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Franklin finds a home : an original mathematical story for children seven to nine years of age

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Franklin Finds A Home

An Original Mathematical Story for Children Seven to Nine
Years of Age

By

Rachel Greenblat

Mentor: Sal Vascellaro

Submitted in partial fulfillment of the requirements of the degree of Master of
Science in Education
Bank Street College of Education
April 2014

Franklin Finds A Home
An Original Mathematical Story for Children Seven to Nine
Years of Age
By Rachel Greenblat

Abstract

Franklin Finds a Home is an original story written for children seven to nine years of age. In the story, the reader accompanies Franklin, a fish in a fantastical underwater world, on a journey to find a new apartment. Franklin encounters obstacles when his most prized possession, his eartharium, fails to fit through various front doors. After his first attempt, Franklin finds a new apartment, but unfortunately, the doorway is still too small. During his next attempt, he begins to understand why his eartharium will not fit. As Franklin realizes the criteria needed for the front door, the reader is following along using the illustrations as clues. Using mathematical thinking, Franklin is able to find the perfect apartment. The mathematical concepts embedded in the story are measurement, length, width, perimeter and area.

The rational section of this independent study describes the writing process that led to the final version of *Franklin Finds a Home*; the development of children ages seven to nine, with a focus on Piaget's theories of the development of mathematical thinking; literary aspects of *Franklin Finds a Home* and how *Franklin Finds a Home* compares to other children's literature that embed mathematical concepts; and finally children's responses to *Franklin Finds a Home*.

To the math teachers who sparked my love of numbers.

To Sal Vascellaro, for helping me find my teacher self.

For my parents, for always knowing.

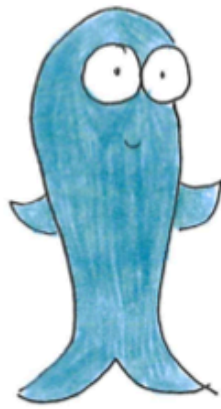
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Franklin Finds a Home is conceived in the typical picture-book format. It is intended to be read from left page to right page, with a relationship between the two pages.

The intended format is 8"x8" with all the even page numbers falling on the left side and all the odd page numbers falling on the right side.

Franklin
Finds a Home



Rachel Greenblat

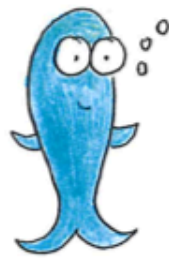
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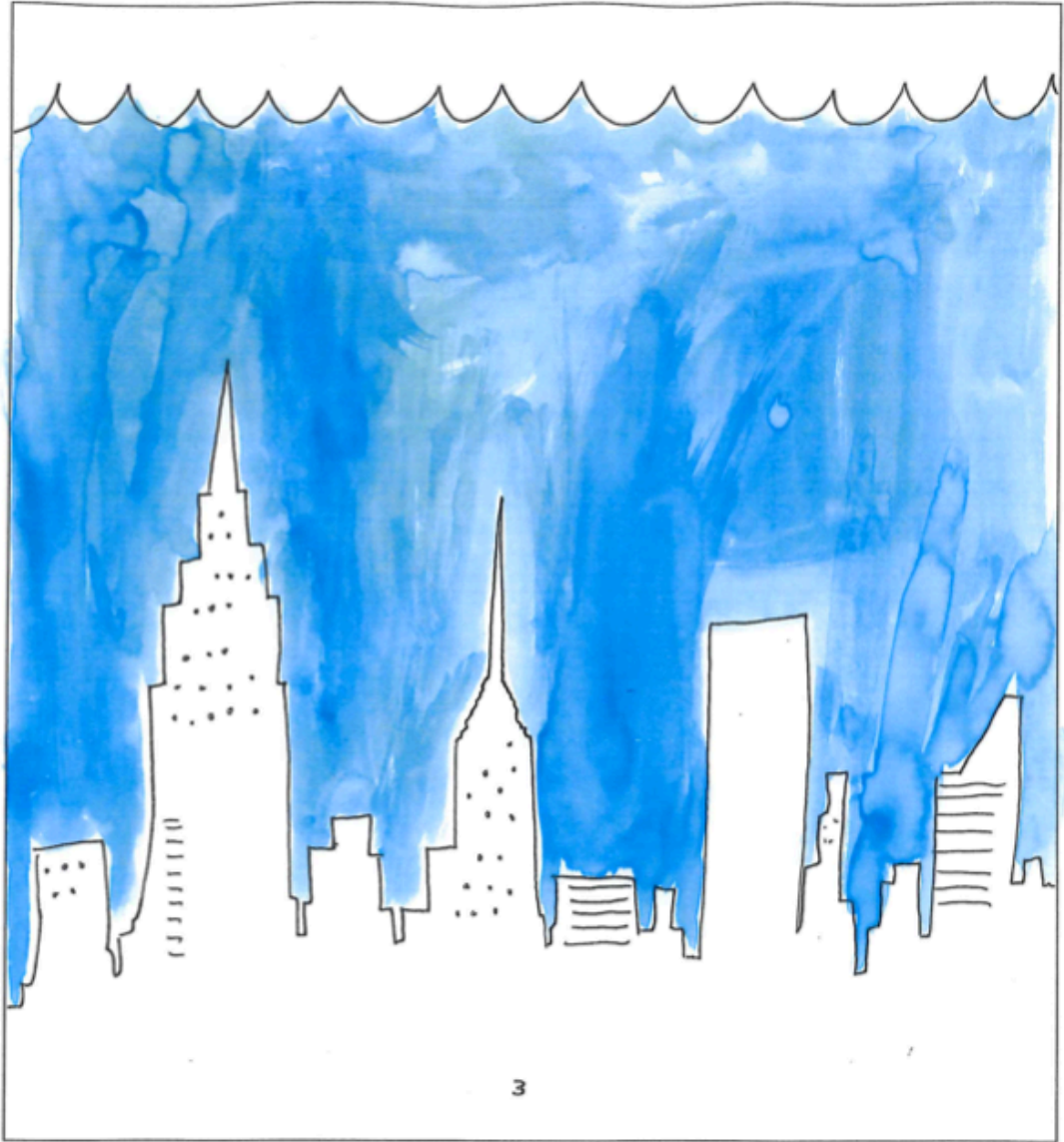
Because math is the best

