Counting and Operations
Teaching Tips: Kindergarten

Using Best Instructional Practices with Educational Media to Enhance Learning
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Teaching Routines

Maintain Brisk Pacing
Research demonstrates that “brisk” pacing is related to greater content coverage, increased motivation and engagement, and, in turn, higher levels of student achievement.

- **Note the time allocated to each component of the lesson.** Monitor the length of your teaching and children’s turns so that all activities are completed within the allocated time.
- **Establish a predetermined system for calling on children** to work at the whiteboard. For example, write each child’s name on a Popsicle stick and place the sticks in a jar. To call a child to the board, draw a stick from the jar. When a child’s name is selected, set that stick aside, leaving only the sticks of children not yet chosen.
- **Invite all selected children to the whiteboard at once** when more than one child will be playing.

Engage All Children
When children are highly focused and engaged, they attain higher levels of achievement.

- **Position children so they do not block the screen** when they stand at the whiteboard, so that everybody can see the videos, games, images, and activities.
- **Involve all children in thinking about the correct answers** even if it is not their turn at the whiteboard. Use strategies such as “Turn and Talk.” For example, ask all children to tell a partner the answer they would choose, or if they agree/disagree with a stated choice.
- When the child at the whiteboard gives an answer, invite all the others to show “thumbs up” if they agree with the answer or “thumbs down” if they disagree.
- **Observe children’s understanding of key concepts.** When most children demonstrate understanding by rapidly choosing correct responses, wrap up the lesson.

Support Independent Learning
When teachers notice and name the learning strategies children use, children are more likely to become strategic and independent learners.
Teaching Routines

Use Key Vocabulary Frequently
When children have many opportunities to hear and use new vocabulary words, they are more likely to acquire and use the words on their own.

- **Repeat key words as often as possible** during the lesson, as well as during other parts of the school day when use of these words is appropriate.
- **Ask children to use key words** while playing the games.
  - When children are at the whiteboard, encourage them to use key words to describe their actions. For example, “We need four more to equal ten.”
  - When children are invited to Turn and Talk, encourage them to use key words. For example, “Peg can get the chickens back in the coop by putting them in a big bag.”

Mediate Game Play
When well-developed educational media programs are effectively joined with a sound classroom curriculum, children demonstrate high levels of motivation and engagement as well as notable increases in early literacy and mathematics skills and knowledge.

- **Load the game on the computer and minimize it before you begin the lesson.** This allows you to optimize instructional time by beginning game play as soon as you and the children are ready.
- **Preview the screen to explain what children will do.** Point out game features such as selecting objects, moving objects, and repeating the game instructions.
- **Quickly mute/unmute the sound by using the mute button** on the top row of the computer keyboard. You can also use the volume down/up buttons on the keyboard, or the volume controls on the interactive whiteboard, to adjust the sound.
- **If the touch function doesn’t work, use your computer to click on the item the child touches.**
- **Prepare for the worst!** Have a dry erase board or manipulatives available to carry out activities intended for the interactive whiteboard (such as rolling dice or counting by tens).
Lesson 1: Preview

**Video: Picking Up Chickens (2:07)**
Preview the video: pbskids.org/peg/videos/picking-up-chickens

Peg, Cat, and Pig have a REALLY BIG problem! One hundred chickens are running wild, because Cat left the door to the chicken coop open. They need to get all the chickens back into the coop before the farmer sees what happened. Peg sings a song about picking up chickens as they all collect and carry chickens back to the coop.

Peg counts the chickens they collected, writing each number as she counts. There are only ten. As Peg says, one hundred chickens is a lot—way more than ten. Their problem is not yet solved. Peg isn’t ready to give up yet; she’s not going to “chicken out.”

**Game: 3-2-1 Snack**
Preview the game: pbskids.org/peg/games/3-2-1-snack

To help Peg feed Cat some snacks, players match quantities with numerals. The numerals are displayed on the screen but not named; children need to recognize them. Players select the correct quantity of snack items (strawberries, blueberries, corn, popcorn). Then they select the correct quantity of chickens to sit on a shed and on a table.

Once players choose all the correct quantities, they ring a bell to launch a complicated chain reaction that ultimately sends the snacks flying into Cat’s mouth. The quantity of items children need to select increases as they continue playing.

**Game: Peg’s Pizza Place**
Preview the game: pbskids.org/peg/games/pizza-place

Peg needs help putting the correct number of toppings on each customer’s pizza. Her notepad has pictures of the customers and the toppings they ordered, along with the number of topping pieces they want.

After Peg reads the order, players move the topping pieces onto the pizza. They cannot put on too many. Peg counts the toppings before saying the next order. The number of customers (1 to 4) and topping pieces (up to 7) increase as children play. When two customers share a pizza, different toppings go on each half. When four customers share, different toppings go on each fourth.
### Lesson 1: Objectives

#### 1. Build Background
Conduct a teacher-led activity that activates and builds children’s background knowledge.

#### 2. Watch Together
View a short video to introduce or review math concepts and to hear new vocabulary in context.

#### 3. Get Ready to Play
Use the interactive whiteboard to preview the game in a teacher-led lesson.

#### 4. Play Together
Play the game as a teacher-led activity.

#### 5. Explore with a Friend
Practice alone or with a partner at a learning station.

### In this lesson, children will:
- make sense of problems and persist in solving them (mathematical practice)
- count to ten
- recognize numerals up to 10
- count up to ten objects in a scattered configuration
- understand the relative size of ten versus 100
- learn new vocabulary and concepts, such as **coop**, **chicken out**, **persistence**, and **chain reaction**
- use technology to learn, working individually and in groups
Lesson 1: Build Background

Time: 5 minutes

Lesson 1: Build Background

Explain that numbers can be represented in three ways: numeral, word, and quantity of objects. To demonstrate, use the SMART Notebook™ file called Numerals 1 to 10.

