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South Carolina Department of Education

Using Principles of UX Design to Connect with Elementary Learners



Objectives

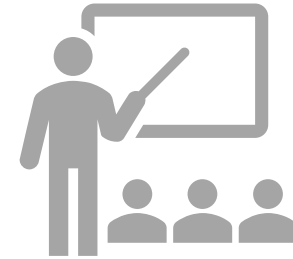
- Connect key characteristics of UX design for younger learners with Quality Matters Standards
- Demonstrate instructional materials that are aligned to these characteristics
- Share templates that guided Subject Matter Experts in meeting these principles



The Grant: Rethinking K-12 Education Models



Quality online resources for K-3 students, including full courses



Available to:

Educators in the SC Instruction Hub as full courses or components

Students and Parents via public page (modules)

The Goal: Modular,
(Mostly)
Asynchronous,
Elementary Courses

SUBJECTS: MATH AND
SOCIAL STUDIES

FORMAT: INDEPENDENT,
ASYNCHRONOUS LESSONS

GRADE LEVEL: 2ND AND
3RD GRADE

Quality standards: "Front End Design"

Quality Matters Standard(s)

Focus

- | | |
|--|------------------------------------|
| <ul style="list-style-type: none">• 8.1 T Course navigation is logical, consistent, efficient, and intuitive.• 8.2 C The course design facilitates readability. | USABLE |
| <ul style="list-style-type: none">• 6.2 T Course tools facilitate student engagement and promote active learning | ENGAGING DESIGN |
| <ul style="list-style-type: none">• 3.3: Assessment strategies provide learners with opportunities to reflect on their progress towards meeting course requirements and mastering learning objectives or competencies. | EFFECTIVE QUESTIONING AND FEEDBACK |

Guidance: UX Design for Kids

- *Children's UX: Usability issues in designing for young people.* (n.d.). Nielsen Norman Group. <https://www.nngroup.com/articles/childrens-websites-usability-issues/>
- *Designing for kids: Cognitive considerations.* (n.d.). Nielsen Norman Group. <https://www.nngroup.com/articles/kids-cognition/> Gelman, D. L. (2014). *Design for kids: Digital Products for playing and learning.* Rosenfeld Media.
- Gelman, D. L. (2014). *Design for kids: Digital Products for playing and learning.* Rosenfeld Media.
- Gelman, D. L., Brosset, P., Prater, S. V., Wills, M., PenzeyMoog, E., & Greenwood, T. (2011, August 9). *Designing fun.* A List Apart. Retrieved February 3, 2022, from <https://alistapart.com/article/designing-fun/>
- Molnár, D. (2021, January 11). *A UX guide to the child's mind.* UX Studio. Retrieved February 3, 2022, from <https://uxstudioteam.com/ux-blog/design-for-kids/>

What We Learned: Navigation (8.1)