1

Franklin spent his whole life in the country.

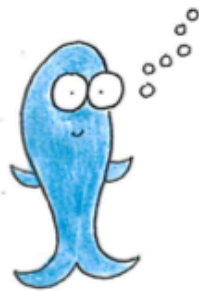
After giving it careful thought, he decided it was time to move to the big city.

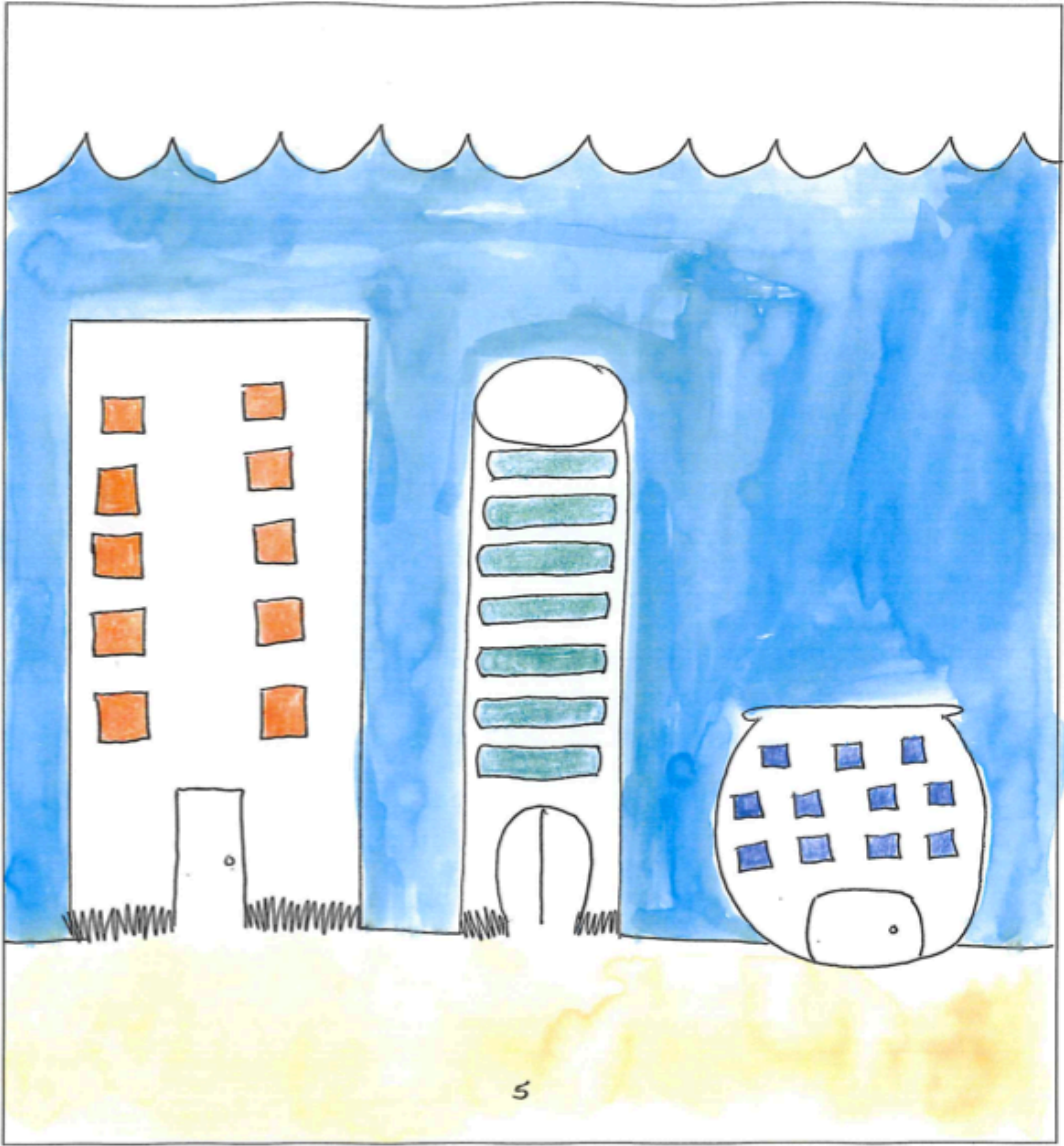