• Point to the numeral in each box and tell children that a numeral is the symbol or figure we use to write a number.

• Then explain that we can also show numbers with words. Point to the word in each box, sweeping your finger beneath as you read.

• Next, explain that we can also show numbers with quantities. Point out the configurations of quantities. Ask children to find the quantity for the number 1.

• Call on a child to touch and drag the quantity to the appropriate box. Review by counting the quantity and pointing to the numeral and word, emphasizing that each represents the number 1.

• Repeat these steps for each number.

• Close the Numerals 1 to 10 file.

Teacher Prep

1. Open three SMART Notebook™ files: Numerals 1 to 10, Vocab–Coop, and Vocab–Chain Reaction. Minimize all but the first file, placing them on the dock for easy access.

2. Launch the video Picking Up Chickens, then press the pause button to stop it from playing. Minimize the video to place it on the dock.
pbskids.org/peg/videos/picking-up-chickens

3. Launch the game 3-2-1 Snack. Mute the sound and minimize it for easy access when it’s time to play.
pbskids.org/peg/games/3-2-1-snack

4. Set up the game Peg’s Pizza Place at a learning station.
pbskids.org/peg/games/pizza-place
Lesson 1: Watch Together

Time: 10 minutes

Display the Vocab–Coop file, and tell children that this picture shows two places where chickens may live.

- Point to the barn and explain that sometimes chickens live in a barn.
- Then point to the coop and tell children that sometimes chickens live in a coop. Explain that a coop is a place where female chickens can lay their eggs and stay safe from other animals. It may have straw or hay on the floor.
- Ask: What might happen if someone leaves the doors open? (chickens will get out)
- Close the Vocab-Coop file and display the video. Say: Let’s see if that happens in this video, called Picking Up Chickens.

Press the play button and watch the video together. After viewing, ask:

- What problem do Peg and Cat need to solve? (how to get all the chickens back into the coop)
- How many chickens did they catch? (ten)
- How many chickens do they need to catch in total? (100)

Close the video screen. Develop the concept of persistence:

- Remind children that Peg and Cat have a REALLY BIG problem. Explain that when we have to solve a big problem, we must be persistent—we must keep trying even if it seems too hard and at first we fail (like Peg and Cat did when they only caught ten chickens).
- Tell children that a funny way to say that we will be persistent and not quit is: “We won’t chicken out!” (That’s what Peg says.)
- Explain that we can persist, or not quit, by thinking about and trying other ways to solve problems. Sometimes it helps to work with others to figure out a solution.
- Have children talk with their partners about how to solve the problem of catching all the chickens. Emphasize that it is much more difficult to catch 100 chickens than ten, because, as Peg discovered, 100 is “way more”—so many more—than ten.
- Invite several children to share their ideas with the class.

Tell children they will find out how Peg and Cat persisted and solved their really big problem in a video they will watch another time.
Lesson 1: Get Ready to Play

Time: 10 minutes

Display the 3-2-1 Snack game. Unmute the sound and refresh the screen so the class can hear the introduction. Mute the sound again after the game displays the number of tasty snacks Cat wants. Invite a child to repeat the purpose of the game (to help feed Cat some snacks.) Minimize the game.

Help children understand the concept of a chain reaction.

- Tell children that Peg has set up a funny and amazing way to feed Cat his snacks. It’s called a chain reaction.
- Explain that a chain reaction is a series of events that happen one after the other. Each event causes the next one to happen.
- Display the Vocab–Chain Reaction file. Point to each object as you describe the chain reaction that feeds Cat some snacks. Invite children to join in as you repeat the series of events.
- Tell children that before launching the chain reaction, they will select the correct quantity of snacks and the correct quantity of chickens Peg needs on the shed roof and on the table.
- Close the Vocab–Chain Reaction file.

Contents

- The bell rings.
- The chickens jump, and an egg rolls.
- The egg bounces on a bale of hay.
- It lands on a music player.
- When the music plays, the chickens on the table dance, knocking the watermelon.
- The watermelon drops onto the shovel handle.
- The shovel swings up, tossing the snacks.
- The snacks land in Cat’s mouth.
Display the game and point to the numeral on the screen.

- Ask: *How many [strawberries] does Cat want?* Have children hold up their fingers to show the number of snacks.
- Unmute the sound and invite a child to the whiteboard. Ask the child to touch the box that shows the correct quantity. Encourage the class to count along with Peg. If the answer is incorrect, have the child count the quantity in another box and choose again.
- After the child selects the correct quantity, ask the child to select the number of chickens that sit on the roof and the number of chickens that sit on the table.
- Then have the child ring the bell, to begin the **chain reaction** that will feed Cat. You may want to narrate each event and invite children to join along.
- Then say: *Wow! That was a complicated solution to that problem!*
- Continue playing, giving other children a turn at the whiteboard as you repeat these steps.

