Wayland Public Schools
November 17 School Committee Meeting

Technology Spotlight #1
EcoMUVE

SAMR Model

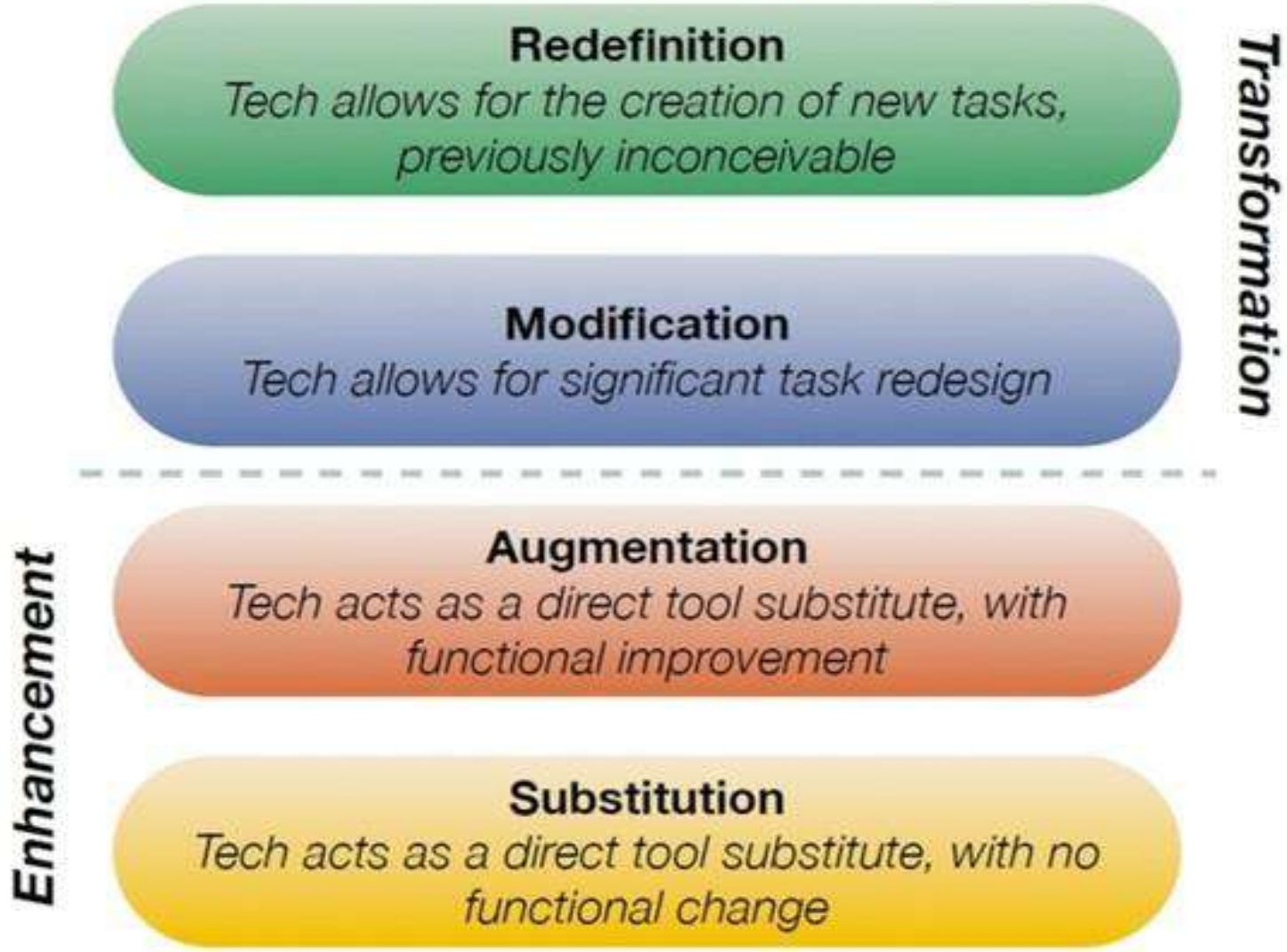

Image the creation of Dr. Ruben Puentedura, Ph.D. http://www.hippasus.com/rrpweblog/

EcoMUVE

Multi User Virtual Environment

- A curriculum research project of the Harvard Graduate School of Education that uses immersive virtual environments to teach middle school students about ecosystems and causal patterns.
- Implementation enabled by Wayland's PLC and computer initiatives.

Wayland Public Schools
December 1 School Committee Meeting

Technology Spotlight #2
itsLearning

itslearning

Learning Management System

- Paperless
- Readings, videos, images, assignments, assessments are all on line.
- Assignments completed on line.
- Materials such as study guides are fluid and can be amended at will.
- Discussion boards
- Integral to success of 1:1 Initiative

itslearning

Benefits

(or: Why it dramatically changes the way teachers can teach.)

- Transparency
- Flexibility
- Accessibility
- Accountability

AP US History Course

Wayland Public Schools
December 15 School Committee Meeting

Technology Spotlight #3
Hour of Code

Hour of Code

Code

- Proficiency in computer science, which includes knowing code, is a new 21st Century literacy skill.
- Learning code teaches skills which transfer to other areas, including logical thinking, problem solving, and persistence.
- Computer science has relevancy in all fields.
- The economy needs more computer scientists and people who know how to code. It holds the promise of being an interesting and lucrative career.

Hour of Code

Goals of Code.org

- Bringing Computer Science to US Schools
  - At HS: Exploring Computer Science, Computer Science Principles
- Removing barriers & establishing policies: Change the rules to accelerate computer science adoption.
  - Incorporate across the curriculum
  - Count as high school math or science requirement.
- Breaking stereotypes with the Hour of Code: Increase participation by women and underrepresented groups.

Link to Code with Anna and Elsa

Wayland Public Schools
January 5 School Committee Meeting

Technology Spotlight #4
One Minute Reader

One Minute Reader

One Minute Reader is a digital version of ReadNaturally, a research based fluency program which the district has been using for approximately 5 years. The app is used on iPad Mini's.

Educational Goals

- Enhances foundational skills in reading fluency and comprehension at the elementary level.
- The elementary language arts curriculum requires students to acquire essential skills in the areas of decoding, reading fluency, and comprehension of reading material.
- This program is focused on fluency, which is the gateway to comprehension. One minute reader has students read along with a fluent reader. Fluency is not just reading rate; it involves expression and **volume, phrasing, smoothness** and **pace.**
- Comprehension: main idea, literal, vocabulary, inferential, short answer.