*He looked at apartment after apartment
after apartment.*

*Days went by and Franklin was starting to
lose hope.*



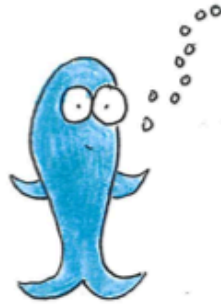


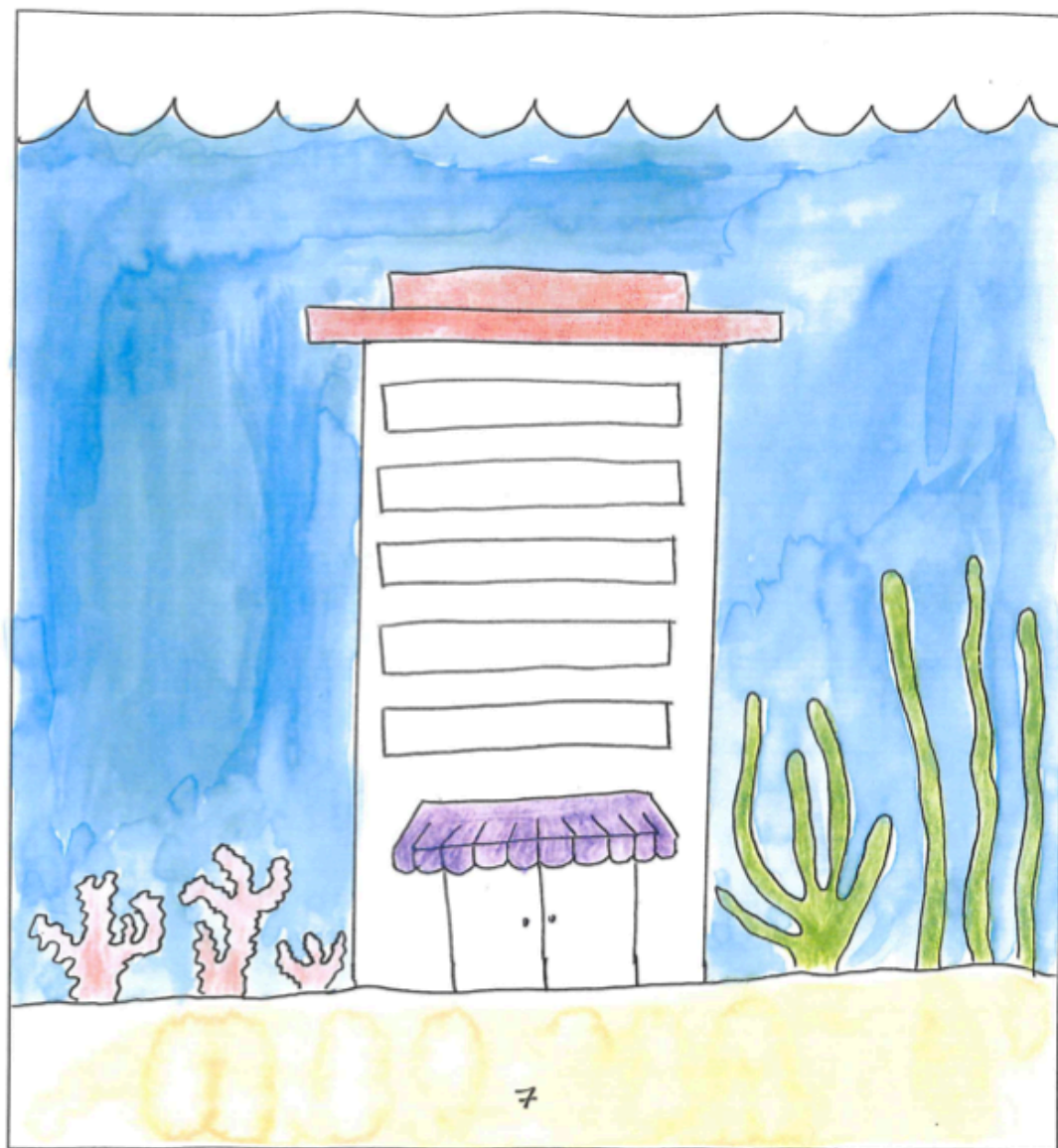
*But then, he found an apartment that
seemed perfect.*