When most children have successfully recognized numerals and selected matching quantities, stop playing and review key concepts. Ask:

- What can we do when a problem is really hard? *(be *persistent* and think about different solutions)*
- What math skills did we need to be able to feed Cat? *(recognize numerals and match them with the correct quantities)*
- How can a **chain reaction** solve a problem? *(by making events happen in a sequence leading to the result you want)*

Tell children: *Next time you have a REALLY BIG problem that you can’t solve right away, don’t *chicken out*. Be *persistent* and try to think of different solutions, on your own or with a friend.*
Lesson 1: Explore with a Friend

Time: 10 minutes

Set up a learning station where children can practice matching numerals with quantities by playing the game Peg’s Pizza Place alone or with a partner.

Before children play, explain some key features of the game:
• To help remember each customer’s order, Peg provides a list with a drawing of the customer and the pizza topping along with the number of each topping ordered.
• If children pause before putting all the toppings on a pizza, the game stops.
• Once they place the correct number of topping pieces, Peg counts them and the game moves on to the next pizza order.
• The longer they play, the harder the game gets (there are more customers and more toppings for each order).

As children play, check to make sure that they are making connections between the numeral and the number of pizza toppings they are putting on the pizza. You can also help develop children’s reasoning and justification skills. Ask questions such as:
• How many pieces of [topping] are you putting on the pizza?
• How do you know how many to put on?
• Do you think this pizza has a little or a lot of [topping]? How do you know?

Teacher Reflection

• Did you stay within the recommended time limits? If not, review brisk pacing routines to see if these might help (page 4).
• Are most students able to count to ten and recognize numerals up to ten? If not, consider repeating this part of the lesson (page 11) in a small group for children who need extra help.
• Are most children able to count up to ten objects in a scattered configuration? If not, consider repeating this part of the lesson (page 11) in a small group for children who need extra help.
• Did most children use new vocabulary (coop, chicken out, persistence, chain reaction) during and after playing the game? If not, review the words briefly as you continue to play this and other games and prompt children to use the words on their own.
Lesson 2: Preview

**Video: 10 Friends (1:25)**
Preview the video: pbskids.org/peg/videos/10-friends

Peg sings about how she and her friends can arrange themselves in two groups that equal ten as they skip, run, hide, wave, rest, read, count, march, yodel, and shake on their way home. She points out, “However you arrange us, we’re still ten friends.” Along the way, she writes a number sentence for all the pairs of numbers that equal ten.

**Video: 10 Friends Escape the Giants (2:35)**
Preview the video: pbskids.org/peg/videos/10-friends-escape-the-giants

Peg, Cat, and their friends are trying to hide from the Giants. Every time they find a place to hide, the wife asks her husband to bring her that very item. The ten friends scurry to a new hiding place. Since the hiding places aren’t big enough for all of them, they have to separate into two groups.

Peg counts the friends in each group as they hide, to make sure everyone is safe. Then she writes a number sentence adding the number of friends in each group to make sure the total equals ten.

**Game: Star Swiper**
Preview the game: pbskids.org/peg/games/star-swiper

Big Mouth loves things that are yellow, so he is stealing yellow stars in the sky. The stars he hasn’t taken are numbered. The missing stars are outlined. The total number of stars always equals ten.

If players clap (or tap the space bar) when they see Big Mouth, he gives back a star and that star is numbered. Once Big Mouth returns all the stars, Peg highlights the ones they started with and says the number. Then she highlights and says the number of stars they found. Beginning with the number of stars in the sky initially, Peg counts to ten, highlighting each star as she counts it.
Lesson 2: Objectives

1. **Build Background**
   Conduct a teacher-led activity that activates and builds children’s background knowledge.

2. **Watch Together**
   View two short videos to introduce or review math concepts and to hear new vocabulary in context.

3. **Get Ready to Play**
   Use the interactive whiteboard to preview a teacher-led activity.

4. **Play Together**
   Play a teacher-led activity.

5. **Explore with a Friend**
   Practice alone or with a partner at a learning station.

In this lesson, children will:

- model with mathematics by writing number sentences (mathematical practice)
- make use of structure by using pairs of numbers to make ten (mathematical practice)
- figure out “how many more” are needed to make ten
- learn academic vocabulary, such as total, add, plus, equal, and sum, and use these words in context
- learn new vocabulary, such as arrange, escape, and positional words including next to, beside, and behind, and use these words in context
- use technology to learn, working individually and in groups
Lesson 2: Build Background

Time: 10 minutes

Teacher Prep

1. Open the SMART Notebook™ file called Blocks.
2. Gather a set of ten chips and a Ten Frame for each pair of children.
3. Create and display a blank version of the Classroom Chart: Number Facts for Ten, shown on page 16.
4. Open two videos: 10 Friends and 10 Friends Escape the Giants. Pause both videos and minimize them. pbskids.org/peg/videos/10-friends pbskids.org/peg/videos/10-friends-escape-the-giants
5. Open an online game die, then minimize it for easy access. curriculumbits.com/prodimages/details/mathematics/singledice.html
6. Set up the game Star Swiper at a learning station. pbskids.org/peg/games/star-swiper

Provide pairs of children with a set of ten chips. Tell them that in the Peg + Cat videos they will watch, Peg writes number sentences, which show the total when two numbers are added together. Before watching the video, they will practice using number sentences.

Using the replicator feature on the Blocks file, drag three blocks to the left-hand side of the screen and two blocks to the right-hand side. Beneath the blocks write: 3 + 2 = □.