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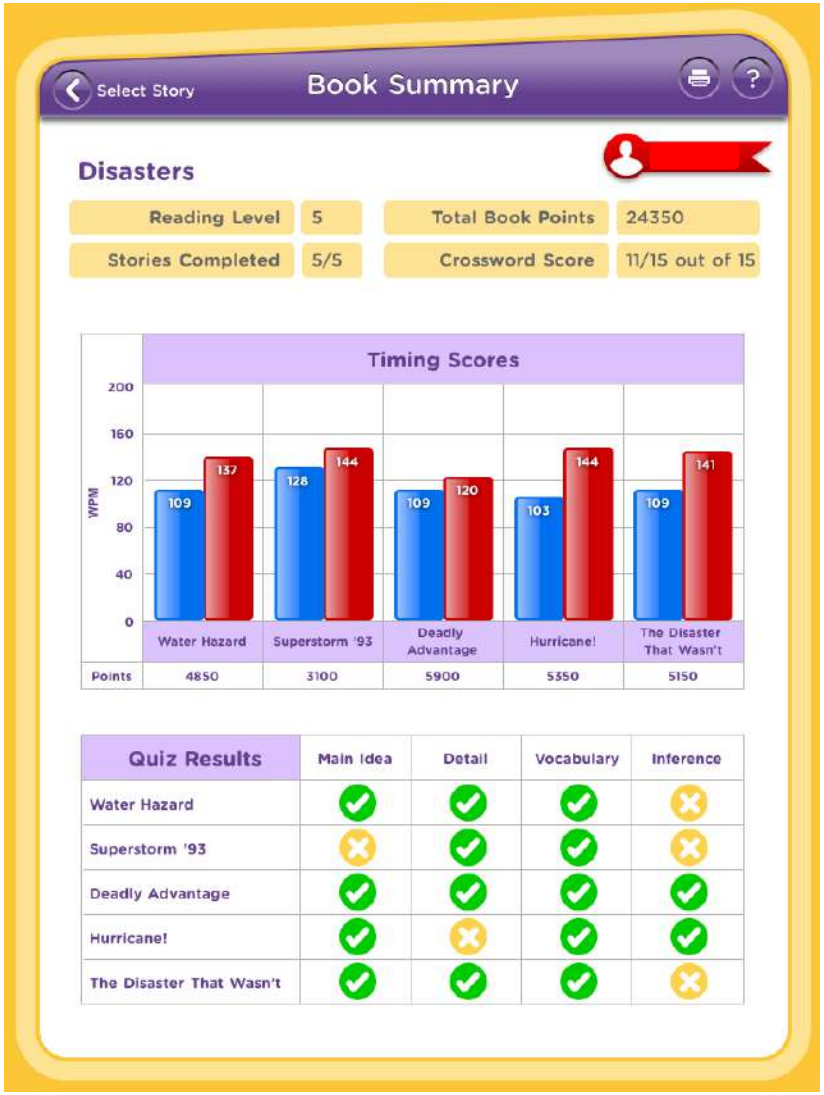
One Minute Reader



[Link to ReadNaturally]

Wayland Public Schools
January 20 School Committee Meeting

Technology Spotlight #5
Operation Lapis

Operation Lapis

- Goal: To teach Latin as a language in which students have the opportunity to hear, speak, read, and write in Latin. In this way, students experience Latin as a language through which people *communicate*.

- This is transformative. In contrast, the traditional approach to Latin education focuses on reading, grammar and translating.

Operation Lapis

- This is a 2-year course of study, replete with well laid out grammatical, cultural and historical learning objectives.
- The world is at risk. Students are charged with the task of finding the Stone of the Ages, which holds the key to saving civilization. The stone weaves the story together.
- Students, in teams of 4, track the story of Roman History.
- Each team is given a character from Ancient Rome which they operate like an avatar.
- Every Monday, students are given a mission and presented with a situation that they need to resolve. They must construct a plausible reply to the situation through the voice of their avatar.
- Mission control, secretly the teacher, observes students discussing their proposed responses -- redirecting or correcting them (on line) in order to assure they remain true to their historical character and to the proper use of Latin.
- There is an on-line textbook to which they can refer.
- The following Monday, teams act out their responses in Latin to the previous week's mission. Peers rate their performance. Awards and points are issued.

Operation Lapis

- Operation Lapis fully employs the power of the Internet.
  - Learning is truly interactive
  - Education is put into the students' hands.
  - Students become researchers, able to follow their interests and delve deeper into their studies on line.
  - It is a differentiated approach to learning.
  - It flips the classroom.
  - Formative assessment is built into the program throughout.

Wayland Public Schools
February 5 School Committee Meeting

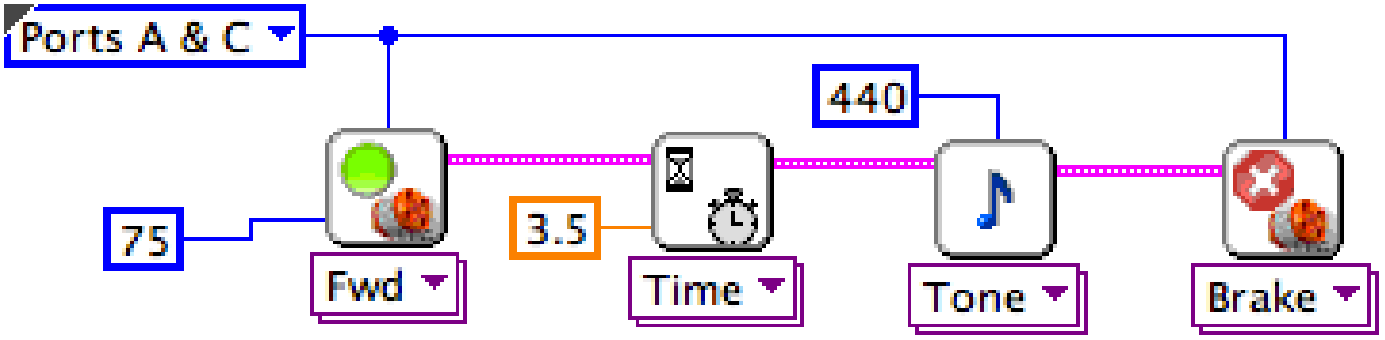
Technology Spotlight #6
Visual Programming

Visual Programming

- Emphasizes the use of icons and images for creating programs.
- Utilizes icons that are easily modified to control hardware such as motors and sensors.
- Click and drag, then connect to hardware right away: instant gratification.
- Used in Robotics and Principals of Technology.
- Paul Shiffler began using this in 2005, and its now even more accessible due to the 1-1 initiative.

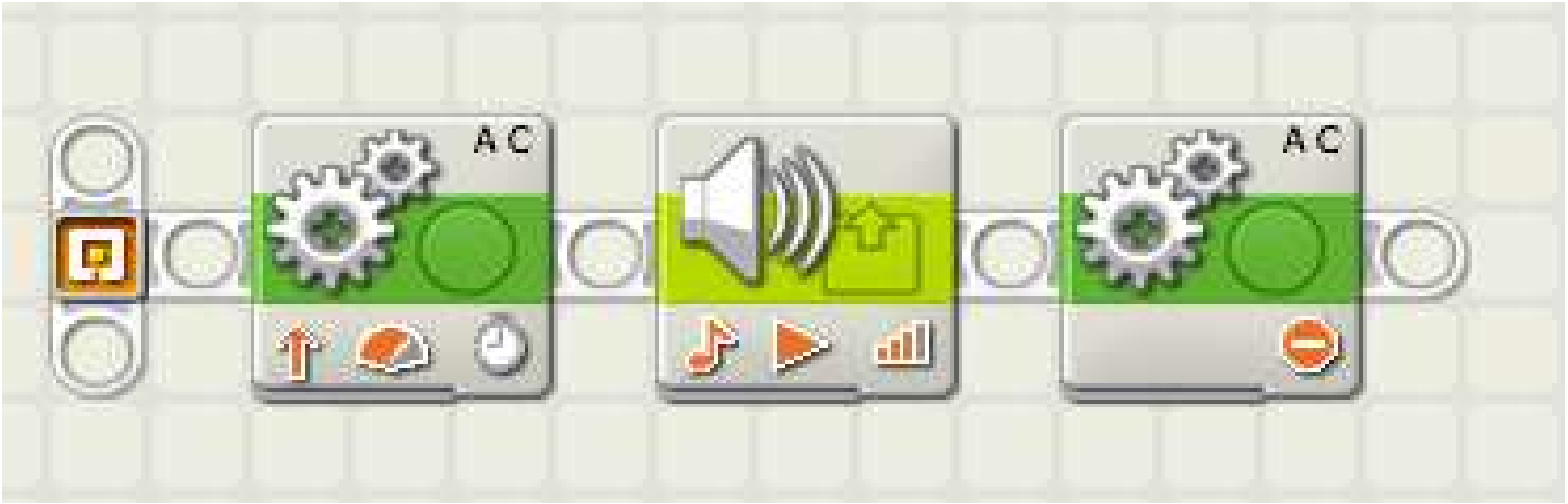
Visual Programming

- LabView
  - Developed in 1986 for industrial use
  - Utilized to control components of NASA Mars rover projects



