

[ELEMENTS OF STORY TIME STEM]

Books are an opportunity to explore ideas, concepts, and themes found in everyday events.

1

Children see math, science, and literacy in their everyday lives. When we teach children to see the math, science, and literacy in picture books, we support their understanding of how these processes and events occur. Reading books multiple times is important for exploring different aspects of a story and deepening understanding.

Children are natural scientists, mathematicians, and observers:

2

Children ask questions about the world and are naturally curious about the events, objects, and living organisms around them. Using books allows us to explore math and science ideas through discussion.

Children bring valuable ideas to discussions.

3

Children are capable of the majority of the discussion talk and ideas. Use children's everyday ideas and experiences during discussions to explore science, math, and literacy topics and questions. Here, educators take on the role of guide and facilitator.

Open-ended questions support and engage children in productive discussions.

4

Use open-ended questions and activities to engage children in discussion about their emerging ideas as they explore math, science, and literacy.

Learning is a process - understanding is something that occurs over time.

5

Just as it is important for young learners to explore the joy of reading before they are able to read, it is important they explore the joy and wonder of math and science even without complete understanding of a concept. This is also true for adults!

All adults are capable of teaching.

6

All adults are teachers whom children can learn from. Use these books and materials as an opportunity to become inspired by picture books to engage with children in math, science, and literacy concepts. Anyone can use stories to have meaningful, exciting discussion that support children's learning.

Guiding Questions

Questions as Refrain



Science

- What do you observe in this (page, picture book)?
- What science ideas do you observe in this book? What do these ideas make you think about?
- What is happening in the science story that we know is there but can't see?



Math

- What do you see, notice, or wonder about?
- What (numbers, combinations, patterns, shapes, other math concept) do you see?
- How might you use the illustrations to show your thinking?



Literacy

- What do you think will happen in this story, and why do you think so?
- What will happen next? How do you know?
- What connections can you make between this story and another story or something else you know?

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Integrated Supplemental Guide

10 LITTLE RUBBER DUCKS

Introducing the book:

- Looking at cover:
 - This book is called *10 Little Rubber Ducks*. **What do you notice about the illustration on the cover? What might this book be about?** (Prediction)
 - Science/Math:** (title page) Let's count the ten little rubber ducks together.

Exploring the book:

- Pages 3-4 ("Then they are packed...")
 - Science:** **Are these real ducks or toy ducks?** How do you know?
 - Math:** **How many ducks are in a box?** Let's count the boxes of ten ducks together. **How many ducks are there in all of the boxes?**
 - Literacy:** What is happening on this page? **Where do you think the rubber ducks are going?**
- Page 8 ("The captain and his cargo ship...")
 - Science:** **Is the ship on a lake or big, wide sea? Why do you think that?**
- Pages 11-12 ("After some time...")
 - Literacy:** **What happened to the rubber ducks? How does this compare to your prediction?**
 - Science:** These toy ducks are floating on the big wide sea. **What do you think will happen to them?**
 - Math:** **How do you see the ten rubber ducks? How can you count them?**

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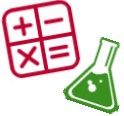


- Pages 21-22 ("The 9th little rubber duck...")
 - Science:** **What do you notice about all of the animals that found the rubber ducks?** (they all live in or near the sea)
- Page 24 ("As far as one can see...")
 - Literacy:** **What happened with the other 9 rubber ducks? What do you think will happen to the tenth duck?**
- Pages 27-28 ("At the end of the day...")
 - Science:** **What do you notice about the little ducks?** (one of them is a rubber toy and rest are real)
 - Math:** **How many ducks do you see? How do you see them?** (children may count by 1s or 2s, start on the left or right, or use some addition facts)

Extending through discussion:

- Science:** **Why couldn't the rubber ducks stay together? Why did they drift apart? Where did each rubber duck end up?**
- Literacy:** **What happened in this story, and how was that different from what you thought would happen? Do you have a rubber duck for your bathtub? If you were a rubber duck, where would you like to drift and what sorts of things might you like to see?**

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Math/Science Bookmark Guide

10 LITTLE RUBBER DUCKS

Exploring the book:

- Title page
 - **Math:** What do you remember about how many ducks are in this story? (10) Let's count those ten ducks again out loud together. 1, 2, 3... 10. **How do you draw a 10?** Let's draw a ten in the air. Follow up with turn and talks about "show your neighbor where you see the 7..."
- Pages 9-10 ("Suddenly a storm...")
 - **Science:** What do you think is happening in this picture? What is a storm? What questions do you have about storms? What can a captain of a ship do if they know a storm is coming? (This is an opportunity to support children to think about how the storm caused the events in the story.)
- Pages 11-12 ("After some time...")
 - **Math:** How many rubber ducks went overboard? (Place ten felt ducks on felt board to match the illustration.) **How would you count them?** (Invite children to show their way of counting– pointing to the ducks on the felt board. They might count by 1s, 2s, 5s, from top to bottom, left to right, etc.). **There are many ways to count to ten!**
 - **Science:** The ducks are starting to drift! Let your duck drift on your mat (using blue felt mat and felt rubber duck)

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- Pages 12-21 ("1st little rubber duck...")
 - **Math:** The rubber ducks are beginning to drift apart. **Let's keep track of the ducks we read the next few pages.** (Have children remove the felt ducks from the board used above. Encourage students to use words like 1st, 2nd, 3rd... 10th)
 - **Science:** (Using a large ocean map invite children to move each duck in the direction the rubber ducks drift).
- Pages 22-24 ("10th little rubber duck...")
 - **Math:** We've been keeping track of the ducks as they drifted! **What do you notice about the ducks?**
 - **Science:** Did you know this is actually a real story that happened to rubber ducks? There really was a storm and a bunch of rubber ducks fell overboard and went all over the world. Some were found. Some were not found.

Exploring and extending the thinking:

- **Math:** There are many ways to make 10! Let's experiment with all the ways we can make ten. (Using felt mat and rubber ducks invite children to work individually or with a partner to make combinations of 10 in more than one way and record with drawing or equation e.g. $10=9+1$, $10=8+2$, $10=7+3$, $10=6+4$, $10=5+5$...). Discuss all the combinations and see how many you can find all together!
- **Science:** Act it out! Children will bring the book to life as they each take a role as a duck (1st, 2nd, 3rd duck as they drift) or a direction (e.g. west, east...) beginning on page 12. The 1st duck drifts west, the "1st duck" child physically moves toward the "west" child.



10 LITTLE RUBBER DUCKS

This book tells the adventure of 10 little rubber ducks that fall overboard from a ship at sea. It's a fun story! Let's read it again, and this time let's pay special attention to WHERE the little rubber ducks drift and WHAT the different animals do when they see the rubber ducks.

Exploring the book:

- Page 13 ("1st little rubber duck drifts west")
 - **WHERE is the little duck drifting?**
WHAT animal sees it, and what does it do?
- Page 14 ("2nd little rubber duck")
 - **WHERE is the little duck drifting?**
WHAT animal sees it, and what does it do?
- Page 15-22 (Ducks 3-9)
 - **WHERE is the little duck drifting?**
WHAT animal sees it, and what does it do?
- Page 24 ("10th little rubber duck")
 - **WHERE is the little duck drifting? What is different about what is happening with this 10th duck?**

Exploring and extending the thinking:

- If YOU were a little rubber duck adrift on the wide ocean, WHERE would you drift? What animal would see you, and what would it do? Discuss, draw, or write about this

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Integrated Bookmark Guide

SPLASH!

Introducing the book:

- Looking at cover:
 - This book is called *Splash!* **What do you notice about the illustration on the cover?** What might this book be about? (Prediction)
 - Science/Math:** **How many animals and plants can you name that live in water?**

Exploring the book:

**The book's repeated question, "How many are in my pond," doesn't need to be read every time during this integrated read-aloud.*

- Pages 2-3 ("I have a pond...")
 - Science:** **What is a pond?**
 - Math:** **How many animals do you see?** How many animals are in the pond? How are you counting them? Can you find a different way to count them?
 - Literacy:** **What do you notice about the animals on these pages?** What do you think is going to happen?
- Pages 4-5 ("My cat comes home.")
 - Science:** **What do you notice about the turtle?** Can turtles swim? What do we know about turtles?
 - Math:** **How many animals are in the pond now, and how do you know that?**
 - Literacy:** What happened? **What did the cat do? How did this compare to your prediction?** What do you think will happen next?
- Pages 8-9 ("My cat falls in.")
 - Science:** **Can cats swim?** Can dogs swim? **How do you know?**
 - Math:** How many animals are in the pond now? **How do you know and how can you count them?** (Kids may count by 1s, 2s, or use addition or subtraction to show their thinking.)