- Say: This is a number sentence. Let’s read it together: 3 + 2 =
- Point to the plus sign and explain that, in math, the word plus and the symbol + mean to add numbers together to find out the total, or sum, of those two numbers.
- Next, point to the equal sign and explain that the word equal and the symbol = mean that the quantities on both sides of the equal sign must be the same.
- Turn and Talk: Tell children to find the total, or sum, using any strategy (counting chips or fingers, using number facts).
- Ask the class: What is the total, or sum, of 3 + 2?
- Record 5 in the box. Pointing to each part of the number sentence, say: 3 + 2 = 5.
- Say: Let’s write another number sentence. Create two groups of blocks on the screen that add up to less than ten. Write the number sentence beneath them with an empty box for the total.
- Have the class read the number sentence together, then work with their partners to figure out the total number of blocks. Write the answer in the box.
- Repeat this once or twice more with different groups of blocks. Then close the Blocks file and have children set their chips aside.
Tell children that in the first video they will watch, called 10 Friends, Peg writes number sentences to show the ways she and her friends arrange, or group, themselves as they walk and play together. These number sentences always add up to ten, since there are ten friends altogether. Ask children to pay attention to the number sentences as they watch.

Display the video. Press the play button and watch the video together. After viewing:

- Remind children that no matter how Peg and her friends arranged, or grouped, themselves, they always added up to ten.
- Ask: What number sentences did Peg write to show how the characters arranged themselves?
- As children respond, record each number sentence on the Classroom Chart: Number Facts for Ten. Write commutative pairs side by side and explain that the order in which they say the two numbers they are adding doesn’t change the total.
- If children do not recall all the number facts, don’t spend time completing the chart at this point. Children will have more practice with these number facts later in the lesson.
- Close the video screen.

Number Facts for Ten

\[
\begin{align*}
3 + 7 & = 10 \\
6 + 4 & = 10 \\
__ + ___ & = 10 \\
__ + ___ & = 10 \\
__ + ___ & = 10
\end{align*}
\]
Tell children that in this next video, called 10 Friends Escape the Giants, the characters again arrange themselves in two groups that add up to ten as they try to escape, or get away from, the giants.

Point out that sometimes Peg and her friends arrange themselves next to, or beside, an object; sometimes they arrange themselves behind an object; sometimes they arrange themselves inside, under, or on an object.

Before watching the video, ask children to pay attention to all the places where the characters hide and to watch for all the number sentences that add up to ten.

Display the video. Press the play button and watch the video together. After viewing:

• Ask: Where did the friends hide to escape from the giants? Prompt children to use positional words to describe their hiding places, such as beside, next to, behind.

• Ask: What number sentences did Peg write to tell us how the characters arranged themselves?

• For each number sentence the children recall, point it out or add it to the chart you made earlier. Again, if children do not recall all the number facts, don’t spend time completing the chart at this point.

• Close the video screen.

Number Facts for Ten

\[
\begin{align*}
3 + 7 &= 10 \\
6 + 4 &= 10 \\
5 + 5 &= 10 \\
\_ + \_ &= 10 & \_ + \_ &= 10 \\
\_ + \_ &= 10 & \_ + \_ &= 10
\end{align*}
\]
Lesson 2: Get Ready to Play

Time: 5 minutes

Provide each pair of children with a Ten Frame. (If children aren’t familiar with a Ten Frame, demonstrate how to use it.) On the whiteboard, display the online file, which features an interactive game die.

• Tell children that they will do an activity with their partners called How Many More Makes Ten?

• Draw children’s attention to the Classroom Chart: Number Facts for Ten. Remind them that there are five pairs of numbers that equal ten and note how many they have found so far.

• Explain that children will take turns rolling the die on the interactive whiteboard. The die will land on a number between one and six. Each pair of children will figure out how many more are needed to make ten.

• Remind children that they may find the answer by using the Ten Frame and chips, counting on their fingers, or using number facts.

• Tell children that they will use chips to show the answer on the Ten Frame.
Lesson 2: Play Together

Time: 10 minutes

Begin each round by inviting a pair of children to the interactive whiteboard. Have one child roll the die by touching the ROLL DICE button at the bottom of the screen.

• Have all children work together in pairs to determine how many more they need to equal ten. Instruct them to use chips to show the answer on their Ten Frames.

• Ask all the children to hold up the number of fingers needed to make ten.

• Have the children at the whiteboard say their answer. If the answer is incorrect, invite a child with the right answer to explain how s/he figured out the answer.

• If the number fact is already on the chart, ask one of the children at the whiteboard to point to it while reading it aloud. If it’s not already on the chart, have the child write it (for example, $8 + 2 = 10$), saying each part of the number sentence. Have the other child write and say the related number sentence ($2 + 8 = 10$).

• As children play, help them make a connection between the chips on their Ten Frames and the number facts on the chart.

• Continue playing with different children at the whiteboard while all children identify the number needed to make ten.

When most children are familiar with all five pairs of numbers that add up to ten, end the game and review key concepts. Ask:

• What math skills did the videos and activity help us practice? (number sentences, number pairs that add up to ten)

• What are the five pairs of numbers that add up to ten? (review the pairs on the classroom chart)

• What new vocabulary did we learn to help us read number sentences? (plus, equal, total, sum)

Tell children: At home, arrange two groups of objects, such as blocks or stuffed animals, that add up to ten. Use the numbers to write a number sentence and share it with a family member. You might say: “Six red blocks plus four green blocks equals a total of ten blocks.”
Lesson 2: Explore with a Friend

Time: 10 minutes

Set up a learning station where children can play the game Star Swiper alone or with a partner. This game gives children practice in following directions and helps them monitor their behavior by responding only when Big Mouth appears (and not other aliens).