Visual Programming

- NXT-G
  - Utilizes a "drag and drop" interface
  - Designed specifically for educational use

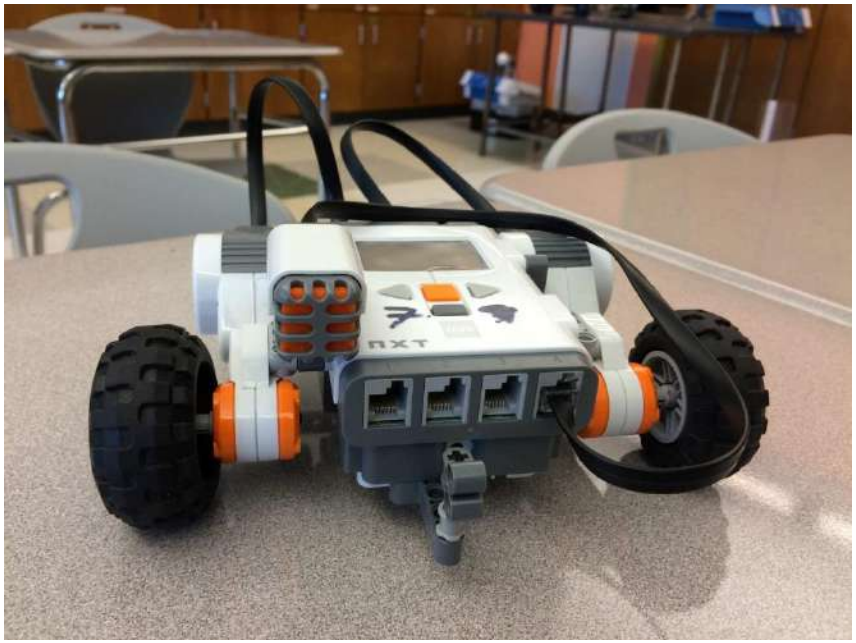


Visual Programming

Why Visual Programming?

- Acts as an “equalizer” – a student’s math or science skills do not necessarily limit access
- It involves engaging, hands-on activities that call on a variety of learning styles that, for instance, appeal to visual and kinesthetic learners.
- It involves a variety of skills including computer, design, and construction skills that have real world applications.
- Allows for immediate interaction with “real” things – motors and sensors.
- Gives students access to programming software that is used in industry.
- It is performance based, and it provides instant feedback – both software and hardware “tell” a student if they have completed their task.
- Students learn about data collection and see how machines can graph data.
- Melds abstract and logical thinking with practical applications.

Visual Programming



Student Projects

- Students can use a distance or light sensor to have this Lego vehicle simulate a pedestrian crossing or navigate a maze.
- Students can also use Vernier sensors which are designed to measure many different variables such as temperature, Oxygen, CO_2, and sound to program the vehicle.

Wayland Public Schools
February 23 School Committee Meeting

Technology Spotlight #7
Lexia

Lexia

- Provides individualized, targeted practice students need to master their reading skills.
- Differentiated and interactive
- Automatically places students at the appropriate level of instruction and monitors student progress for skill developments and time on task.
- Reinforcing: students can see their progress, receive award certificates for each level of completion.
- Appeals to auditory and visual learners.
- Focuses on critical reading skills that have been identified by national reading experts.

Lexia

PHONOLOGICAL AWARENESS

- Rhyming
- Identifying beginning and ending sounds
- Segmenting compound words and syllables
- Blending compound words and syllables
- Segmenting sounds
- Blending sounds

PHONICS / PHONOLOGICALAWARENESS

- Letter-sound correspondence for consonants, short vowels and consonant digraphs
- Identifying beginning and ending sounds and letters
- Identifying medial sounds and letters, short and long vowels
- Segmenting, blending and manipulating sounds with letters
- Short-vowel words, Silent-e words, Vowel-r words, Vowel combination words
- Open syllable words, consonant-le words
- Two-syllable words
- Three-syllable words

VOCABULARY

- Picture-word matching (Oral)
- Categorical sorting
- Picture-word matching (Reading)
- Pre-primer through third grade sight words
- Anglo-Saxon prefixes and suffixes
- Latin prefixes, roots and suffixes
- Greek combining forms

AUTOMATICITY / FLUENCY

- Phoneme intervals for blending and segmenting
- Timed discrimination of easily reversible letters
- Timed medial vowel discrimination with letters
- Automatic recognition of short vowel words
- Timed identification of simple and complex words and syllables
- Automatic recognition of words with vowel digraphs
- Automatic identification of irregular words
- Modeled paragraph reading

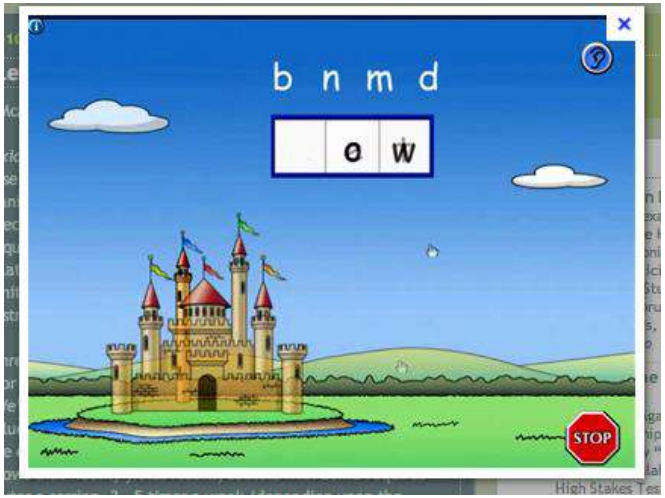
COMPREHENSION

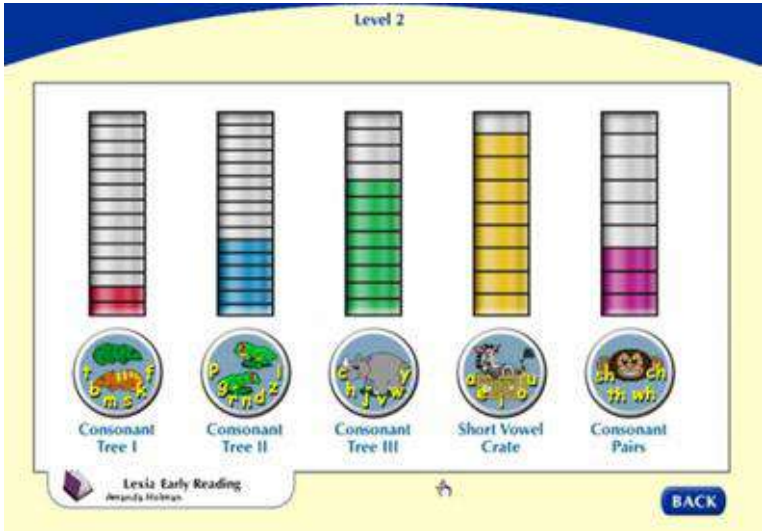
- Categorical and associative thinking
- Comprehension of words and word parts
- Use of picture support to enhance comprehension of words, phrases, sentences and paragraphs
- Word construction from syllables and prefixes, stems and suffixes
- Systematic cloze procedure comprehension of sentences, paragraphs and stories

Lexia

- Used at least 2 times a week, usually in 20 minute blocks.
- All students in Grades K-2. In Grades 3-5, it is used mostly for students with more intensive needs.
- Students systematically progress through the software; fosters independent learning.
- Teachers can monitor progress and mistakes, identifying needed support and scaffolding.
- Reports can be automatically emailed to teachers, showing student progress, including recommendations for additional lessons and practice.
- Teachers check reports to track if students are having difficulty with any of the practice activities
- If so, then students are pulled into an instructional group to work on a particular skill
- Lesson plans and practice sheets accompany program. There is also an at-home component.