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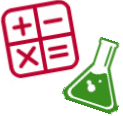


- Pages 10-11 ("Two frogs jump in.")
 - Literacy/Science:** What has happened? **Which animals do you think might LIKE being in the pond?** Which animals might be unhappy about being wet? **How do you know?** What do you think will happen next?
- Pages 14-15 ("Two frogs hop out.")
 - Math:** Do you think there are **more or fewer animals** in the pond than before? How do you know? How can you count them?
 - Literacy:** What has happened? **What are the animals doing?** What do you think will happen next?
- Pages 18-19 ("The bird flies away.")
 - Science:** **What do we know about frogs and turtles and how they can swim?** Can the girl swim? What do you think?
 - Literacy:** What is happening on these pages? **What is surprising to you?** What are the animals doing? What is the girl doing? What do you think will happen next?

Extending through discussion:

- Science:** Why do you think the girl is feeding the fish? Do you think this is a natural pond or one made by the girl's family?
- Math:** Animals jumped in and jumped out of the pond. What did you notice about animals getting in and out of the pond?
- Literacy:** What were the different animals in this story? What happened to them? Which animals do you think LIKED being in the pond, and which didn't? How do you know?

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Math/Science Bookmark Guide

SPLASH!

Exploring the book:

- Pages 2-3 ("I have a pond...")
 - Math:** How many animals are in the pond? How many animals are outside of the pond? Let's keep track of how many are in and out of the pond as we go through the story.
 - Science:** What kinds of animals live in a pond? What kinds of habitats do you see, and how are they different?
- Pages 4-5 ("My cat comes home.")
 - Math:** Let's see how many animals are in the pond and out of the pond. **Are there more animals IN the pond or OUT of the pond?** Use the picture to show us how you know.
 - Science:** Where do turtles live? Can turtles live underwater? How do you know?
- Pages 10-11 ("Two frogs jump in.")
 - Math:** What do you notice about how many animals are in the pond? How many animals are in the pond? How many animals are outside of the pond? (Offering opportunities for young mathematicians to compare quantities and use the illustrations and context to describe their thinking)
 - Science:** What animals cannot live under water? Which animals live in the pond?
- Pages 12-13 ("My dog and cat climb out.")
 - Math:** How many animals got out of the pond? **Now how many are in the pond? How many out of the pond?** (Offering opportunities for young mathematicians to compare quantities and use the illustrations and context to describe their thinking – possible prompts if comparisons don't naturally emerge: **Are there more or fewer in the pond?** How many more/fewer?)
 - Science:** What do you think will happen to the dragonfly?

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- Pages 18-19 ("The bird flies away.")
 - Math:** How many frogs need to hop into the pond for ALL the frogs to be in the pond? How do you know?
 - Science:** Do animals need water? Do all the animals on these pages need water?

Exploring and extending the thinking:

- Math:** Invite students to return to a favorite page in the story (such as page 12.) Use the illustration to **write a number sentence and act out** (with blocks) **what happened in the story.** Invite children to use numbers to describe what they are noticing on this page. (e.g.. "I see that three animals got out, and one jumped in" or "I notice that 10 animals are in the pond and four animals are out of the pond.")
- Science:** Asking students to think deeply about the pond and the living organisms in and near the pond allow for a deeper dive into creative and critical thinking. **Do you think this is a natural pond or a pond made by the girl's family? Are ponds made of saltwater or freshwater? Are there other kinds of animals or insects that live in ponds that were not in this story?** Look at the plants in the pond, do you think those are real plants or plants made from plastic used for decoration?

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Literacy Bookmark Guide

SPLASH!

Let's read this fun story again! This time let's pay special attention to how the illustrations help the words tell the story. What do we notice about what's happening in the story from what the illustrations show?