*It had a view of the coral reef on the
west side,*

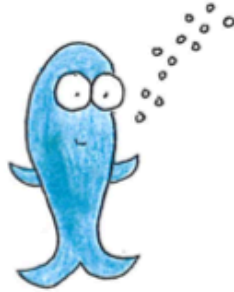
and a seaweed garden in the back,

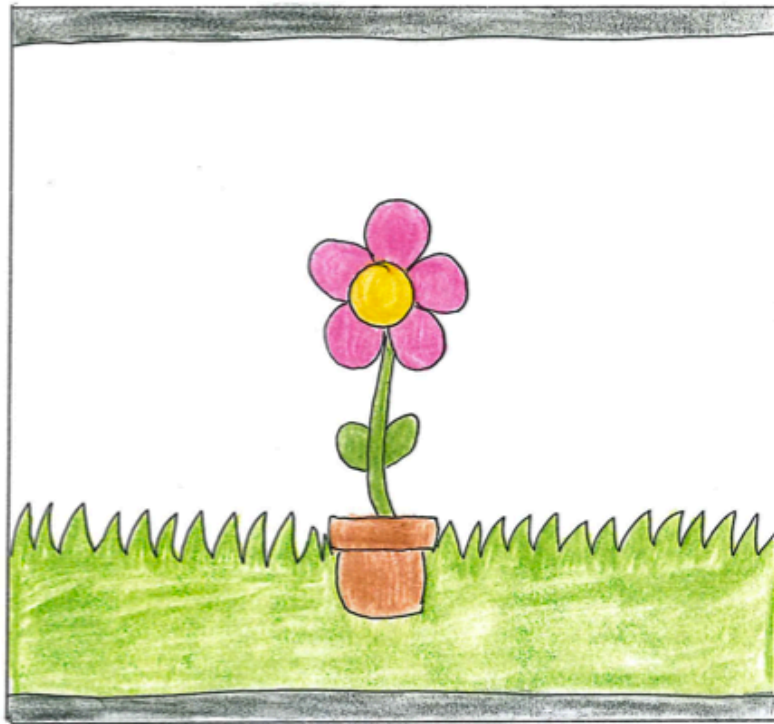
*and a cozy inside where any fish could
feel at home.*





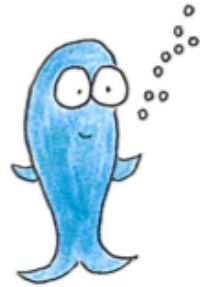
On moving day, Franklin couldn't wait.
Fish don't wear clothes,
so packing was easy.
All he needed to bring was his eartharium.
Ever since he was a guppy,
Franklin was fascinated by the creatures
that live above the surface.
And last year,
his mom and dad got him his very own air
breather.





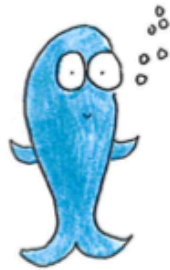
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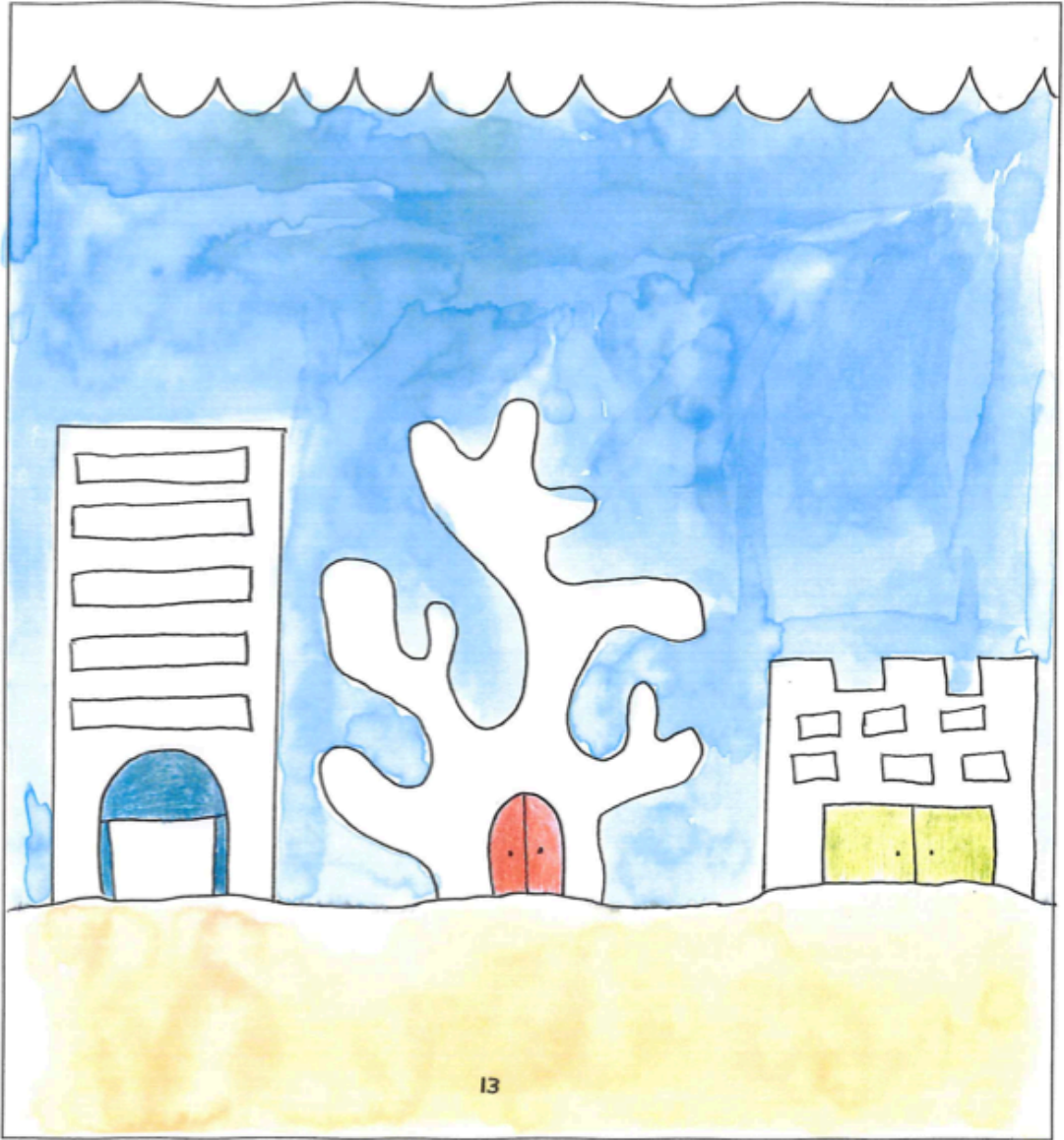
Franklin arrived,
eartharium in tow.
He entered the building's door,
but something was wrong.
Without looking behind him,
he tugged his wagon handle.