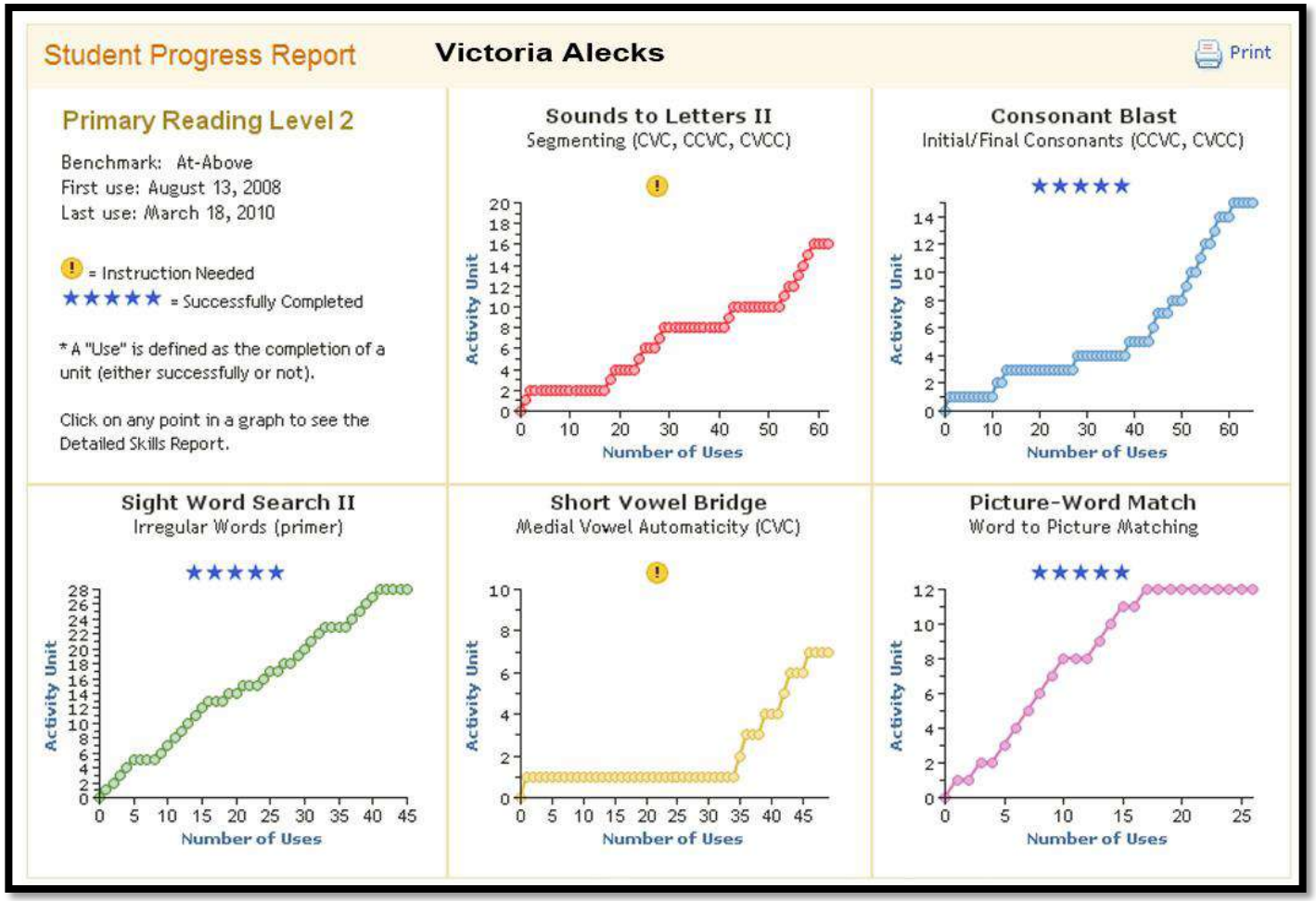
Lexia: Examples





Lexia: Student Data Reports

Lexia organizes data about areas in which the child is succeeding and areas where the child needs more practice, or more specific skill instruction. Teachers have access to this data from children's Lexia work at home and at school.



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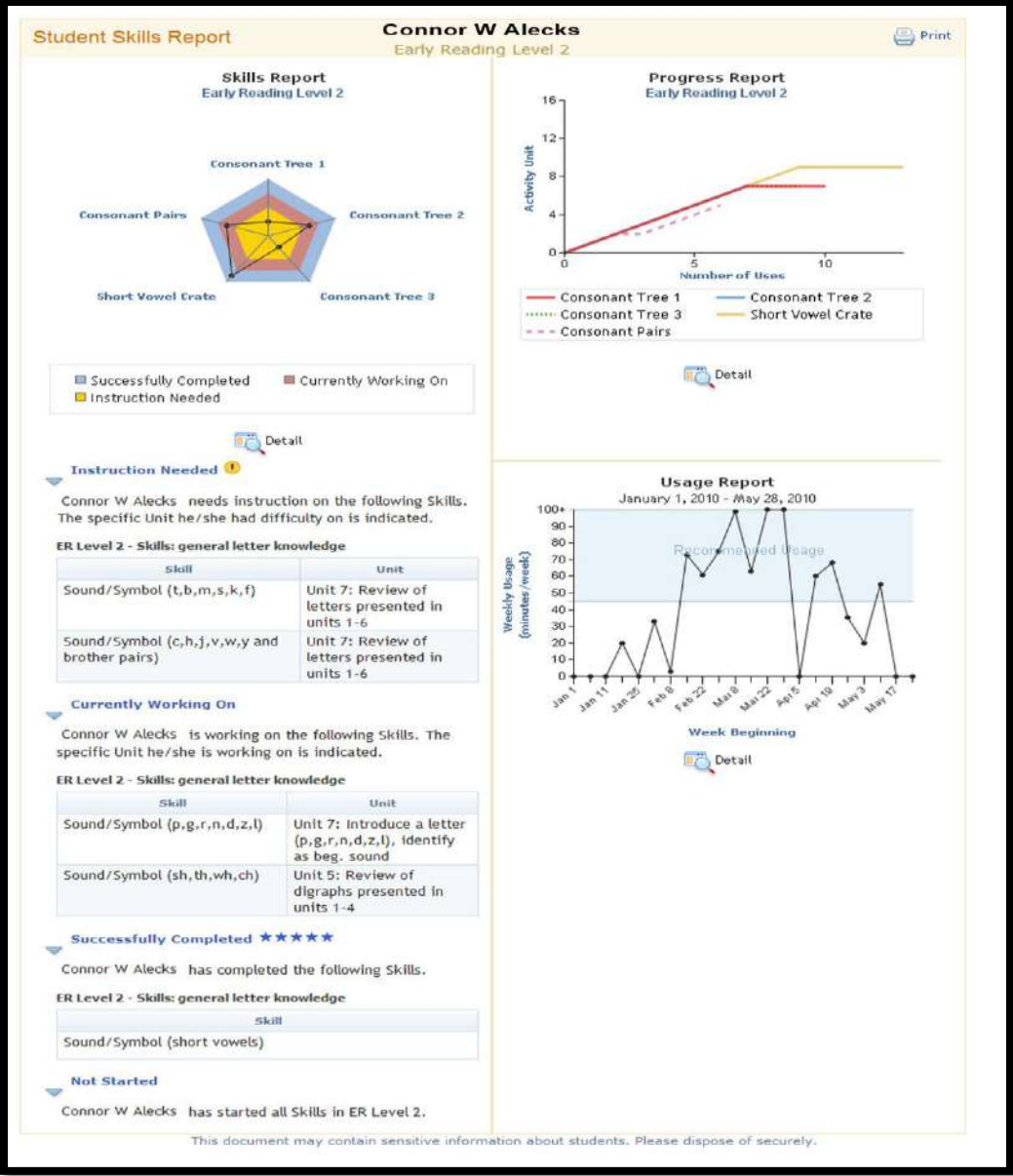