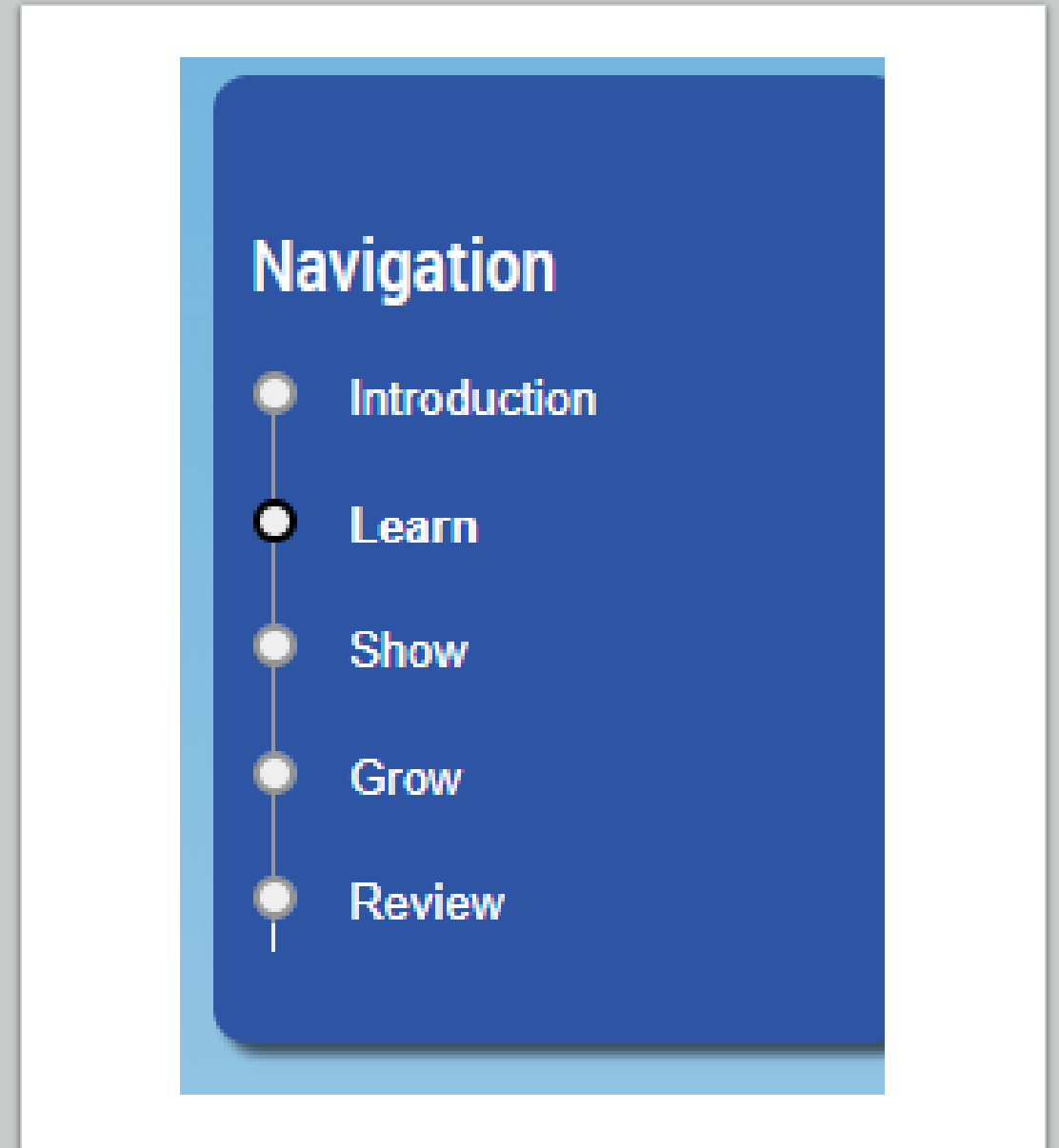


Make navigation a clear journey

What We Designed: Navigation

Predictable Lesson Structure:
Underlying Structure

1. Consistent lesson structure
2. Transition statements
3. Repeated iconography



Navigation

- Introduction
- Learn 1: Using an Alphanumeric Grid
- Learn 2: Using an Alphanumeric Grid on a World Map
- Show
- Grow
- Review

Learn 1: Using an Alphanumeric Grid



Sal will explore the Riverbanks Zoo in Columbia, South Carolina. You can use **alphanumeric grids** to communicate where certain landmarks are on maps. Use the zoo map below to find different things to see at the zoo.



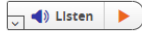
Directions: Click the **Play** button to watch the video and learn how to use an **alphanumeric** grid.



Navigation

- Skill Review
- Introduction
- Learn
- Practice
- Show: Level 1 ←
- Grow
- Review

Show: Level 1



Sal is busy adding a variety of songs to different playlists. You can help Sal by determining how many songs were added each day in the practice problem below!

Directions: Use what you know about rounding to solve the problems below.

On Monday Sal adds 765 songs to a playlist. About how many songs did Sal add this day?



About how many songs did Sal add on Monday?

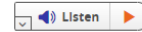
- 700
- 720
- 800

SUBMIT

Navigation

- Skill Review
- Introduction
- Learn
- Practice
- Show: Level 1
- Grow ←
- Review

Grow



You and Sal should know that growing is all a part of learning. As you continue “rounding” your way through this lesson, the two of you will work together to solve some real-world problems, you know those problems in the real world where you put your math skills to work.

What are some ways you might use rounding?

SUBMIT

Directions: Match each number to the hundred number it rounds to.

Exact Number	Rounded Number	Choices
342	<input type="text"/>	900
456	<input type="text"/>	200
897	<input type="text"/>	300
227	<input type="text"/>	400
387	<input type="text"/>	500

Navigation

- Skill Review
- Introduction
- Learn
- Practice
- Show: Level 1
- Grow
- Review ←

Review



Hooray! You and your teammate Sal have made it to the end of this lesson!

Directions: Click each vocabulary word to view the definition.

- + Rounding
- + Estimate

Directions: Sort each number by the hundred number it rounds to.

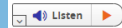
700	900	800	Choices
			718
			764
			914
			678
			865
			781
			653
			908
			811

Math

Navigation

- Skill Review ←
- Introduction
- Learn
- Practice
- Show: Level 1
- Grow
- Review

Skill Review



Before you get started with this lesson, you will complete a short Skill Review. When completing this activity, you should think about where the number is close to falling or landing based on the range of the number pairs.

Directions: Match each number to the hundreds place it falls between.

Hundreds Range	Number	Choices
100 to 200	<input type="text"/>	567
200 to 300	<input type="text"/>	259
300 to 400	<input type="text"/>	660
400 to 500	<input type="text"/>	123
500 to 600	<input type="text"/>	440

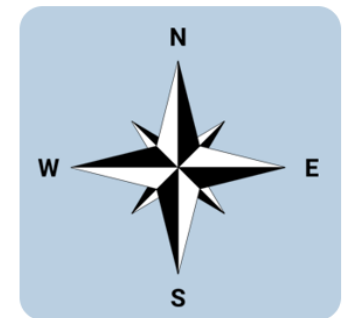
Social Studies

Navigation

- Introduction
- Learn 1: Where is South Carolina on the Map?
- Learn 2: Map Features ←
- Show
- Grow
- Review

Learn 2: Map Features

Reading a **map** is a special skill. Before you and Sal can use a map to travel the world, you will need to learn how to use one. Use the map below to learn about important **map features**.



The Compass Rose

Navigation

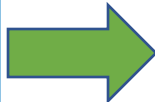
- Skill Review
- Introduction
- Learn
- Practice
- Show: Level 1
- Show: Level 2
- Grow
- Review

2.2 Lesson: Rounding Numbers to the Nearest 100

[A-Z View Glossary](#)

Introduction

Listen



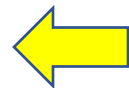
In today's lesson, you and your friend Sal will learn how to use place value in order to round whole numbers to the nearest 100.

You and Sal are going to be pros at using place value to round whole numbers to the nearest 100.

Directions: Click each vocabulary word to view the definition.

- + Rounding
- + Estimate

Remember that you should pay close attention to the number in the hundreds place.



Navigation

- Introduction
- Learn 1: Using an Alphanumeric Grid
- Learn 2: Using an Alphanumeric Grid on a World Map
- Show
- Grow
- Review

1.3 Lesson: The Grid

[A-Z View Glossary](#)

Introduction

Listen

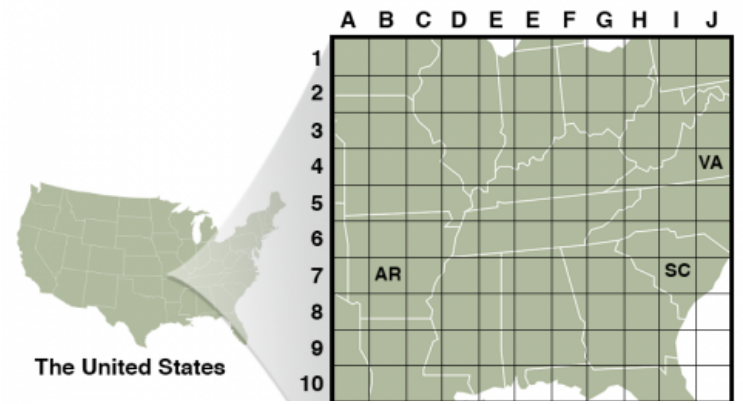
Your friend, Sal the Salamander, has been looking for Bobby the Bear. There is a map that uses an **alphanumeric grid** to quickly locate specific places. How could this map help you find your way around?



