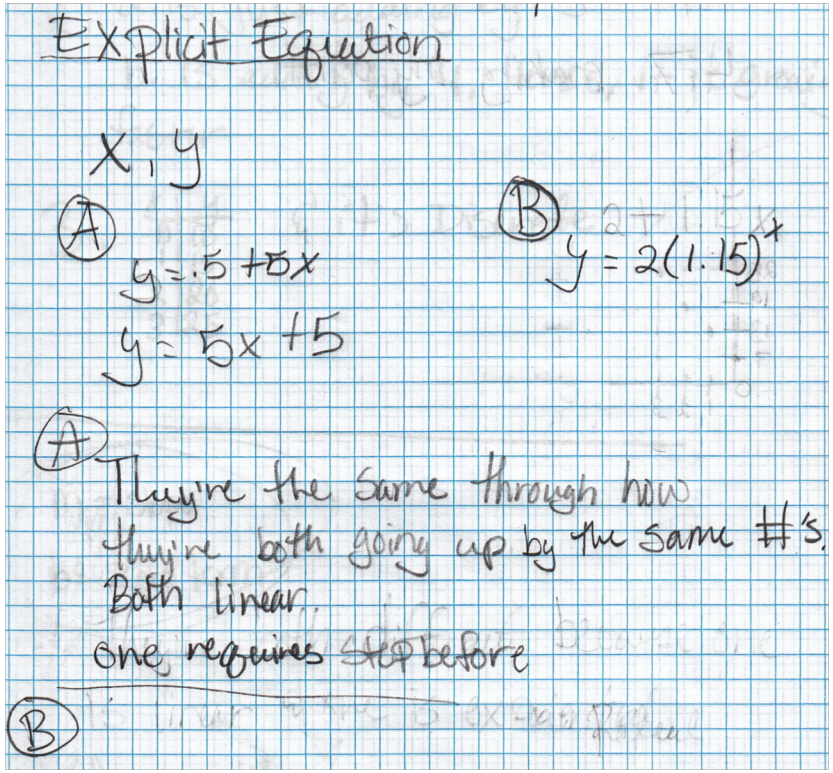
3. Comprehension & Application
SMP.7: Look for and make use of structure.

As is evident from the number of erasures and revisions in the student work, the student seems to be working back and forth between the tables and the equations, trying to make the structure revealed by the table to match the structure of the equations.

4. CCSS Alignment
The student is approaching proficiency in HSF-LE.A.1c. The student recognizes the number 1.15 as a factor, and can create a table from a percent change, but initially struggled to create the corresponding equation. The equation was revised to the correct form.

Standard referenced:
HSF-LE.A.1c: Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

2.4 Getting Down to Business, parts A and B: equations



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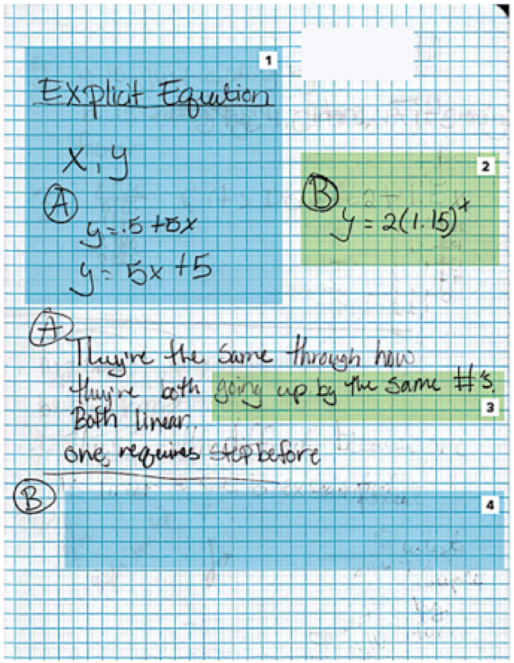

Understanding
(Enitre page)
The student has shown progress in creating linear and exponential equations when compared to task 4.1.

1. CCSS Alignment
The student is approaching proficiency in HSF-LE.A.2. There is evidence that the student is able to create a recursive linear equation from a context. The student is struggling with the explicit linear equation, since the student exchanges the rate of growth parameter with the initial value. The student has no evidence of the exponential recursive equation but does have the explicit exponential equation.

Standard referenced:
HSF-LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

2. Understanding
This task is the fifth in the unit and students have encountered percent growth factors before (i.e. Task 4.1). The student is still grappling with this idea. It is unclear what led to the change in the explicit exponential equation.

3. Understanding
The language "going up by the same number" is not precise enough to distinguish between linear and exponential.

4. CCSS Alignment
There is no evidence for standard HSF-LE.A.3 in the work since the student didn't discuss why Computafest's plan is better.

Standard referenced:
HSF-LE.A.3: Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

5. Synthesize analysis and determine next steps

- Discuss the whole collection.

- Think about *your* purpose for this work:
  - Inform your own instruction?
  - Create professional learning activities?
  - Annotated student work?

EQuIP Student Work Protocol for Teachers

This document provides guidance to classroom teachers for using the Student Work Protocol. Teachers have a unique, hands-on experience with student work that gives them a different perspective from educators that are even a short distance from the classroom.

Why would a teacher use the EQuIP Student Work Protocol (SWP)?

- To take a deep look at a student task and its alignment to the CCSS or the state's college- and career-ready (CCR) standards.
- To examine how the targeted standards are reflected in students' responses to the task.
- To gain a better understanding of exactly how students experience the task.
- To reflect on the overall quality of the task and on ways to improve it.
- To consider modifications to instruction and materials to better prepare students for the task.
- To build collaborative relationships and a common understanding of quality and alignment with fellow teachers.
- To become a reflective practitioner, forming a habit of looking at student work for purposes other than evaluating the student.
- To deepen understanding of the CCSS or the state's college- and career-ready (CCR) standards.

ANNOTATED STUDENT WORK INITIATIVE

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