Exploring the book:

- Pages 4-5 ("My cat comes home.")
 - **What do the illustrations on these pages tell us about what is happening?** What are the cat and dog doing? How are they feeling?
- Pages 8-9 ("My cat falls in.")
 - What do the illustrations on these pages tell us about what is happening? **What are the cat and dog doing?** How are they feeling? What are the other animals doing?
- Pages 14-15 ("Two frogs hop out.")
 - What do the illustrations on these pages tell us about what is happening? What are the cat and dog doing? **How are they feeling?** What are the other animals doing?
- Pages 18-19 ("The bird flies away.")
 - What do the illustrations on these pages tell us about what is happening? What are the cat and dog doing? How are they feeling? **What are the other animals doing?** What is the girl doing?

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- Pages 22-23 ("My dog is sad.")
 - What do the illustrations on these pages tell us about what is happening? What are the cat and dog doing? How are they feeling? What are the other animals doing?
What is the girl doing?

Exploring and extending the thinking:

- The words and illustrations in this book worked together to tell a story. **What was your favorite part, and why? How did you use the words and illustrations to understand what the animals were doing and feeling?** Use paper, pencil, and crayons to show your favorite part of this story, using words and illustrations to describe what is happening.

[STORY TIME STEM]



Integrated Bookmark Guide

WHAT FLOATS IN A MOAT?

Introducing the book:

- Looking at cover:
 - This book is called *What Floats in a Moat?* **What do you notice about the illustration on the cover? What might this book be about?** (Prediction)

Exploring the book:

- Pages 1-2 ("Archie...stopped")
 - Literacy:** What is a moat? What is the problem Archie is trying to solve?
 - Math:** What do you notice about how Archie is problem solving?
- Page 3 ("'Or' said Skinny")
 - Science:** What do you think they mean when they say, "This is the time for science"?
- Page 6 ("Archie...climbed aboard.")
 - Science/Literacy:** What do you think will happen when they launch a barrel full of buttermilk in the moat?
 - Math:** Do you think the SS Buttermilk will float? Why or why not?
- Pages 9-10 ("and sank")
 - Science:** What do you observe?
 - Math:** Why do you think the SS Buttermilk sank?
 - Literacy:** What do you think Archie will try next? How might Archie be revising his plan?

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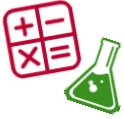


- Pages 17-18 ("Archie...climbed")
 - Science, Literacy, Math:** What do you think will happen when they launch the empty barrel? Why do you think that?
- Pages 23-24 ("'Indeed,' said Archie...")
 - Science:** What might be different about the SS Ballast from the other barrel ships?
 - Literacy:** What went wrong with the SS Empty?
 - Math:** What is Archie doing to try to problem-solve?
- Page 26 ("Heave, heave, heave")
 - Literacy, Science, Math:** What do you think will happen when the SS Ballast is launched? Why do you think that?

Extending through discussion:

- Literacy:** What was the problem Archie and Skinny were trying to solve, and how did they solve it?
- Science:** Have you ever seen something sink or float? What was that like?
- Math:** Where else might objects float or sink, and why? (bathtub, puddle, ocean, soup, etc.)

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Math/Science
Bookmark Guide

WHAT FLOATS IN A MOAT?

Exploring the book:

- Page 7 (“Push!”)
 - **Math:** Why is Skinny having to push so much to get the barrel into the moat? What makes you think that?
 - **Science:** How full do you think the barrel is? (ex. half full, completely full, empty) What will happen when they put the full barrel in the water?
- Page 9 (“and sank”)
 - **Science:** Why do you think that the barrel full of buttermilk sank?
- Page 12 (“Archie... gazed”)
 - **Math/Science:** Why is Archie back at the table sketching and scribbling? What science problem is Archie trying to solve?
- Page 17-19 (“Archie... climbed”)
 - **Math:** What is different about the way Not-So Skinny the Hen pushes the barrel into the water this time? Why do you think it was different?
 - **Science:** What do you think this barrel will do? Why do you think so?