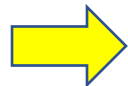
Vocabulary Words

Directions: Click the tab to learn more.

- + Alphanumeric Grid



Sal is ready to learn more about maps! Time to get started!



SME Template with Transition Statements

Learn 1

Transition to next section-

Learn 2

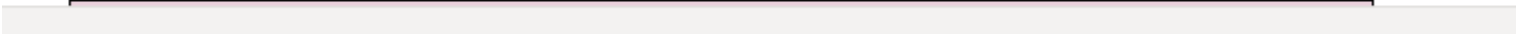
Transition to next section-

Show

Transition to next section-

Grow

Transition to next section-



What We Learned: (Readability 8.2)



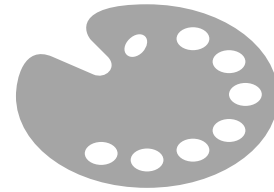
Avoid cognitive overload

Avoid long paragraphs and instructions

Minimize distractions

Provide content in multiple formats

Limit Lesson Length



Make content readable

Use bigger fonts and readable texts

Use bold colors and background textures

Text Chunking

You have learned different strategies to multiply and divide. Some strategies are using equal groups, arrays, and number lines. In this lesson, you will use these strategies to solve real-world problems.

People moving from one place to another to live is called human migration. People migrate for many reasons. If a lot of people move into or away from an area at the same time, it can impact everyone in the community. Can you think of ways this could impact a community? Watch the video to learn the positive and negative effects of people moving to and from an area.

[Watch the video: Positive and Negative Effects of Migration](#)

Content in Different Ways

People moving from one place to another to live is called human migration. People migrate for many reasons. If a lot of people move into or away from an area at the same time, it can impact everyone in the community. Can you think of ways this could impact a community? Watch the video to learn the positive and negative effects of people moving to and from an area.



People Migrating

▶ Directions: Click play to view the video.



What is the largest number you know? One million? One billion? You can write these numbers in many ways. One way is standard form. In this lesson, you are going to read and write numbers in standard form.

▶ Directions: Watch the video to learn more about standard form.



Readable Content

- Themed colors
- Larger, rounder, sans serif fonts
- Predictable elements on pages
- No out-linking (limit distractions)

The screenshot shows a user interface for the 'Elementary Test Course' on the VirtualSC platform. On the left, a blue navigation sidebar lists 'Introduction', 'Learn' (the active page), 'Show', 'Grow', and 'Review', with a '+ Add New Page' button at the bottom. The main content area has a white background with a blue header bar containing the 'VirtualSC' logo and the text 'Elementary Test Course'. Below the header, the page title is 'Elementary Theme' with a 'View Glossary' link. A 'Learn' section is followed by a 'Listen' button. A welcome message reads: 'Welcome to our Test Course! Our team is excited to show you what we have built so far!'. Below this is a 'Directions' section with a list icon and the text 'Type your answer to the question below.' A text input field contains the question: 'What do you think is most important about designing courses for elementary students?'. A blue 'SUBMIT' button is positioned below the input field. A green checkmark icon and the text 'Good work! Move on to the show section.' are displayed. At the bottom, there is a back arrow icon next to the text 'Introduction' and a 'Show' button with a right arrow icon. A footer note at the bottom of the page reads: 'Original content by VirtualSC unless otherwise noted, 2021. [CC BY-NC-SA 4.0 (opens in a new window)]'.

Readability Guidance for SMEs

Lesson Content/Questions

Content (Learn, Practice*, Show, Grow)

*Practice section may not be needed for all subjects

- Connect the learning content with a real-life scenario
- Focus on answering the ULQs and practicing the appropriate skills in the ULOs
- Develop lesson based on the Unit Plan (content and skills)
- **Chunk and order content in a way that helps learners progress through the lesson (Do not exceed text chunks that are more than 5 sentences)**
- Label each of the lesson chunks: Learn 1, Learn 2, Show, Grow.
- Focus on the topic of the Learn section (Learn 1 & Learn 2)
- Continue building a narrative from Sal's perspective for each chunk of content
- Present Sal's story in only the Introduction and show sections
- Make sure not to use pronouns to describe Sal
- **Narration, Headings, and transitions follow the guidelines of the [Narration, Instructional Text and Feedback Guidelines](#)**
- **Write student-friendly content and scaffolded questions at the level of the target student audience**
- **Use a text complexity analyzer to check for appropriate reading level**
- Include image, content, or video script/description
- Provide opportunities for active learning through different types of interactions (according to UDL principles) (e.g., text, audio, video, or animations)
- **Guide students from one page to the next with appropriate transitions**
- Create content that is culturally diverse and presented without bias, including names, images, and illustrations
- Add self-check question(s) for each chunk of content or topic