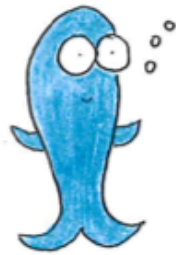


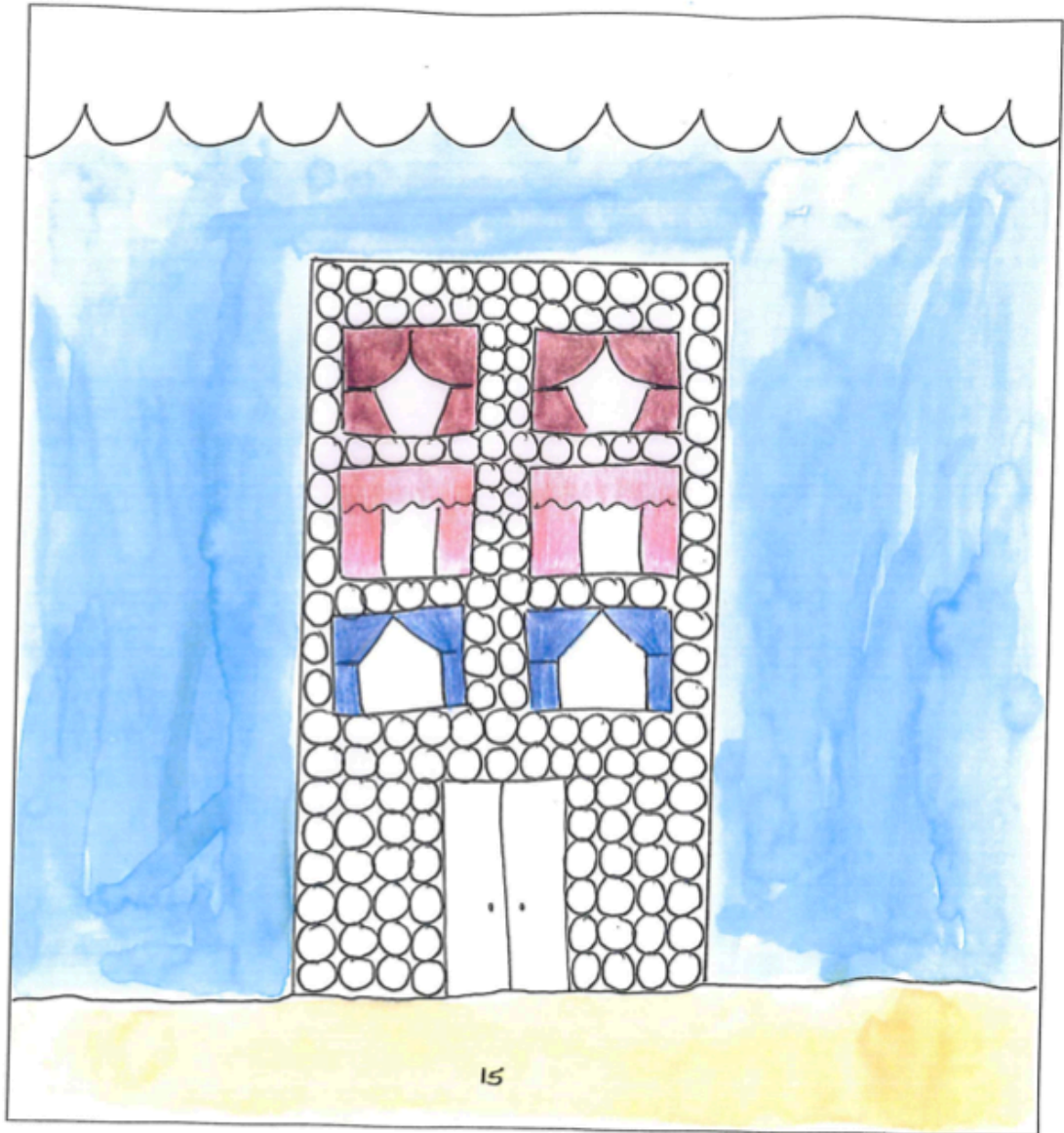
"I can't live in a apartment if my
eartharium won't fit inside,"
Franklin thought.
So the search began again.