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- Page 23 (“Indeed”, said Archie)
 - **Math:** How much of the buttermilk do you think Skinny the Hen drank? Why do you think that?
 - **Science:** So far, they have tried a barrel full of buttermilk and an empty barrel; what do you think they are going to try now?
- Page 25 (“heave, heave, heave”)
 - **Math:** How does pushing this barrel (S.S. Ballast) compare to pushing the other barrels? (the S.S. Buttermilk & the S.S. Empty)
- Page 28 (“but floated”)
 - **Science:** What do you observe about the barrel now? Why do you think Archie was able to stay afloat?

Exploring and extending the thinking:

- **Math:** Discuss the process that Archie went through in working to solve his problems. How many different solutions did he come up with? How did he use what he learned from earlier attempts help him with his next idea? (For older children this discussion could be paired with Math Practice Standards – MP1 “Make sense of problems and Persevere in solving them”)
- **Science:** Consider experimenting with the concepts in this story at home using plastic water bottles, water filled at different levels in the bottles, and a large container of water. Why did the name of the barrel change through the story?

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Literacy Bookmark Guide

WHAT FLOATS IN A MOAT?

Let's read this fun story again! But this time let's pay special attention to the kinds of words the author uses to describe what Archie and Skinny are doing. So many interesting words!

Exploring the book:

- Page 2 ("He measured and mapped.")
 - **What words did you hear? What did Archie do?** (Measured and mapped; doodled and drew; sketched and scribbled and scrawled). **What are those last five words like? What does it look like when you do those?** Let's keep an ear open for other interesting words!
- Page 5 ("The hen and the goat...")
 - **What words did you hear? What did Archie do?** (Hammered and nailed; clanged and banged; wired and tied and built.) **What are those last five words like? What does it look like when you do those?** Let's keep an ear open for other interesting words!
- Page 7 ("Push!")
 - **What did Archie tell Skinny to do?** (push, shove, heave). **How are these words the same, and how are they different? What does it look like to push, shove, and heave?** (act it out)

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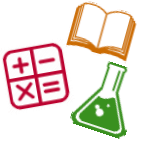
- Page 15 ("Skinny held her nose...")
 - **What is Skinny doing on these pages? What words did the author use to describe this?** (Slurped, guzzled, gulped, sipped.)
 - **How are these words the same, and how are they different? What does it look like to sip, slurp, gulp, and guzzle?** (act it out)
 - Listen for any of the words we've talked about so far as we read the rest of the story!

Exploring and extending the thinking:

List of interesting words the author used:

- Measured, mapped, doodled, drew, sketched, scribbled, scrawled
- Hammered, nailed, clanged, banged, wired, tied, built
- Pushed, shoved, heaved, splashed
- Sipped, slurped, gulped, guzzled
- Sank, float
- Draw a picture that shows at least two of these words, and write sentences to describe what is happening in the picture
- Choose 3 words and act them out in a skit to show what these words look like in action.

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Integrated Supplemental Guide

WHO SANK THE BOAT?

Introducing the book:

- Looking at cover:
 - This book is called *Who Sank the Boat?* **What do you notice about the illustration on the cover?** What might this book be about? (Prediction)
 - What does the word “**sank**” (or sink) mean?
 - Science/Math:** Have you ever had to **balance** your body? Maybe at recess?
 - Have you ever **lifted something really heavy**? How did it feel?
 - What about **lifting something that is not heavy**?
 - What are the objects that you can share that are **heavy or light**?

Exploring the book:

- Pages 3-4 (“They were good friends...”)
 - Math:** **How many animals do you see?** How can you count them?
 - Literacy:** **What are the animals doing?** What will happen next? Who do you predict will sink the boat, and why do you think so?

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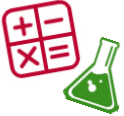


- Pages 5-6 (“Was it the cow...?”)
 - Science:** **Do you know what the word tilted means?** Can you show me with your body?
 - Math:** **Will the other animals tilt the boat the same way?** Why or why not?
 - Literacy:** **What is the cow doing? What do you think will happen?**
- Pages 9-10 (“Was it the donkey...?”)
 - Science:** **What does “balanced her weight” mean?** Can you show me what that looks like?
 - Literacy:** **What is the donkey doing? What do you think will happen?**
 - Math:** **Now that the donkey is getting in, what do you notice about the boat?**
- Pages 17-18 (“Was it the sheep...?”)
 - Literacy:** **What is the sheep doing? What do you think will happen?**
- Pages 21-22 (“Was it the little mouse...?”)
 - Literacy:** **What is the mouse doing? What do you think will happen?**
 - Science:** **Who do you think sank the boat? How did that happen?**

Extending through discussion:

- Literacy:** **Was your prediction correct?** What was your favorite part of the story?
- Science:** **Who sank the boat, and why do you think so?**
- Math:** **What do you think would have happened if the animals had gotten into the boat in a different order?**

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Math/Science Bookmark Guide

WHO SANK THE BOAT?