What we
Learned:
**Engagement for
6-8 year-olds
(6.2)**

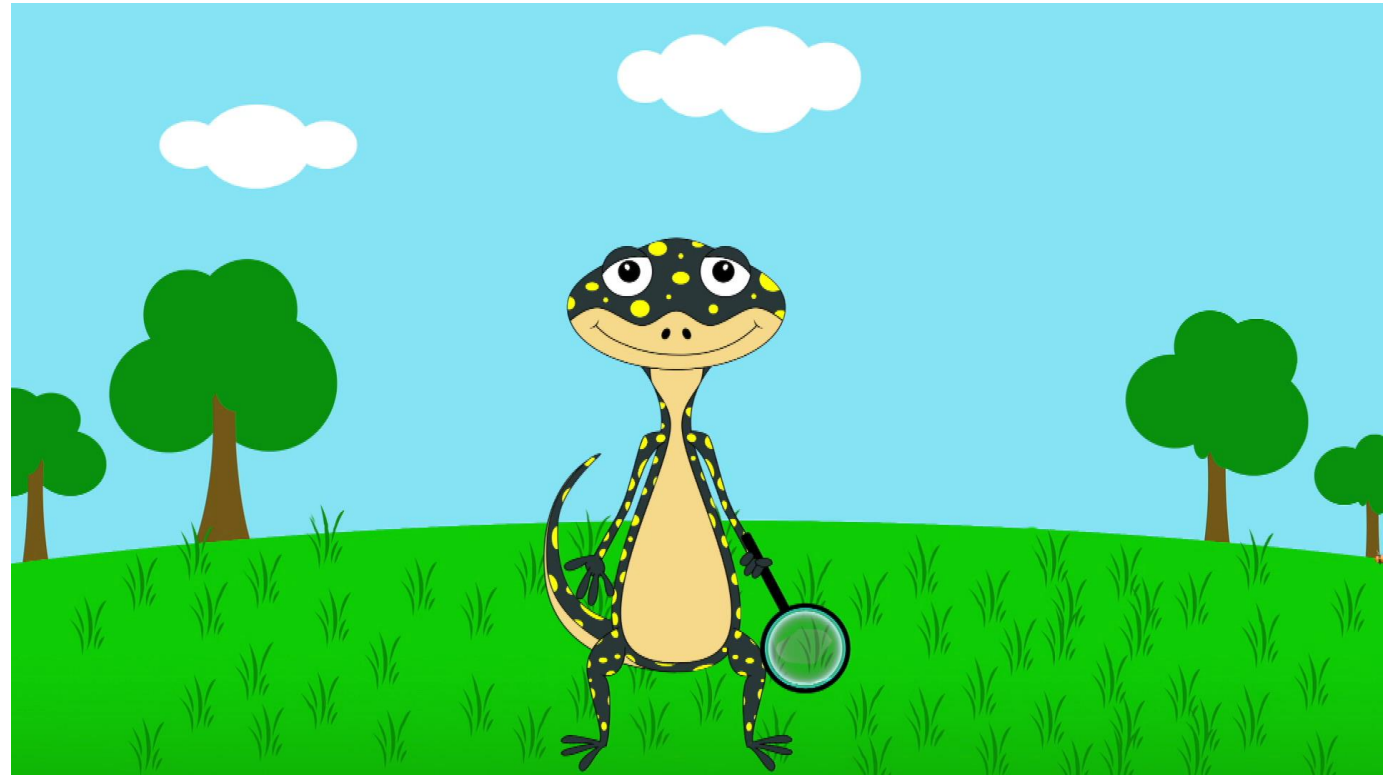
Used to exploring, wondering, and discovering new things.

Expect animations and sounds in lessons and activities.

Understand through stories. "Thinking in terms of a whole story helps children unfold the plot and assimilate to behavior patterns."

Focus on self-expression instead of social interaction.

Introducing Sal, the Salamander





Sal baked some cakes. Take a look at the array of cakes below.



Directions: Use the array of cakes to answer the questions below.

Which repeated addition problem matches the array of cakes?

- $3 + 3 + 3$
- $6 + 6 + 6$
- $18 + 18 + 18$
- $9 + 9$

SUBMIT

Solve. $3 \times 6 =$

Sal has 8 cupcakes. Sal has four plates. Sal needs even groups of cupcakes on each plate. How many cupcakes will Sal set on each plate to divide the cupcakes evenly?




Directions: Drag and drop each cupcake to create 4 equal groups. Try as many times as you need.

Check


Reuse Embed H-P

See Sal in
Action: **Math**

 **Directions:** Select play to learn about factors and products.

$$2 \times 8 = 16$$



 **Directions:** Play the video to see how Sal uses a measurement model

Measurement Model

$$12 \div 3 = 4$$

Dividend

Divisor

How many times can this number be split evenly?

How many are in each group?



YOU ARE ONE SMART COOKIE!

$$12 - 3 = 9$$

$$9 - 3 = 6$$





Directions: Use the map below to learn about important map features. Click on each cross to learn more about the **Legend** and the **Compass Rose**.



Legend

A legend tells you what the symbols on a map mean. The star on this map indicates the state capital.

1.1 Lesson: Exploring Maps ^{A-Z} [View Glossary](#)

Learn 1: Where is South Carolina on the Map?

Before the adventure can begin, it is necessary to understand where Sal is in the world. Sal is from Columbia, South Carolina.