The next apartment was even better.
It was covered in abalone shingles that
shimmered in the afternoon sun.
This front door was bigger.
"My eartharium is bound to fit through
this door!" Franklin thought to himself.





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When moving day arrived once more, the door still wasn't the right size.

"How can this be?" Franklin exclaimed!

He went back outside to take a look.

He looked at his eartharium.

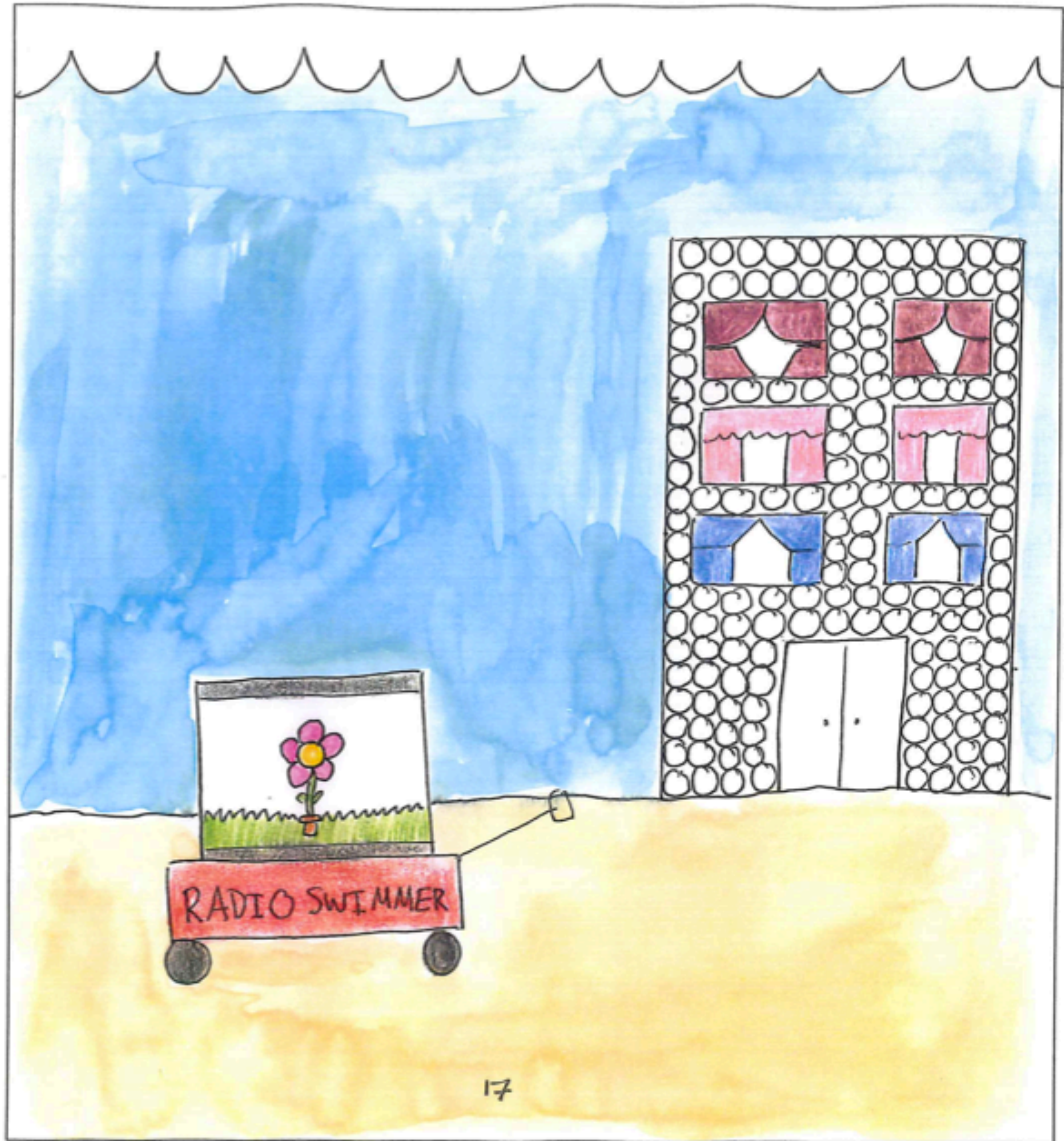
Then he looked at the front door.