Student Skills Report

Connor W Alecks
Early Reading Level 2

Print

Skills Report
Early Reading Level 2

Consonant Tree 1
Consonant Pairs
Consonant Tree 2
Short Vowel Crate
Consonant Tree 3

Successfully Completed
Currently Working On
Instruction Needed

Detail

Instruction Needed

Connor W Alecks needs instruction on the following Skills. The specific Unit he/she had difficulty on is indicated.

ER Level 2 - Skills: general letter knowledge

Skill	Unit
Sound/Symbol (t,b,m,s,k,f)	Unit 7: Review of letters presented in units 1-6
Sound/Symbol (c,h,j,v,w,y and brother pairs)	Unit 7: Review of letters presented in units 1-6

Currently Working On

Connor W Alecks is working on the following Skills. The specific Unit he/she is working on is indicated.

ER Level 2 - Skills: general letter knowledge

Skill	Unit
Sound/Symbol (p,g,r,n,d,z,l)	Unit 7: Introduce a letter (p,g,r,n,d,z,l), identify as beg. sound
Sound/Symbol (sh,th,wh,ch)	Unit 5: Review of digraphs presented in units 1-4

Successfully Completed ★★★★★

Connor W Alecks has completed the following Skills.

ER Level 2 - Skills: general letter knowledge

Skill
Sound/Symbol (short vowels)

Not Started

Connor W Alecks has started all Skills in ER Level 2.

Progress Report
Early Reading Level 2

Activity Unit
Number of Uses
Consonant Tree 1
Consonant Tree 2
Consonant Tree 3
Short Vowel Crate
Consonant Pairs

Detail

Usage Report
January 1, 2010 - May 28, 2010

Weekly Usage (minutes/week)
Recommended Usage
Week Beginning

Detail

This document may contain sensitive information about students. Please dispose of securely.

Wayland Public Schools
March 9 School Committee Meeting

Technology Spotlight #8
Google Earth

Google Earth

- The foundational task: knowing "where."
- A fundamental skill: knowing how to locate ourselves in relation to other people, places and things.
- Functionally, if not consciously, we all have a spatial map in our brains.
- The brain is constantly activating information and processes we need while deactivating things that would clutter our thoughts.

Google Earth

Some History

- During the Cold War, satellites were first used to view the Earth.
- In the 1980's spy satellites were opened for companies' use.
- The Keyhole Project developed the first satellite maps. Google later became interested in and bought the project. This was the origin of Google Earth.
- Later, other companies' images and information were loaded into this platform.

Google Earth

- Google Earth is a global tool which connects the user to the whole world.
- It can be employed to discover visual patterns in space.
- It is a tool that fosters the analysis and synthesis of visually enhanced information.
- Students can creativity superimpose layers of information and display it all on a map. Options include roads, 3D buildings, cities, oceans, weather, and political borders – to name just a few.
- Google Earth is not web-browsed, so it does not work on Chromebooks. It does work on both PC's and Mac's.

Google Earth

Students can…

- insert videos, pictures, street views, and hyperlinks.
- save and merge files.
- use other software in conjunction with Google Earth. For instance, Quicktime can be used to create a movie of a Google Earth presentation.
- create visually compelling, creative, and informative class projects (Example from history class: project on the European Union, overlaying historic maps)
- upload their projects to Google Earth Community and whole world can see it. Some student projects have been viewed by over 50,000 people.
- find something on Google Earth Community, customize it, and then repost to the Google Earth Community.

Google Earth

Teachers use Google Earth to …

- share projects with other teachers.
- create interdisciplinary lessons.
- show students places they've never seen before. (Example from world languages: showing roots)
- have students create tours and travelogues to places that they have been or would love to be. (Example from Cape Cod and DC trips: students add their own pictures and journals from the trip)

Wayland Public Schools
March 23 School Committee Meeting

Technology Spotlight #9

Computer Science and Programming

Computer Science and Programming

Programming:

- … requires students to think logically, problem-solve, collaborate, and communicate.
- … sits at the intersection of logic and creativity.
- …exemplifies 21st Century Skills.

Computer Science and Programming

- **Exploring Computer Science**: Students develop a deeper understanding of how computer software and hardware work, get experience with electrical engineering concepts and have an introduction to writing code.
- **Computing with Python:** Students learn the fundamentals of writing computer programs, from helpful utility programs to interactive games.
- **Android App Development:** Students learn to write apps for Android mobile devices using the Java language. The class focuses more on creating interesting products than advanced programming techniques.
- **AP Computer Science:** Students learn the fundamentals of writing computer programs with an Object Oriented Design approach, and advance to more sophisticated concepts, enabling the creation of complex programs.

Computer Science and Programming

Arduino (Purchased through a WPSF grant)

- Students learn to engineer a circuit to achieve a set of goals.
- They create circuits with sensors, motors and buttons, and write the code to control them.
- They are given a micro-controller to hook up a series of sensors and output devices (using circuits and wires).
- They program the chip, using software on their computer, to process an input to produce a desired output.