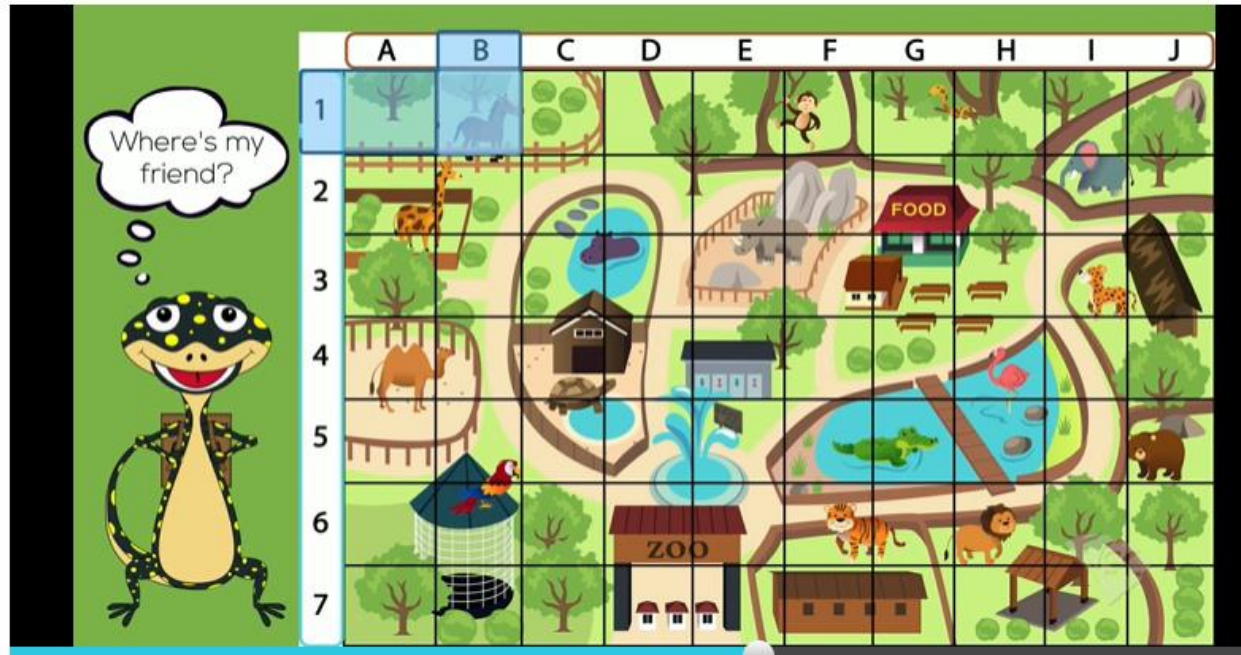
South Carolina on the United States Map

See Sal in
Action: **Social
Studies**

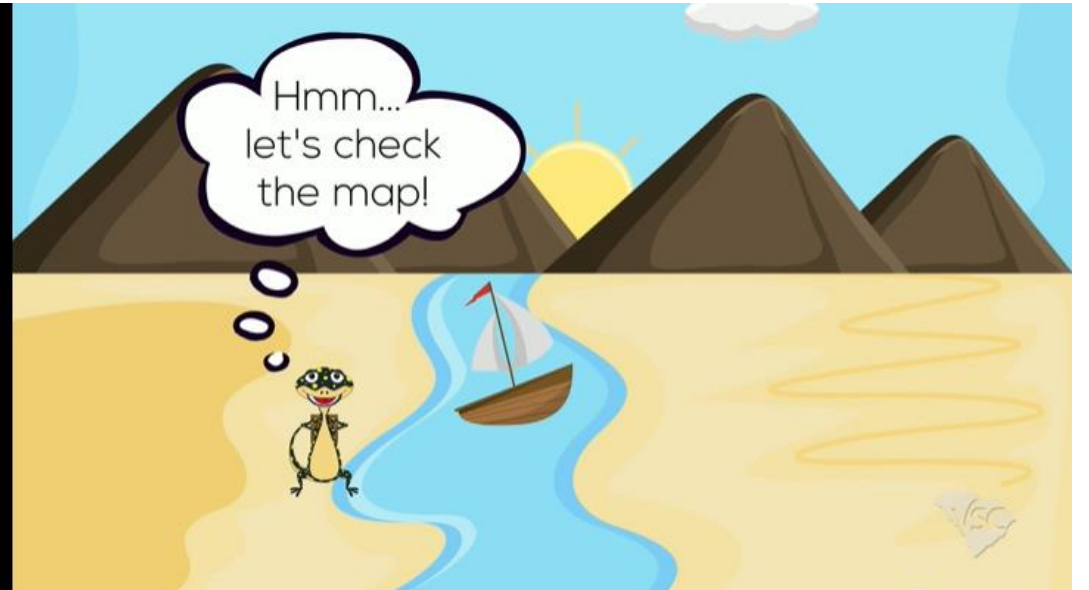
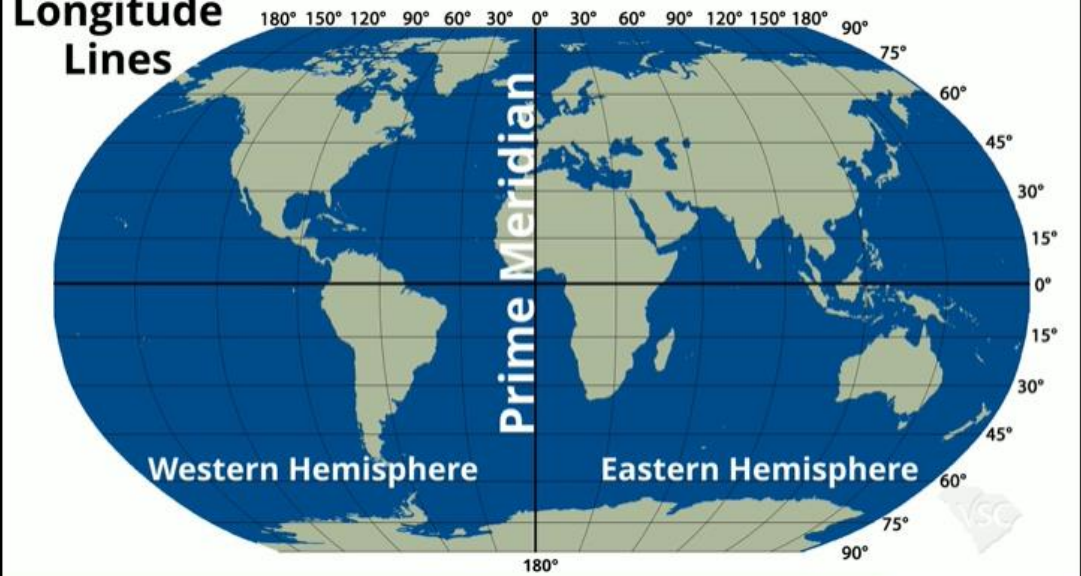
Click the **Play** button on the video to learn where Columbia, South Carolina is on a map.