He looked back at his eartharium, and back at the front door.

"I don't understand how this can be," Franklin thought.

So he swam to the top of his eartharium.



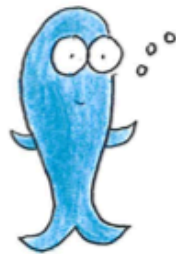


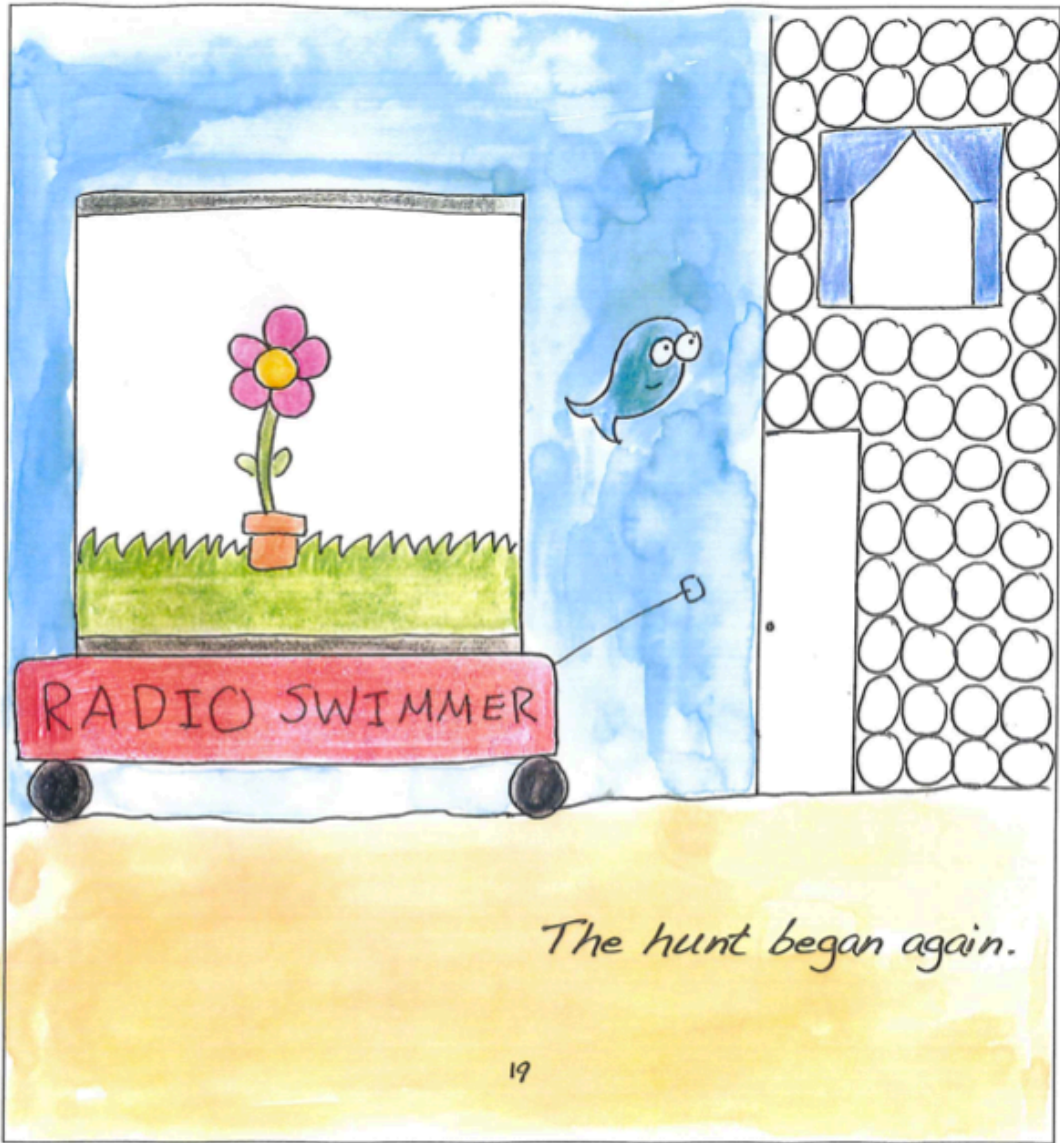
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As he swam towards the top of his eartharium, the sun reflected off one of the shingles and caught Franklin's eye.