Computer Science and Programming

ServoLEDPointer | Arduino 1.6.0

File Edit Sketch Tools Help

ServoLEDPointer §

```
Servo myServo;

int const ledA = 3; //bottom
int const ledB = 4; //middle
int const ledC = 5; //top

void setup() {
  myServo.attach(9);
  pinMode(ledA, INPUT);
  pinMode(ledB, INPUT);
  pinMode(ledC, INPUT);
  myServo.write(0);
}
void loop() {

  if(digitalRead(ledA) == HIGH){
    myServo.write(60);
  }
  else if(digitalRead(ledB) == HIGH){
    myServo.write(120);
  }
  else if(digitalRead(ledC) == HIGH){
    myServo.write(180);
  }
```

18 Arduino Uno on COM4

ARDUINO

Computer Science and Programming

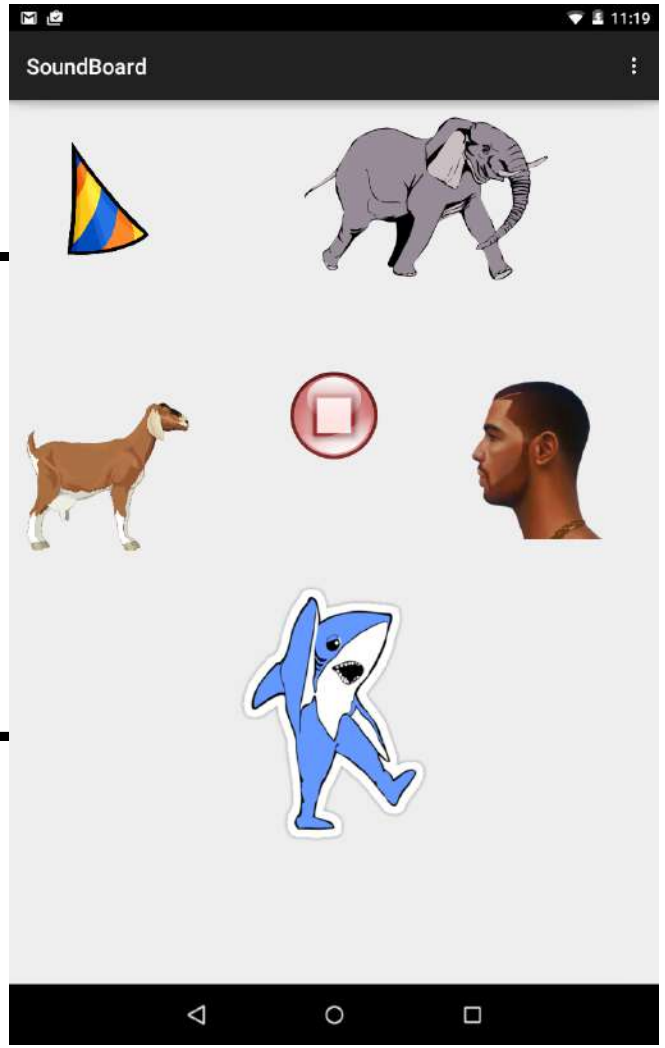
Android

- Students learn to create a variety of programs for Android phones and tablets.
- They utilize features on these devices such as the touch screen, accelerometer, and GPS.
- They employ the JAVA computer language. JAVA, created in 1990, is not machine specific. It is one of the most popular computer languages in the world.
- Students come to understand how basic functions (such as the touch screen) work. This enables them to explore and create.

Computer Science and Programming

ANDROID

```
final ImageView goatPic = (ImageView)findViewById(R.id.goat);
mpGoat = MediaPlayer.create(MainActivity.this, R.raw.screamgoat);
goatPic.setOnTouchListener(new View.OnTouchListener() {
        @Override
        public boolean onTouch(View v, MotionEvent event) {
            if (event.getAction() == MotionEvent.ACTION_DOWN){
                if (sound == true)
                    mpGoat.start();
                return true;
            }
            return false;
        }
 });
```



Computer Science and Programming

AP Class Sample Assignment: Space Invaders

- Students are asked to create a space invaders game AND add something beyond the basics. As the teacher puts it, he asks his student to, “add more awesome.”
- Students grow curious about something they want to accomplish. They will go onto the Internet and find their way. There is a lot of discovery, collaboration and learning that goes beyond the required AP curriculum itself.

(Space Invaders: 3 samples of student work)

Computer Science and Programming

Trends

- The 1:1 initiative accelerated student progress in these courses because they could work on their assignments throughout the school day and not have to stop when class ended.
- 13 years ago, there were 7 students, all boys, in the teacher's first class. Now he teaches 84 students, 34 of whom are girls.

Wayland Public Schools
April 27 School Committee Meeting

Technology Spotlight #10

Symphony Math

Symphony Math

- Is a common core-based independent instructional program which supplements the general curriculum
- Assesses as well as instructs
- Builds skills at a pace that matches each student's needs
- Covers content in Grades K-4
- Is used for practice, extensions, or interventions. (In the upper grades, it is more likely to be used for interventions.)
- Employs visuals, differentiated learning, and instant teacher reports -- all made possible by the technology.

Note: In grades K- 2, students go to a skills lab, which was an outcome of the last set of contract negotiations. Symphony Math and Lexia are two activities done during this lab time.

[Link to Introduction to Symphony Math Video]

Symphony Math: The Underlying Approach

There are six components for each concept covered:

- Manipulatives
- Manipulatives and Symbols
- Symbols (abstract level)
- Auditory
- Story problems (real life problem solving)
- Mastery (which is where fluency is emphasized)

Focuses on conceptual understanding, in contrast to an approach that counts on memorization. Fluency comes after mastery.

(Note: The district has other software, such as Fast Math, which serves as fact practice.)

Symphony Math: Differentiated Learning

- Students progress through tiered stages, or skill levels.
- The program constantly differentiates tasks for each student based on their task performance.
- The program automatically determines when the student needs practice and when her or she should move on to the next concept.
- Students can click on a life preserver tool icon and the program will walk them through a problem that is challenging to them.