Directions: Click the **Play** button to watch the video and learn how to use an **alphanumeric grid**.



Longitude Lines



Other Opportunities for Engagement



That video showed how to use a world map to learn about planet Earth. Describe a time when you have either used a map or seen a map being used.

SUBMIT

Did you know?

Mount Everest is almost **60 million** years old! Do you know anything else that might be that old?



Sal has become a ringmaster! This means Sal is the leader of a circus! Sal's first order of business as a ringmaster is to make sure all the circus animals are fed. In this lesson, you will help Sal feed the circus animals by learning how to add numbers up to 1,000 using place value and properties of addition.

What kinds of animals would you like to see at a circus?

SUBMIT



Did you know wild elephants will eat as many as 200 plant species during a year, but their favorite staple food is grass and bamboo?

Engagement Guidance for SMEs

Framing/Introduction

- Introduce the learning objective by creating a narrative for Sal
- Ask students a question to hook them into the narrative.
- Provide an image that relates to the content.
- Include an activity to try the concept
- Include key words that the student will see throughout the lesson.
- Provide a transition to the next topic, motivating the student to move forward with his learning journey.

Lesson Page 1: Learn: Topic (I do)

- Provide content information specific to learning the objective.
- Create a story that spans the entire lesson (*i.e., Sal will begin learning how/about... (estimating, estimating is...)*)
- Provide images, videos, or other multimedia objects that align to the topic/objective
- Ask 1 review/reinforcement questions with steps (Indicate [Coursearc](#) or [H5P](#) question type) that are like the video
- Provide a transition to the next topic, motivating the student to move forward with his learning journey.

*If video/images are difficult to find provide a quick script and description for a video to be created.

What We Learned: Assessment, Feedback and Reflection (3.3)



Instant feedback



"Failure" as teachable moments



Transparent and self-explanatory interface




Reference existing knowledge

Instant Feedback



• Array 2

• Array 3

 **Directions:** Solve and select the correct answer.

Which of the arrays that Sal made has 2 rows with 6 muffins in each?

- Array 1
- Array 2
- Array 3

SUBMIT

0 / 1 points

Which multiplication sentence matches the correct array of muffins?

$2 \times 5 = 10$ **Incorrect**

$2 \times 6 = 12$

$2 \times 4 = 8$

$6 \times 3 = 18$

Think about 2 rows with 6 in each row. Count the muffins to find the total.

SUBMIT **TRY AGAIN**

"Think about 2 rows with 6 in each row. Count the muffins to find the total."

0 / 1 points

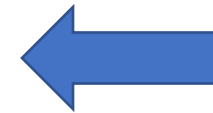
Think about animals in the Tundra such as a polar bear.
What is one way these animals stay warm?

Having thick fur or layers of fat

Hiding from other animals **Incorrect**

Swimming in the cold water

Oops! Think about something an animal has to keep them warm in the cold.



"Oops! Think about something an animal has to keep them warm in the cold."

SUBMIT

TRY AGAIN

Did you know?

An ecologist is someone who studies how plants and animals interact with their environment? Would you want that job?



Get ready to move to the review page.

0 / 1 points

Solve the equation. $89 + 874 =$ _____

874

963

964

Incorrect

953

Make sure you have added each place correctly and regrouped correctly. Try again.

SUBMIT

TRY AGAIN

Check

Remember the estimation you made before solving the equation? Review your estimation and explain why your answer is or is not reasonable.

SUBMIT



Continue to the next page to show what you have learned about adding numbers using place value.

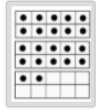


"Make sure you have added each place correctly and regrouped correctly. Try again."



Directions: Drag each number representation to the number it represents in standard form.

5



864

$300 + 10 + 1$

311



14



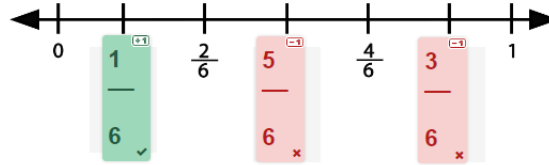
22

eight hundred sixty four

Check



Directions: Which fractions are missing on the number line? Drag each fraction to the correct place on the number line.



0/3 ? Retry

Reuse Embed

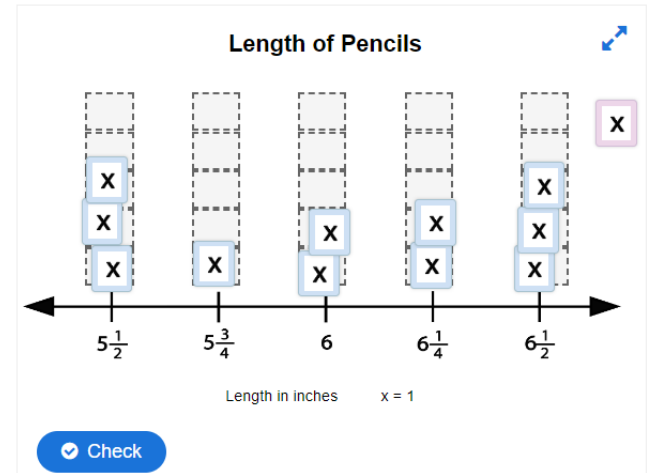
H-P

Length of Pencils

$5 \frac{3}{4}$	6	$6 \frac{1}{4}$	6	$5 \frac{3}{4}$
$6 \frac{1}{2}$	$6 \frac{1}{4}$	$5 \frac{1}{2}$	$5 \frac{3}{4}$	6
$6 \frac{1}{4}$	6	6	$6 \frac{1}{2}$	$6 \frac{1}{4}$



Directions: Complete the line plot below using the measurements of pencils from the table above. Drag the X's onto the line plot.



Failure as Teachable Moments

◀ QUESTION 2 OF 6 ▶
 Librarian- A librarian connects people to resources in their community.