Before children play, display the game and explain key features.

• Tell children that Big Mouth has stolen some stars from the sky and Peg needs their help to get them back.

• Select the play button. If your computer has a microphone and you don’t mind the noise of children clapping during game play, select the check mark. Otherwise, select the X. (If you choose the check mark, on the next screen select “Allow” so the game can access the microphone.)

• Have children listen to the game instructions. If you have allowed the microphone, prompt them to clap when they see Big Mouth during the practice round, to make sure the microphone is working. If not, have children press the space bar instead.

• Point out that each time Big Mouth appears and they clap or press the space bar, he will return a star. Warn them not to be tricked by other space creatures, or aliens, that pop up. (If children respond incorrectly a few times in a row, Peg shows them what Big Mouth looks like.)

As children play, encourage them to figure out how many more stars they need to make ten and help them develop their reasoning and justification skills. Ask questions such as:

• How many stars are on the top of the screen?

• How many more stars do you need to make ten?

• How many stars did Big Mouth steal? How do you know?

Teacher Reflection

• Did you stay within the recommended time limits? If not, review brisk pacing routines to see if these might help (page 4).

• Are most students able to write number sentences? If not, consider repeating this part of the lesson (page 15) in a small group for children who need extra help.

• Are most children able to use pairs of numbers to make ten and to figure out how many more are needed to make ten? If not, consider repeating this part of the lesson (page 19) in a small group for children who need extra help.

• Did most children use new vocabulary during and after playing the game? If not, review the words briefly as you continue to play this and other games and prompt children to use the words on their own.
Lesson 3: Preview

Video: Counting by 10s (1:32)
Preview the video: pbskids.org/peg/videos/counting-by-10s

Peg and Cat have another REALLY BIG problem: They have to get 100 chickens into their spaceship before Big Mouth gets them.

Ramone arrives on the scene and shows them how he can quickly collect 100 space rocks for NASA. Instead of counting the rocks one by one, he uses trays that each hold ten rocks. That way he can collect the rocks ten at a time and count them by ten.

Video: 100 Chickens on the Purple Planet (1:01)
Preview the video: pbskids.org/peg/videos/100-chickens-on-the-purple-planet

Peg and her friends use Ramone’s trays to scoop up chickens ten at a time, quickly collecting all 100 chickens. Ramone sings as he counts by tens and points out that when you count by tens you can count really high and "get there so fast too."

Helpful Background
The two videos in this lesson introduce the concept of counting by tens. The lesson calls attention to the pattern established when counting by tens—the ones digit remains the same while the tens digit goes up by one.

After children practice counting by tens with a Hundreds Chart, instead of a Peg + Cat game they’ll use a SMART Notebook™ file for a teacher-led activity to count by tens beginning with other numbers.

Children will use the same SMART Notebook™ file for the Explore with a Friend activity, so that will need to be set up on the interactive whiteboard, not at a computer.
Lesson 3: Objectives

1. Build Background
   Conduct a teacher-led activity that activates and builds children’s background knowledge.

2. Watch Together
   View two short videos to introduce or review math concepts and to hear new vocabulary in context.

3. Get Ready to Play
   Use the interactive whiteboard to preview a teacher-led activity.

4. Play Together
   Play a teacher-led activity.

5. Explore with a Friend
   Practice alone or with a partner at a learning station.

In this lesson, children will:

- make sense of patterns (mathematical practice)
- make sense of problems and persist in solving them (mathematical practice)
- count by tens
- learn new vocabulary, such as collect, in no time, tray, and pattern, and use these words in context
- use technology to learn, working individually and in groups
Lesson 3: Build Background

Time: 5 minutes

Teacher Prep

1. Open three SMART Notebook™ files: 100 Chickens, Hundreds Chart, and Counting by Tens. Minimize all but the first file, placing them on the dock for easy access.

2. Open two videos: Counting by 10s and 100 Chickens on the Purple Planet. Pause both videos and minimize them. pbskids.org/peg/videos/counting-by-10s

pbskids.org/peg/videos/100-chickens-on-the-purple-planet

Draw children’s attention to the picture on the 100 Chickens file, which shows the scene from a Peg + Cat video when 100 chickens escaped from the coop.

• Remind children that after Peg and her friends collected, or gathered, only ten of the chickens, they realized that 100 chickens is “way more than ten.”

• Tell children that all 100 chickens ended up on a rocket ship that landed on the Purple Planet. Now Peg and Cat have another REALLY BIG problem. They need to collect 100 chickens quickly, before Big Mouth gets them.

• Let children know that in the video they’re going to watch, they’ll see how Ramone collects 100 moon rocks in no time—very quickly—without having to count them one at a time.

• Say: If you needed to collect and move many objects, how could you do it? Turn and tell your partner.

• Invite a few children to share their ideas with the class.

• Say: Let’s watch the video and see how Ramone helps Peg and Cat figure out a way to solve the problem of collecting 100 chickens quickly.

• Close the 100 Chickens file.
Lesson 3: Watch Together, Part 1

Time: 5 minutes

Display the Counting by 10s video. Press the play button and watch the video together.

After viewing:

• Ask: What did Ramone do to collect moon rocks quickly? (used a tray to collect ten at a time)

• Say: That’s right. By using a tray and collecting ten at a time, he could collect one hundred rocks in no time—that means very quickly—and then he could count by tens to check if he had one hundred.

