Contents

Focus: Numbers in Base 10

2nd Grade

Overview of Education Closet and Susan Riley

EDUCATION CLOSET

EducationCloset.com is an online professional resource for K-12 educators interested in Art Integration and STEAM. The popular site receives over 100,000 visitors each month and is an internationally-respected authority in the integrated approach. The website offers free daily articles, lesson plans, video and podcast series, online classes, and conferences, as well as several digital publications all dedicated to helping educators use the Art Integration and STEAM approaches.

SUSAN RILEY

Susan Riley is the founder and CEO of Education Closet and is an internationally-recognized art integration and STEAM Specialist. Susan focuses on teacher professional development in art integration, integrating 21st century standards, 21st century learning skills, and STEAM. She is a sought-after speaker, consultant, and advisor for organizations and institutions interested in art integration. Susan's work has been featured in Edutopia, US News and World Report, EducationWeek, Americans for the Arts and ASCD, and she is the author of three books, including the popular No Permission Required and STEAM Point.

Overview of Standards Covered in the Kit

The standards addressed in the lessons in this kit include:

MATH:

Focal MATH standard of this lesson:

2.NBT.A.1
Understand place value.

Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.

VISUAL ART:

Focal VISUAL ART standard of this lesson:

Cr1.2.2a: Creating.
Make art or design with various materials and tools to explore personal interests, questions and curiosity.

Enduring Understanding:
Artists and designers experiment with forms, structures, materials, concepts, media and art-making approaches.

Overview of Standards Covered in the Kit

Additional MATH standards covered in this lesson:

2.NBT.A.1.A

Understand place value, special case:

100 can be thought of as a bundle of ten tens - called a "hundred.

2.NBT.B.7

Use place value understanding and properties of operations to add and subtract.

Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/ or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

2.MD.A.1

Measure and estimate lengths in standard units.

Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

PRACTICE.MP2:

Standards for Mathematical Practice 2: Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize- to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents-and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

PRACTICE.MP7:

Standards for Mathematical Practice 7: Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

PRACTICE.MP3:

Standards for Mathematical Practice 3: Construct viable arguments and critique the reasoning of others.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

Overview of Standards Covered in the Kit

Additional VISUAL ART standards covered in this lesson:

Cr2.1.2a: Creating.

Experiment with various materials and tools to explore personal interests in a work of art or design.

Cr3.1.2a: Creating.

Discuss and reflect with peers about choices made in creating artwork.

These standards can be referenced at through the Mathematics Common Core State Standards and the National Coalition for Core Arts National Arts Standards.

Benefits of Art Integration

Art Integration is an approach to teaching and learning through which content standards are taught and assessed equitably in and through the arts. Benefits to this approach include:

- Higher Student Achievement. Studies indicate an increase of 10-15% on tested areas when art integration is used intentionally and authentically.

- Increased Student Buy-in. Students become active participants in their learning when art is intentionally integrated.

- High-level Critical Thinking Skills. Students engage in critical thinking and construct personal meaning through their learning in art integrated lessons.

- True Equity. Art integration yields an equitable learning environment for all learners through their own access points.

- Connective Learning Opportunities. Art integration furnishes a research based pathway to teaching 21st century skills and natural areas for differentiation. Teacher Empowerment. Instructors become facilitators of creative learning and are empowered in their own professional growth.

Resources:

Barry, N. H. (2010). Oklahoma A+ Schools: What the research tells us 2002-2007. Volume three, quantitative measures. Oklahoma A+ Schools/University of Central Oklahoma.

Overview of the Kit

This packet contains a lesson plan custom developed to authentically connect the selected second grade 21st century math standards and a naturally-aligned visual art standard.

The lesson will be provided to you in full on a one-page lesson overview sheet. This is a great way to introduce yourself to the overall lesson concept. In the following pages, you'll find the lesson plan broken down into fine detail, accompanied by images to help guide you through each step.

At the end of the lesson, you'll find an assessment suggestion, as well as an additional lesson for the next math standard and an extension lesson if your students need more practice.