Service

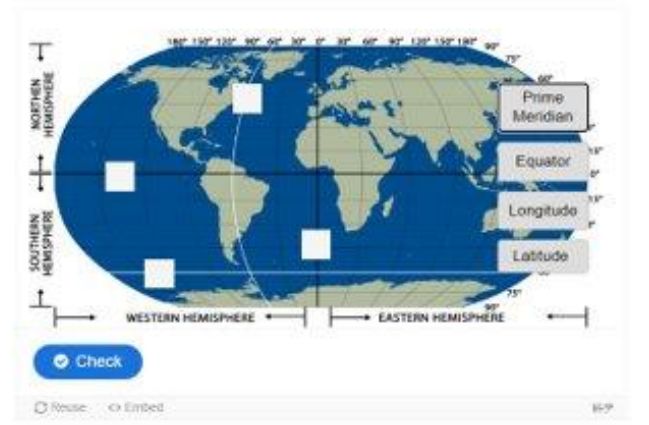
Agriculture

Industry

Choices:



Description	Your Answer
Sal is planning a trip to the beach. Sal needs to travel on an interstate. Which map would show which interstate to travel?	
Sal wants to know which county the state capital is in. Which map would show the counties?	
Sal wants to visit the mountains. Which physical map would show which region to go to?	
Sal wants to go white water rafting. Which map would show where to go?	



Self-Check

I can build line plots out of measurements and interpret the data plotted on them.

- Yes!
- Not sure.
- Still need help.

Type the answer choice that best describes how you feel.

Still need help



SUBMIT

Nice work! If you still have questions be sure to talk to your teacher.

Self-Check

How do you feel about climates across the Earth?

- Confident
- Not sure
- I need more practice

Type the answer choice that best describes how you feel.

I need more practice



SUBMIT

Keep working hard! If you feel that you need more practice, go back and review the lesson.

Winter Coat

Mittens

Incorrect

Sunscreen

Oops! What item can help Sal in a hot, dry climate? Try again.

0 / 1 points

In which climate could this photo have been taken?

- Tropical
- Dry
- Temperate
- Continental
- Polar

Incorrect

Not quite! Did you think about the climate in this picture? Try again.

SUBMIT

TRY AGAIN

1 / 1 points

In which climate could this photo have been taken?

- Tropical
- Dry
- Temperate
- Continental
- Polar

Correct!

Great job! You showed you can identify the correct climate.

SUBMIT

TRY AGAIN



0 / 1 points

In which climate could this photo have been taken?

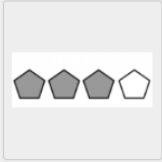
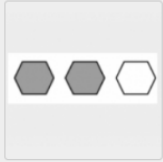
- Tropical
- Dry
- Temperate
- Continental
- Polar

SUBMIT

TRY AGAIN

Transparent and Self-Explanatory Interface

Choices:



Description	Your Answer
$2/3$	
$3/8$	
$3/4$	
$5/6$	

CHECK LATEST MOVE RESET

Choices:

Description	Your Answer
$2/3$	
$3/8$	
$3/4$	
$5/6$	

CHECK LATEST MOVE CHECK WHOLE QUESTION RESET

Choices:

Description	Your Answer
$2/3$	
$3/8$	
$3/4$	
$5/6$	

CHECK LATEST MOVE CHECK WHOLE QUESTION RESET

✗ Incorrect. The following answers are incorrect:

- $2/3$
- $3/4$



A cartoon map of France



Directions: Use the text box to answer the following question.

Can you think of a time when you traveled to a new place? What did you notice about the food or language there?