Symphony Math:
Sample from Scope and Sequence

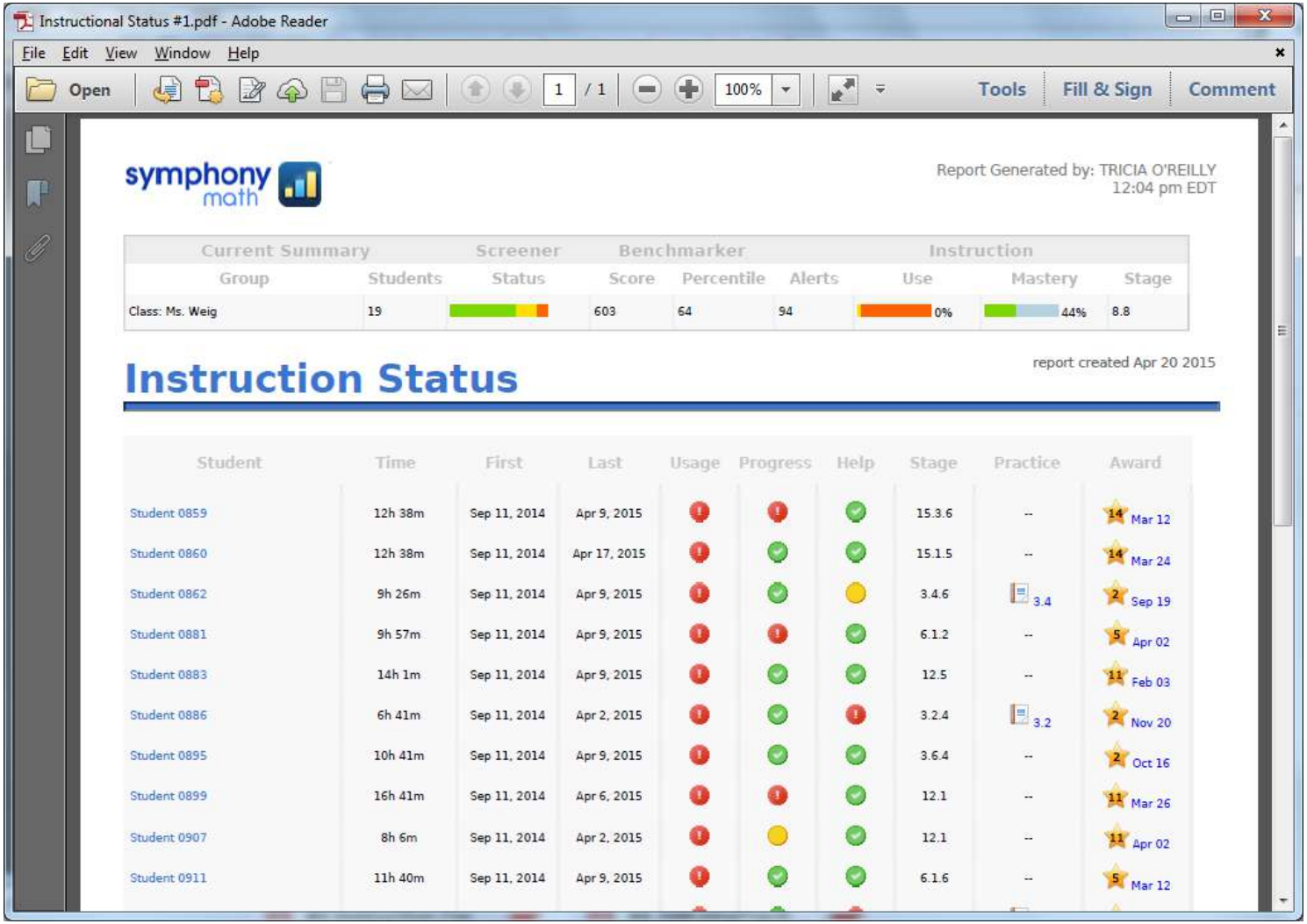
Stage	Concept (Aligned with Common Core Standards)	Example
1.2	Identifying Numbers	Find '3'
1.3	Counting Forward	4,5,6,?
1.4	Counting Backward	7,6,5,?
2	More/Less/Same	Find '1' more than 6.
2.1	Find 'One More'	Find '1' more than 6.
2.2	Find 'One Less'	Find '1' less than 5.
2.3	Find 'More'	Find 'Taller.'
2.4	Find 'Less'	Find 'Less'.
2.5	Same	4 = ?
3	Add & Subtract to 5	3 + 2 = ?
3.1	Beginning Addition: Missing Result	3 + 2 = ?
3.2	Beginning Addition: Missing Change	? + 1 = 5
3.3	Beginning Subtraction: Missing Result	5 – 1 = ?
3.4	Beginning Subtraction: Missing Change	4 – 2 = ?
3.5	Adding 0 and 1	6 + 0 = ?
3.6	Subtracting 0 and 1	7 – 1 = ?
3.7	Commutative Property	7 + 1 = 1 + ?
4	Ten as a Unit	8 + 2 = ?
4.1	Introducing 10	8 + 2 = ?
4.2	Making 10	? + 7 = 10
4.3	10 Plus	10 + 3 = ?
4.4	Subtracting with 10	10 – 4 = ?
5	Comparing Numbers	? = 13
5.1	Equals	? = 13
5.2	Greater Than	8 > ?
5.3	Less Than	8 < ?

Mastery Round Levels, or timed mastery rounds that practice math facts, are activated when students master particular Stages.

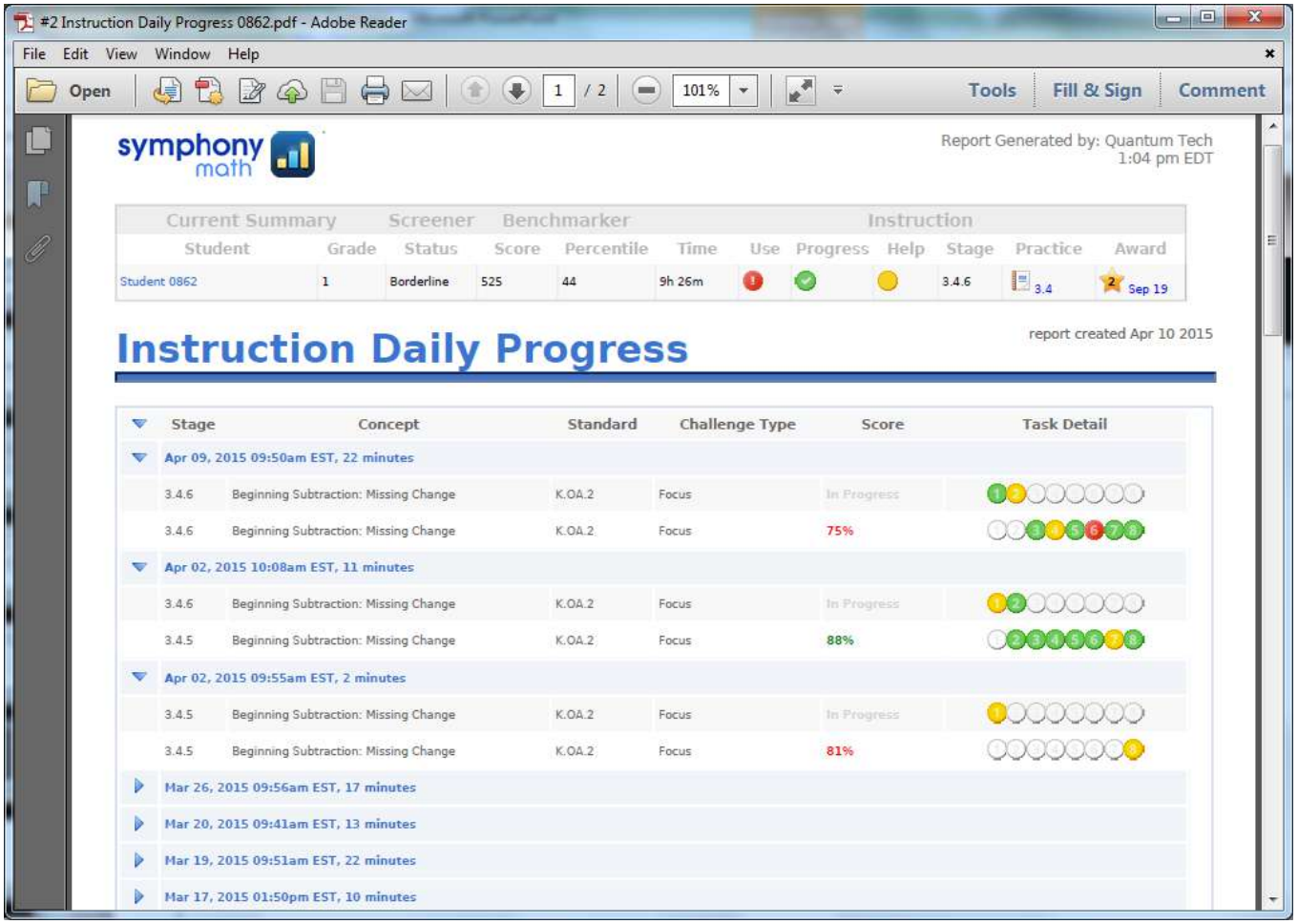
Symphony Math: Assessment

- The program will know if a student needs help by his or her use of the life preserver, by how often a problem is repeated, and by the amount of time spent on the problem.
- The assessment itself differentiates, as the program adjusts the questions based on a student's answer to previous questions.
- The program provides detailed teacher reports on each student and for the whole class.
- Reports can be sent home.
- In addition to ongoing built-in assessment, students are screened and benchmarked three times a year, providing data on growth, as well as whether students are progressing on or above grade level.
- The program will also provide teachers with activities tailored to individual student's skills.