Finally, you'll find a curriculum map for the second grade math standards that align with other visual art standards so that you can continue to create more art-integrated lessons for your students.

What's so convenient about this kit is that all of the hard-to-find materials and resources are already provided for you. There are enough materials for a full classroom of 30 students. The only exceptions are things that are commonly found in your classroom, including items such as glue, pencils, and basic tape.

Let's get started!

Core Lesson:
PLACE VALUE MOBILES
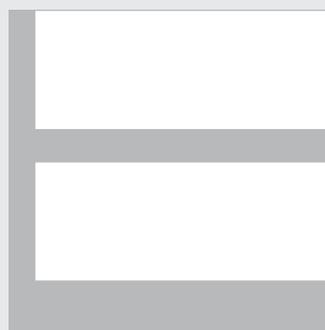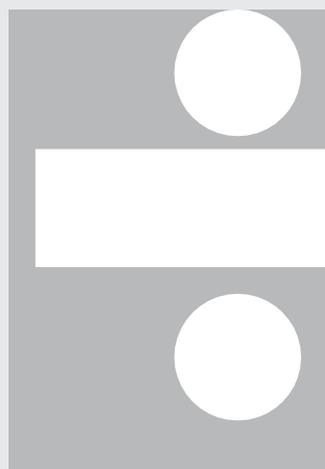
Overview

FOCUS SUMMARY

Design and create a mobile that represents the hundreds, tens and ones of a 3-digit number below 199.

Materials In the Kit

- Pacon® White Poster Board
- Pacon® Yarn
- Pacon® Origami Paper
- Creativity Street® Craft Sticks

Teacher-Provided Materials

- Transparent Tape
- Scissors
- Pencils
- Scrap Paper
- Large example images of Alexander Calder artwork

Essential Questions

- How can we represent the same number in different ways?
- How does the position of a digit in a number affect its value?
- How do artists and designers learn from trial and error?
- How do artists organize their work?

21st Century Skills

- Creativity
- Critical Thinking and Problem-Solving
- Media Literacy
- Initiative and Self-Direction

Teacher Summary

PRE-ASSESSMENT:

Ask students to think of a number between 100 and 199. Select a student to share their number and write it on the board. Then, create a 3-box grid and label it with H, T, O from left to right. Ask a student to fill in the grid for the number that was shared. For example, 125 would look like this:

H (hundreds)	T (tens)	O (ones)
1	2	5

Share a variety of ways we could show that number. For example, 125 could be represented by 1 large square, 2 triangles and 5 circles.

ENGAGEMENT:

Observe examples of hanging mobiles from master artist Alexander Calder. As a class, ask students what they observe about how each mobile is similar and different. How does the artist use individual elements to create a whole mobile? How does the design effect how the mobile hangs?

ACTIVITY:

Modeling - Look at Alexander Calder's work Elephant as a class. Ask students how this is different than the other mobiles they viewed? Then, write the number 1 1 on the board and ask students why you may have written that number for this image. After listening to some answers, share that there is 1 large red piece of metal (the hundreds), 1 smaller bone going through the red metal (the tens) and 1 smaller yellow fin attached (the ones). How else might we interpret this mobile as a 3-digit number? Take various answers and ask students to explain their reasoning. Do the same process again using the mobile Red Ghost as the example, and label it with the number 127 (1 large connector, 2 hanging elements and 7 color attachments). Explore and ask how else this could be represented in a 3-digit number.

Doing - Provide each student with a piece of scrap paper and a pencil. Create a place value chart like the one at the beginning of class and ask students to select a number and fill in their chart. Then, select a shape for their hundreds number, one for their tens number and one for the ones numbers. Have students draw the amount of corresponding shapes for each of their place value numbers (just like in the pre-assessment). Finally, ask students to think about and sketch out a design that would combine their three shapes into one mobile. Remember: they can combine all of the elements into a single hanging item (like Elephant) or have a large connector and several hanging elements/attachments (like Red Ghost).