SUBMIT



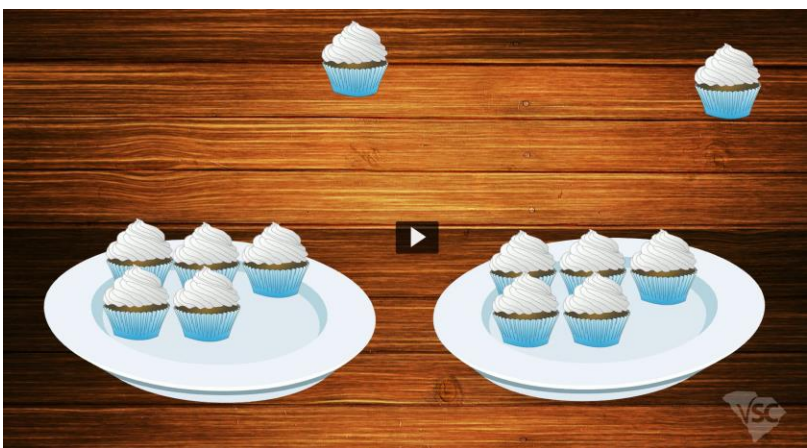
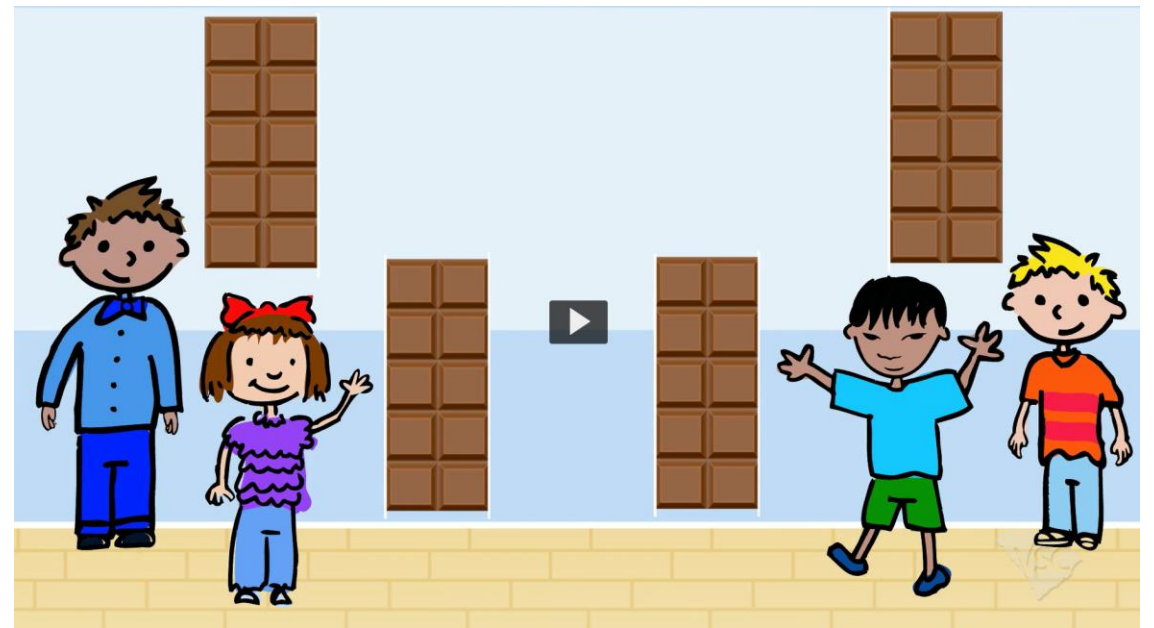
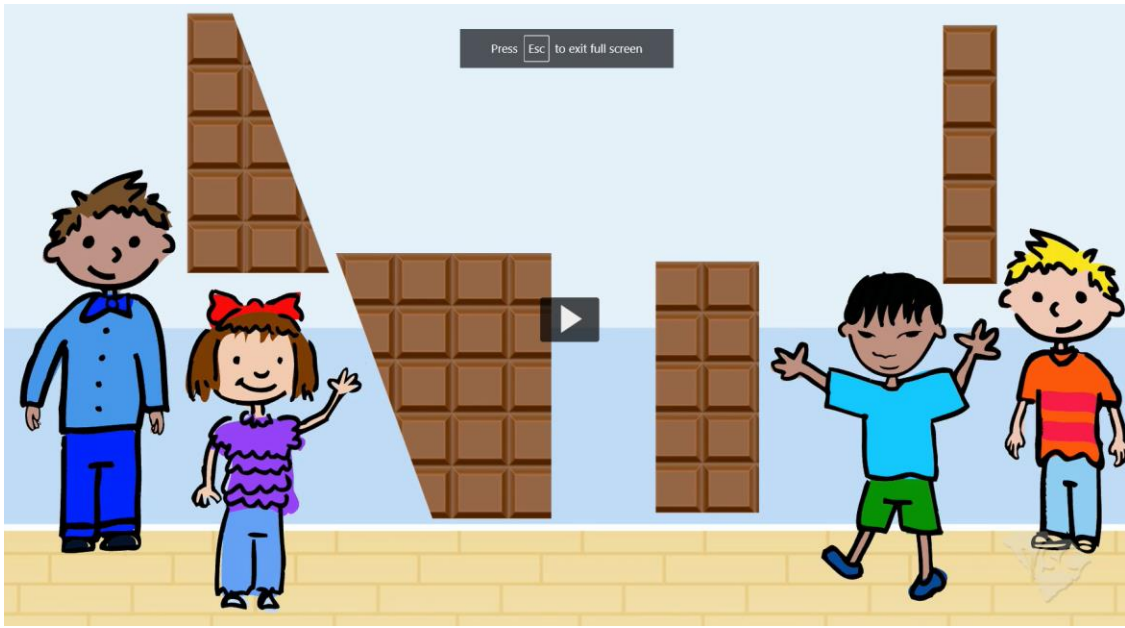
Directions: Match the French cultural characteristic to the correct category.

Category	French Cultural Characteristics	Choices
Food	<input type="text"/>	French
Holiday	<input type="text"/>	Cheese
Religion	<input type="text"/>	Christmas
Language	<input type="text"/>	Christianity



Alternative Activity

Referencing Existing Knowledge



Engagement Guidance for SMEs

Lesson Page 1: Learn: Topic (I do)

- Provide content information specific to learning the objective.
- Create a story that spans the entire lesson (*i.e.*, *Sal will begin learning how/about... (estimating, estimating is...)*)
- Provide images, videos, or other multimedia objects that align to the topic/objective
- Ask 1 review/reinforcement questions with steps (Indicate [Coursearc](#) or [H5P](#) question type) that are like the video
- Provide a transition to the next topic, motivating the student to move forward with his learning journey.

*If video/images are difficult to find provide a quick script and description for a video to be created.

Lesson Page 2: Practice (We Do)

- Incorporate guided step by step practice exercises.
- Include 2-3 guided practice problems and supporting learning objects (images, video, etc.)
 - Indicate [Coursearc](#) or [H5P](#) question type
 - Provide the correct answer in blue
 - Provide specific feedback for correct and incorrect answers.
- Provide a 2-3 sentence word of encouragement for transition into the next page.

*This page should act as a scaffold before students complete practice problems independently

*Make sure to highlight or address any common misconceptions that come with the skill

Progress

- 3rd Grade Social Studies: Complete and under revision
- 3rd Grade Math: Completed and packaged
- 2nd Grade Math and Social Studies: under construction
- Over 50 tutorial videos created

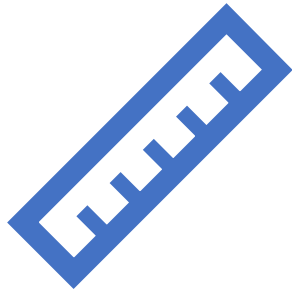


Lessons Learned

- Narrative elements add complexity!
 - Balancing narrative, connections, and alignment is difficult
- Shorter is harder than longer!
- Tight templates and scripting guidelines are very helpful



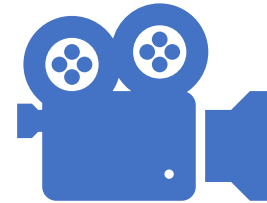
Take a look!



[3rd Grade Math](#)



[3rd Grade Social Studies
sample lesson](#)



[VirtualSC Public Video
Portal](#)



Thank you!