Exploring the book:

- Pages 3-4 ("They were good friends")
 - Science:** Which animal do you think is the heaviest? Lightest? Smallest? Biggest?
- Pages 5-6 ("Was it the cow...?")
 - Math:** Look at all those animals waiting to get into the boat! **How many animals are on the dock waiting to get in the boat?** How many are in the boat? How many in all? Are there more animals in the boat or on the dock?
 - Science:** **Why does the boat look tilted to one side?** Does it look safe?
- Pages 11-12 ("No, it wasn't the donkey...")
 - Math/Science:** What do you notice about the boat now? Does it look tilted or balanced? Why is the boat not tipping into the water now that the donkey got in?
- Pages 13-14 ("Was it the pig...?")
 - Math/Science:** Look at the pig in the boat, when the pig stepped in the boat **does it look balanced or unbalanced?** How do you know?
 - Math:** **Now how many animals are on the dock? How many in the boat? How many altogether? Are there more animals in the boat or on the dock?**

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- Pages 15-16 ("No, it wasn't the pig...")
 - Science:** Look at the boat in the water, what do you see? **What is making the boat sink down?**
- Pages 19-20 ("No, it wasn't the sheep...")
 - Math/Science:** **Why is the boat not tipping now that the sheep got in?** Would it be balanced if the mouse sat there instead?
- Pages 21-22 ("Was it the little mouse...?")
 - Science:** **Did the mouse get in the boat safely?** What do you think will happen next?
 - Math:** **Now how many animals are on the dock?** How many in the boat? How many altogether? Are there more animals in the boat or on the dock?
- Pages 23-24 (Do you know who sank the boat?)
 - Science:** **Who do you think sank the boat?** Why do you think so?

Exploring and extending the thinking:

- Math/Science:** Consider using a felt story boat throughout the story, allowing children to add animals to the boat and count the remaining animals left on the dock. **Compare the total quantity of animals to the total quantity before the change** (there are always 5 animals). Compare the total quantity of animals on the dock and in the boat.
- Math/Science:** **What might have happened in this story if the animals got in the boat in a different order.** What makes you think that?
- Math/Science:** **If just one animal got in the boat, where could they sit in order to keep the boat balanced?** (The cow? The mouse?)

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Literacy Bookmark Guide

WHO SANK THE BOAT?

In this funny story there are five very different animals. Let's visit the story again, this time paying attention to how each of these animals is described as it tries to get into the boat!

Exploring the book:

- Pages 5-6 ("Was it the cow...?")
 - **What is the cow doing as she tries to get in?** (...almost fell in...tilted the boat...made such a din.)
- Pages 9-10 ("Was it the donkey...?")
 - **What is the donkey doing as she tries to get in?** (...balanced her weight...get in the bow before it's too late.)
- Pages 13-14 ("Was it the pig...?")
 - **What is the pig doing as it tries to get in?** (...as fat as butter...stepped in at the side...caused a great flutter.)
- Pages 17-18 ("Was it the sheep...?")
 - **What is the sheep doing as it tries to get in?** (...knew where to sit...level the boat...so she could knit.)
- Pages 21-22 ("Was it the little mouse...?")
 - **What is the mouse doing as it tries to get in?** (...last to get in...lightest of all...could it be him?)

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Exploring and extending the thinking:

- Discuss how the descriptive phrases rhyme.
 - What is rhyme?
 - How do we think about or write something that rhymes?
 - Think of something you would do, or how you would get into the little rowboat, and how you would say this in a way that rhymes.

Vocabulary

- Balance
- Bow
- Din
- Flutter
- Knit
- Level
- Tilt
- Weight