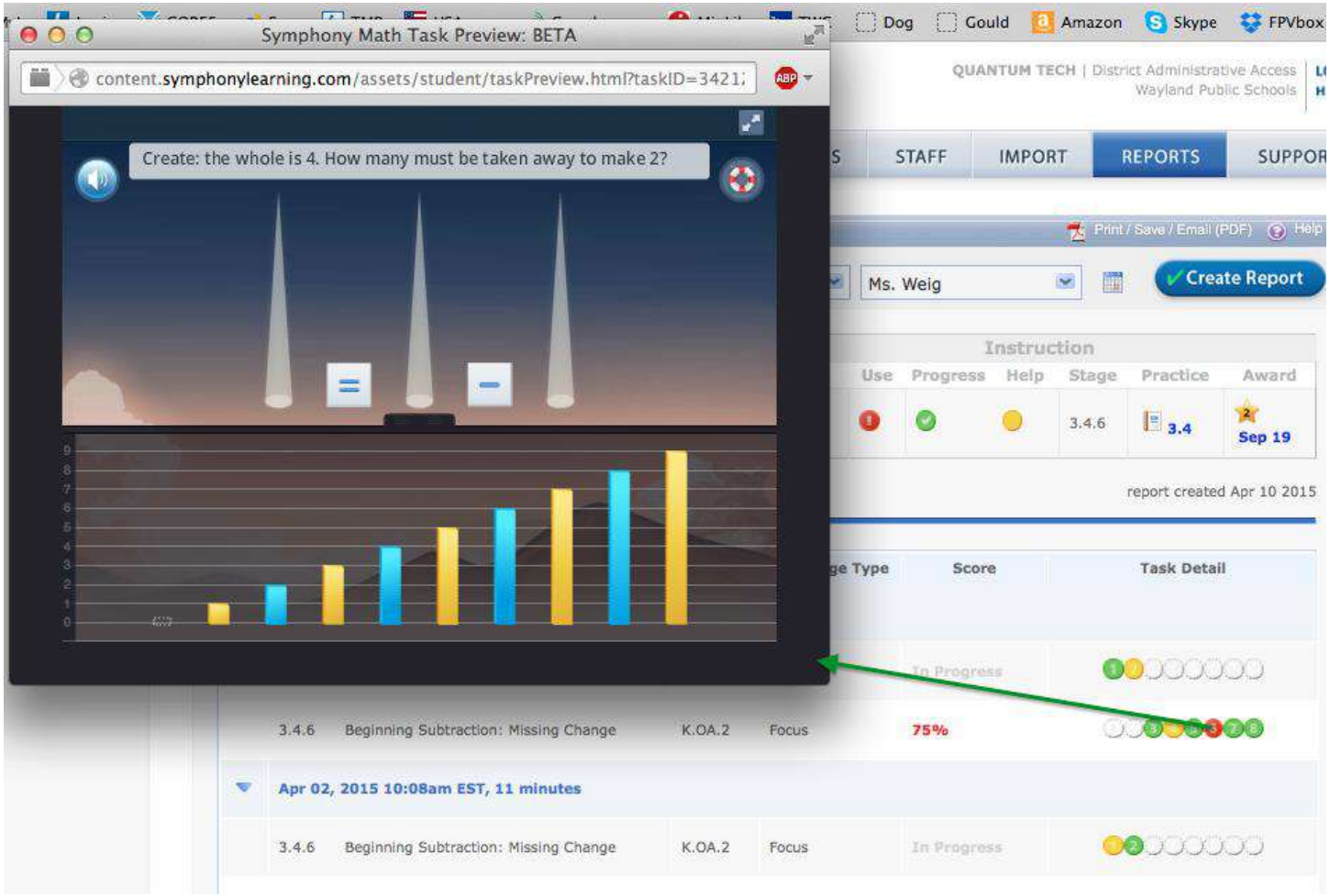
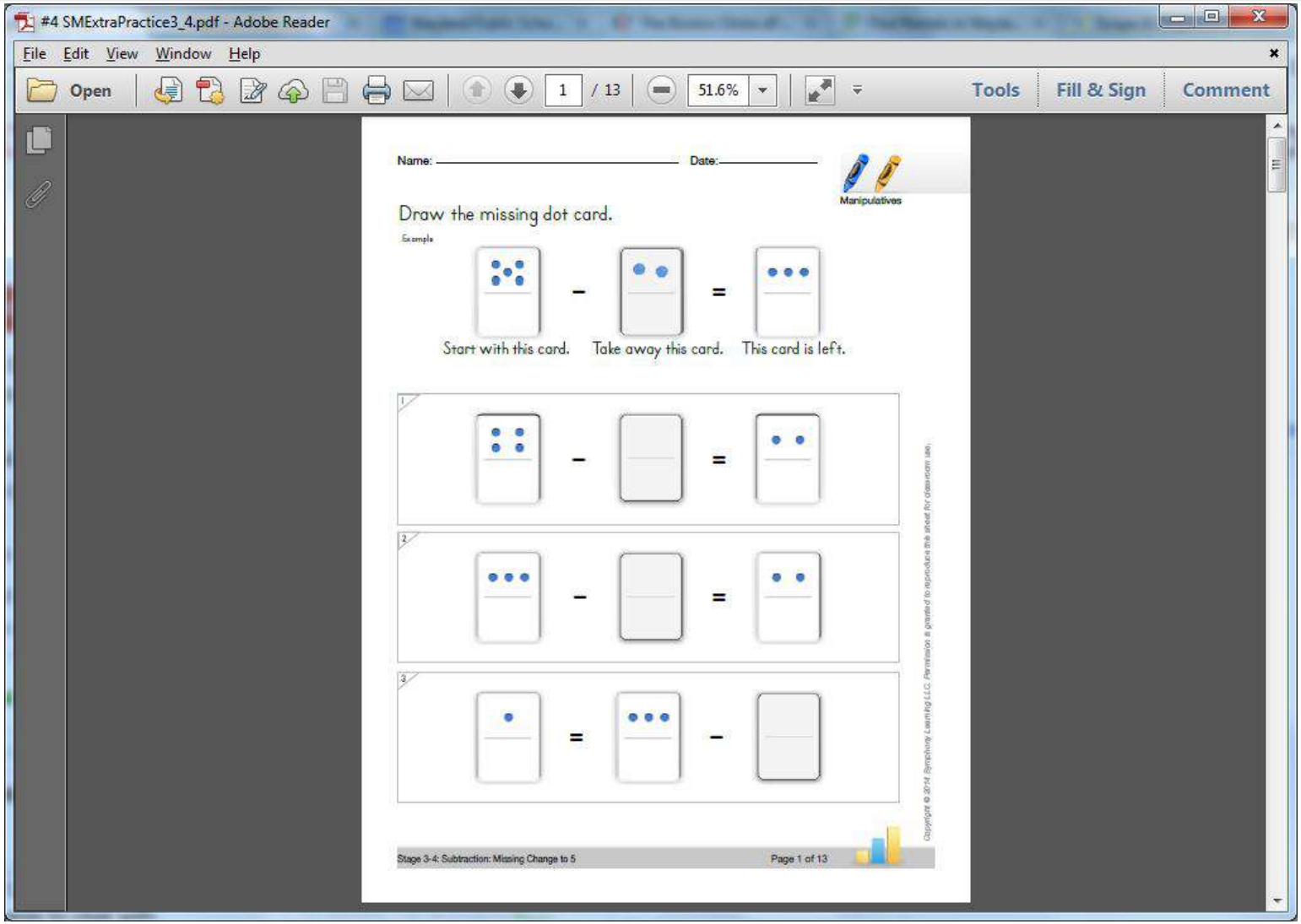
Symphony Math



Symphony Math



Symphony Math



Symphony Math