• Ask: How do you think Ramone’s strategy for collecting moon rocks will help Peg and Cat solve their REALLY BIG problem? (use trays that hold ten chickens, count by tens)

• Tell children that in the next video, they’ll see how Peg and Cat collect all 100 chickens.

• Close the video screen.
Lesson 3: Watch Together, Part 2

Time: 5 minutes

Display the 100 Chickens on the Purple Planet video. Press the play button and watch the video together. After viewing, ask:

- How did Peg and her friends collect one hundred chickens in no time to solve their REALLY BIG problem? (collected ten at a time)

Close the video screen and display the Hundreds Chart file.

- Tell children they can count by tens too, just like Ramone and Peg.
- Point to the number 10 and say: Let’s start here and follow the numbers down this column.
- Point out that each number in the column is ten more than the number above it.
- Invite them to read and say the numbers with you as you touch (and highlight) them on the chart: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
To help children gain a better understanding of counting by tens, continue using the Hundreds Chart.

- Ask: Did you notice a pattern on the Hundreds Chart when we counted by tens? (the ones digit remains the same, the tens digit goes up by one)
- Say: Let’s check to see if this pattern still works if we start counting with a number other than ten.
- Invite a child to suggest a number from 1 to 9.
- Say: Let’s start at the number [4]. Let’s count and see how many is ten more than [4]. As you point to the next number on the Hundreds Chart [14], have children say the number with you.
- Say: [14] is ten more than [4] and it is directly below the number [4]. Let’s see what is ten more than [14].
- Invite children to continue counting with you as you point to each number on the Hundreds Chart, touching the number that is ten more than the number above it.
- Say: [24] is ten more than [14] and it is directly below the number [14].
- Ask: What number do you think is going to be ten more than [24]? And after that?
- Repeat these steps until you reach the end of the column.
- Then ask: What pattern did you notice? (the ones place stays the same, the tens place is always one more)
- Close the Hundreds Chart file and display the Counting by Tens file.
NOTE: Each slide in the Counting by Tens file has a column beginning with a number from 1 to 10. To see all the slides, uncheck the Auto-hide button on the bottom corner. Select any slide to display it on the screen.

- Say: Let’s practice counting by tens so we can add numbers in no time!
- Draw children’s attention to the whiteboard. Point out the number at the top of the column and the numbers scattered on the board.
- Explain that they must complete each column by finding the number that is ten more than the one above it. They can do this in no time—very quickly—if they count by tens, then find the correct number and drag it to the space.
- Tell children that some numbers do not fit the pattern, so they should look carefully before choosing a number.
- Call three children to the whiteboard. In turn, have each child complete the next three boxes in the column, adding ten to the last number to figure out the number below.
- After the third number is moved into place, ask the class to show “thumbs up” or “thumbs down” to agree or disagree. If the answer is incorrect, guide the child to use the “counting on” strategy to figure out ten more. When the three correct numbers are in place, call children’s attention to the pattern and remind them that they can use the pattern to check their answer.
- Repeat these steps with the other two children to complete the column.
- Invite the class to say the numbers aloud with you as you point to each one.
- Continue playing with different groups of three children and different starting numbers.

When most children can successfully count by tens, stop playing and review key concepts. Ask:

- What does counting by tens help us do? (count quickly—in no time)
- What can we do to help us count by tens? (think about the pattern in the numbers)

Tell children: When you want to find the total of many items, such as pennies or blocks, first make groups of ten, then count by tens to find the total in no time.
Set up a learning station at the interactive whiteboard where children can play Counting by Tens alone or with a partner. Review the instructions for playing on page 27.

As children play, check to see if they are using the number **pattern** when choosing the numbers to place in a column. You can also help develop their reasoning and justification skills. Ask questions such as:

- How did you decide which number is ten more than [43]?
- What **pattern** are you using to count by ten?
- Can we count by tens starting at a bigger number, like sixty-seven? Why or why not?
- Can we count by tens starting with any number? Why or why not?

**Teacher Reflection**

- Did you stay within the recommended time limits? If not, review brisk pacing routines to see if these might help (page 4).
- Are most children able to count by tens and recognize the **pattern**? If not, consider repeating this part of the lesson (page 27) in a small group for children who need extra help.
- Did most children use new vocabulary (collect, in no time, tray, pattern), during and after playing the game? If not, review the words briefly as you continue to play this and other games and prompt children to use the words on their own.
A dragon bouncing on Ramone is squashing his sphere, which has lost its sparkle. He needs help to get his sparkle back.

Peg is “freaked out,” so Cat suggests she count backward from ten (by twos) to calm down. But Ramone says he needs everyone who believes in wizards to count forward to twenty by twos so he can regain his sparkle.

When Peg, Cat, other characters, and the audience count to twenty by twos, Ramone’s sphere gets round and sparkly again.

Game: Rock Art
Preview the game: pbskids.org/peg/games/rock-art

This open-ended art activity allows children to decorate a plain or illustrated background with rocks (including ones earned by playing other Peg + Cat games). A counter shows the number of rocks placed on the picture. Cat says each number that is a multiple of five.

This lesson uses the Rock Art game to help children practice counting by twos and to reinforce the meaning of the words beside and next to. Children take turns placing two rocks next to each other and counting the total number of rocks by twos.

Helpful Background
Like the previous lesson on counting by tens, this lesson calls children’s attention to the number pattern established, in this case when counting by twos. All numbers end in 0, 2, 4, 6, or 8.

The lesson plan for Rock Art is designed to reinforce counting by twos but can easily be adapted to reinforce counting by fives.

The lesson relies on a SMART Notebook™ file for the Explore with a Friend activity, so that will need to be set up on the interactive whiteboard, not at a computer.
Lesson 4: Objectives

In this lesson, children will:

- make sense of patterns (mathematical practice)
- use a number line to compare numbers
- count by twos
- learn new vocabulary, such as **sparkle**, and positional words including **forward**, **backward**, **beside**, and **next to**, and use these words in context
- use technology to learn, working individually and in groups

### 1. Build Background
Conduct a teacher-led activity that activates and builds children’s background knowledge.

### 2. Watch Together
View a short video to introduce or review math concepts and to hear new vocabulary in context.

### 3. Get Ready to Play
Use the interactive whiteboard to preview the game in a teacher-led lesson.

### 4. Play Together
Play the game as a teacher-led activity.

### 5. Explore with a Friend
Practice alone or with a partner at a learning station.
Tell children that in the video they will watch, the characters must understand the difference between **forward** and **backward** to solve a problem. Explain that **forward** means to move ahead or toward the front. Demonstrate by taking a few steps **forward**. Next, explain that **backward** means to move toward the back or away from an object or location. Demonstrate by taking a few **backward** steps.

- Invite two children to stand in front of the group and face each other. Tell the children that when you say “Go!” one child (designate which one) will move **forward** (toward the other child); the other child will move **backward** (away from the other child).
- Tell the rest of the class to show “thumbs up” if the children are moving in the correct direction or “thumbs down” if they are not.
- Repeat once or twice with different pairs of children.
- Next, draw children’s attention to a number line with the numbers 0 to 20. Explain that in mathematics, counting **forward** means counting to larger numbers; counting **backward** means counting to smaller numbers.
- Point to a number and ask: Which direction should I go to count **forward**? Will the numbers be greater or less than the number I am pointing to?
- Invite one child to respond and ask others to agree or disagree by showing “thumbs up” or “thumbs down.”
- Point to another number and ask: Which direction should I go to count **backward**? Will the numbers be greater or less than the number I am pointing to?
- Invite one child to respond and ask others to agree or disagree by showing “thumbs up” or “thumbs down.”
- Continue until most children demonstrate understanding through answers or gestures.

**Teacher Prep**

1. Have a number line (0 to 20) available to show the class.

2. Launch the video called Saving Wizard Ramone, press the pause button, and minimize the video to place it on the dock.

   http://pbskids.org/video/?guid=96359084-1494-46e3-81f1-a9dfca7f8b16

3. Launch the game called Rock Art and minimize it to place it on the dock.

   pbskids.org/peg/games/rock-art

4. Open the SMART Notebook™ file called Hundreds Chart by Twos. Minimize the file to place it on the dock for easy access.
Display the video called Saving Wizard Ramone. Explain that Ramone is in trouble and needs Peg and Cat to help him. Tell children that after they watch the video you will ask them what happened to Ramone and how Peg and Cat solved the problem.

Press the play button and watch the video together. After watching:

- Ask: Where was Ramone and what happened to him? (under the dinosaur who bounced on his sphere and squashed him flat)
- When Ramone said he was “under here” and Peg couldn’t see him, she asked, “Under where?” Cat giggled and said, “You said underwear!” Ask children what made Cat, Peg, and the dragon giggle.
- Remind children that some words sound the same but mean something totally different, like the words under where and the word underwear, another word for underpants.
- Ask: How did Peg and Cat restore his sparkle, or glitter? (counted to twenty by twos)
- Have children turn and talk with their partners about why Peg and Cat had to count forward from two and not backward from ten? (they needed to get to twenty and that’s more than ten)
- Invite a few children to share their responses.
- Ask: Why do you think it’s important to know how to count by twos? (to count things more quickly, especially when there are lots of things to count)
- Close the video screen.

Time: 10 minutes
Lesson 4: Get Ready to Play

Time: 5 minutes

Display the game. Tell children that in this game, called Rock Art, they will make pictures with rocks. Then they will count the rocks by twos to quickly figure out how many they used. Instruct children to listen to Peg’s directions for how to play the game, then select the play button.

After Peg’s explanation, mute the sound and review key game features on the screen:

- Point out the button with the purple star in the bottom right corner. Touch the button to show children all the different backgrounds they can choose for their picture. Select one of the backgrounds.
- Demonstrate how to add rocks to the picture, by touching a rock and then touching the screen. Show how you can move a rock the same way if you want to put it somewhere else or put it back.
- Draw children’s attention to the number shown above the rocks. Tell them this counts the rocks as they add them to the picture. Let them know that each time five rocks have been added, Cat will say how many rocks there are in total.
- Tell children that when it’s their turn to put rocks in the picture you want them to place two rocks beside, or next to, each other. This will make it easier at the end to count the rocks by twos. Demonstrate by placing two rocks beside each other.
- Point out the trash can next to the star. Touch the button to show that this gets rid of all the rocks on the picture. They can also start over by choosing a different background.
- Unmute the sound.
Lesson 4: Play Together

Time: 10 minutes

• Invite two children to the whiteboard. Have the first child select a background and the second child place two rocks beside each other.

• Invite two other children to the whiteboard to take turns placing a pair of rocks.

• After one child places two more rocks on the picture, have that child lead the class in counting all the rocks by twos, pointing to each group of two rocks as they are counted (“two, four”). Then have the next child place two rocks and lead the class in counting the total by twos (“two, four, six”).

• Continue inviting two children to the board to place rocks and lead the class in counting the total number of rocks by twos. Remind children that they can look at the number above the rocks to see if they counted correctly.

• When the background starts to get crowded (about 20 rocks), admire the rock art the class created.

• Play the game again by having the next pair of children choose a different background and place the first two rocks.

When most of the children have mastered counting by twos, stop playing and review key concepts. Ask:

• What math skill did we learn by watching the video and playing this game? (counting by twos)

• What does counting by twos help us do? (count groups of items quickly)

Tell children: When you want to find the total of many items, such as stuffed animals, blocks, or books, try counting them by twos. That will help you figure out the total in no time!
Lesson 4: Explore with a Friend

Time: 10 minutes

Set up a learning station at the interactive whiteboard where children can practice counting by twos alone or with a partner, using the Hundreds Chart by Twos file.

Explain to children that their task is to count by twos, starting with the number 2. Tell them to touch the numbers as they count. Encourage them to look for the pattern that occurs in the numbers when they count by twos.

As children play, check to see whether they are counting correctly (all even numbers on the chart will turn green even if they are not selected in order). Ask questions to check their understanding and develop their reasoning and justification skills. For example:

- What number is two more than [14]?
- What pattern did you find when you counted by twos? (all numbers end in 0, 2, 4, 6, or 8)
- Is it easier to count by ones or by twos? Why?

**NOTE:** When children touch an even number on the chart, that square will turn green. If they touch an odd number, they will hear a sound and the color of the square will not change. To reset the chart, select the next page arrow, then select the previous page arrow.

### Hundreds Chart by Twos

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Teacher Reflection

- Did you stay within the recommended time limits? If not, review brisk pacing routines to see if these might help (page 4).
- Are most students able to use a number line to compare numbers? If not, consider repeating this part of the lesson (page 31) in a small group for children who need extra help.
- Are most children able to recognize the pattern when counting by twos? If not, consider repeating this part of the lesson in a small group (page 35) for children who need extra help.
- Did most children use new vocabulary (sparkle, forward, backward, beside, next to) during and after playing the game? If not, review the words briefly as you continue to play this and other games and prompt children to use the words on their own.
## Alignment to CCSS: Mathematics

### Counting and Cardinality

<table>
<thead>
<tr>
<th>Standard</th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
<th>Lesson 4</th>
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</thead>
<tbody>
<tr>
<td>K.CC.A.1 Count to 100 by ones and by tens.</td>
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<tr>
<td>K.CC.A.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).</td>
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<tr>
<td>K.CC.A.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects).</td>
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<tr>
<td>K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.</td>
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<tr>
<td>K.CC.B.5 Count to answer &quot;how many?&quot; questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.</td>
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### Operations and Algebraic Thinking

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<th>Lesson 2</th>
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</thead>
<tbody>
<tr>
<td>K.OA.A.1 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.</td>
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<tr>
<td>K.OA.A.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.</td>
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<tr>
<td>K.OA.A.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., (5 = 2 + 3); (5 = 4 + 1)).</td>
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<tr>
<td>K.OA.A.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.</td>
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## Alignment to CCSS: English Language Arts

### Vocabulary Acquisition and Use

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<tbody>
<tr>
<td>L.K.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on kindergarten reading and content.</td>
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<td>L.K.5 With guidance and support from adults, explore word relationships and nuances in word meanings.</td>
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<tr>
<td>L.K.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts.</td>
<td>✓</td>
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## Alignment to ISTE Technology Standards: Students

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<thead>
<tr>
<th>2. Communication and Collaboration</th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
<th>Lesson 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.</td>
<td>●</td>
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<tr>
<td>d. Contribute to project teams to produce original works or solve problems.</td>
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<thead>
<tr>
<th>4. Critical Thinking, Problem Solving, and Decision Making</th>
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<tr>
<td>b. Plan and manage activities to develop a solution or complete a project.</td>
<td>●</td>
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<tr>
<th>5. Digital Citizenship</th>
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<tbody>
<tr>
<td>a. Advocate and practice safe, legal, and responsible use of information and technology.</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.</td>
<td>●</td>
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<thead>
<tr>
<th>6. Technology Operations and Concepts</th>
<th>Lesson 3</th>
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</thead>
<tbody>
<tr>
<td>a. Understand and use technology systems.</td>
<td>●</td>
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<tr>
<td>b. Select and use applications effectively and productively.</td>
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</table>
### 1. Facilitate and Inspire Student Learning and Creativity

<table>
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<tbody>
<tr>
<td>a. Promote, support, and model creative and innovative thinking and inventiveness.</td>
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<tr>
<td>c. Promote student reflection using collaborative tools to reveal and clarify students’ conceptual understanding and thinking, planning, and creative processes.</td>
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<td>d. Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments.</td>
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### 2. Design and Develop Digital-Age Learning Experiences and Assessments

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<tbody>
<tr>
<td>a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity.</td>
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<tr>
<td>b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress.</td>
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### 3. Model Digital-Age Work and Learning

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<tbody>
<tr>
<td>a. Demonstrate fluency in technology systems and the transfer of current knowledge to new technologies and situations.</td>
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<tr>
<td>b. Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation.</td>
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<tr>
<td>c. Communicate relevant information and ideas effectively to students, parents, and peers using a variety of digital-age media and formats.</td>
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### 4. Promote and Model Digital Citizenship and Responsibility

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<tr>
<td>c. Promote and model digital etiquette and responsible social interactions related to the use of technology and information.</td>
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These lessons were developed by PBS in partnership with the Boston University School of Education.

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