"The shingles!" Franklin shouted, "The doorway is 6 shingles high but my eartharium is 10 shingles high!"

I need to find a doorway that is at least 10 shingles high."



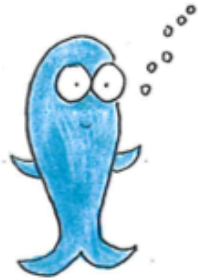


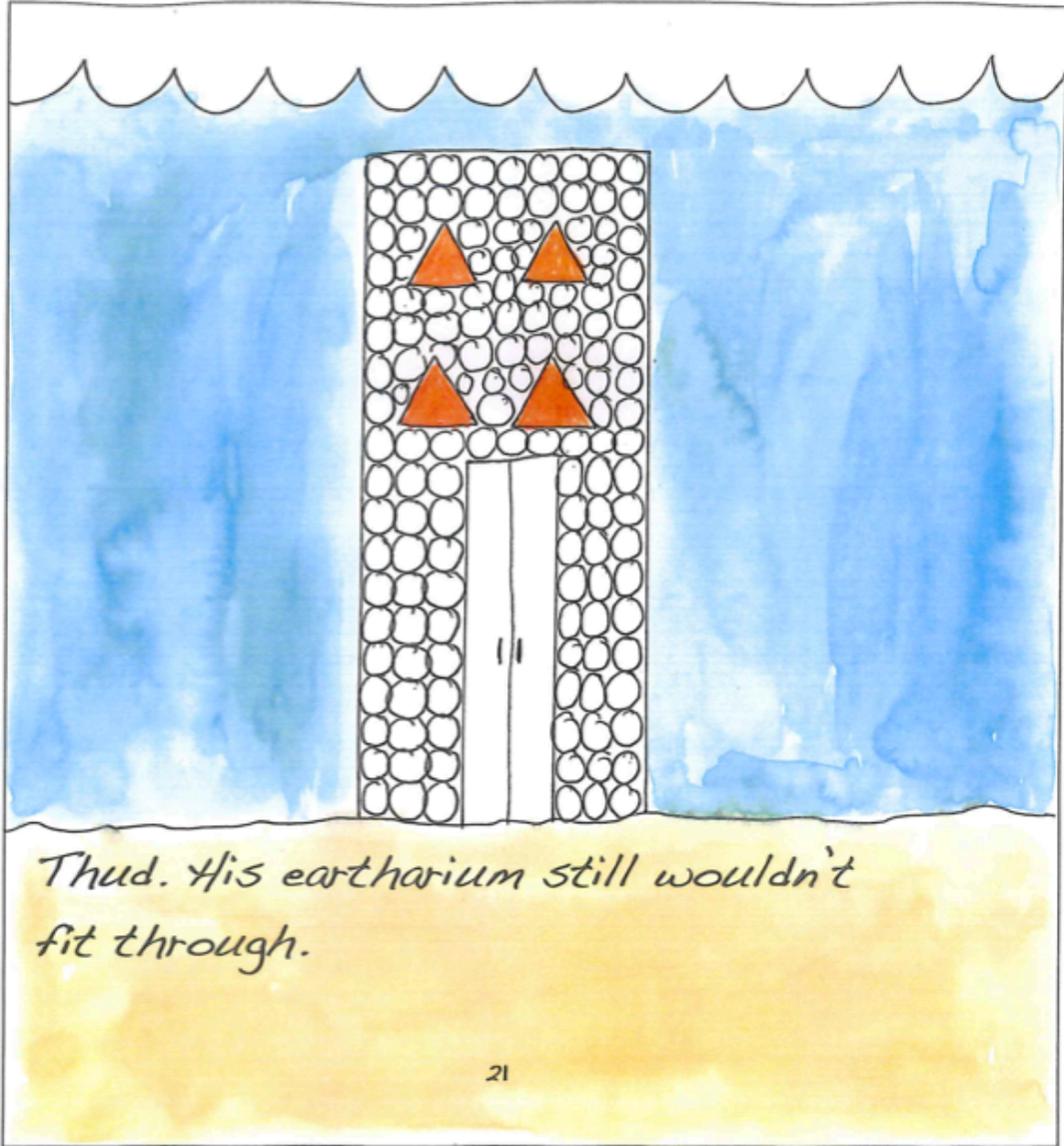
The hunt began again.

Franklin found a new building with the same beautiful shell shingles.

This time, the building had a doorway that was exactly 10 shingles high.

"This should work!" Franklin said as he went through the door with his eartharium in tow.





"How can this be?"

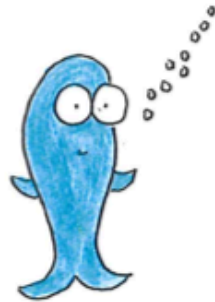
Once again, Franklin went outside to take a look.

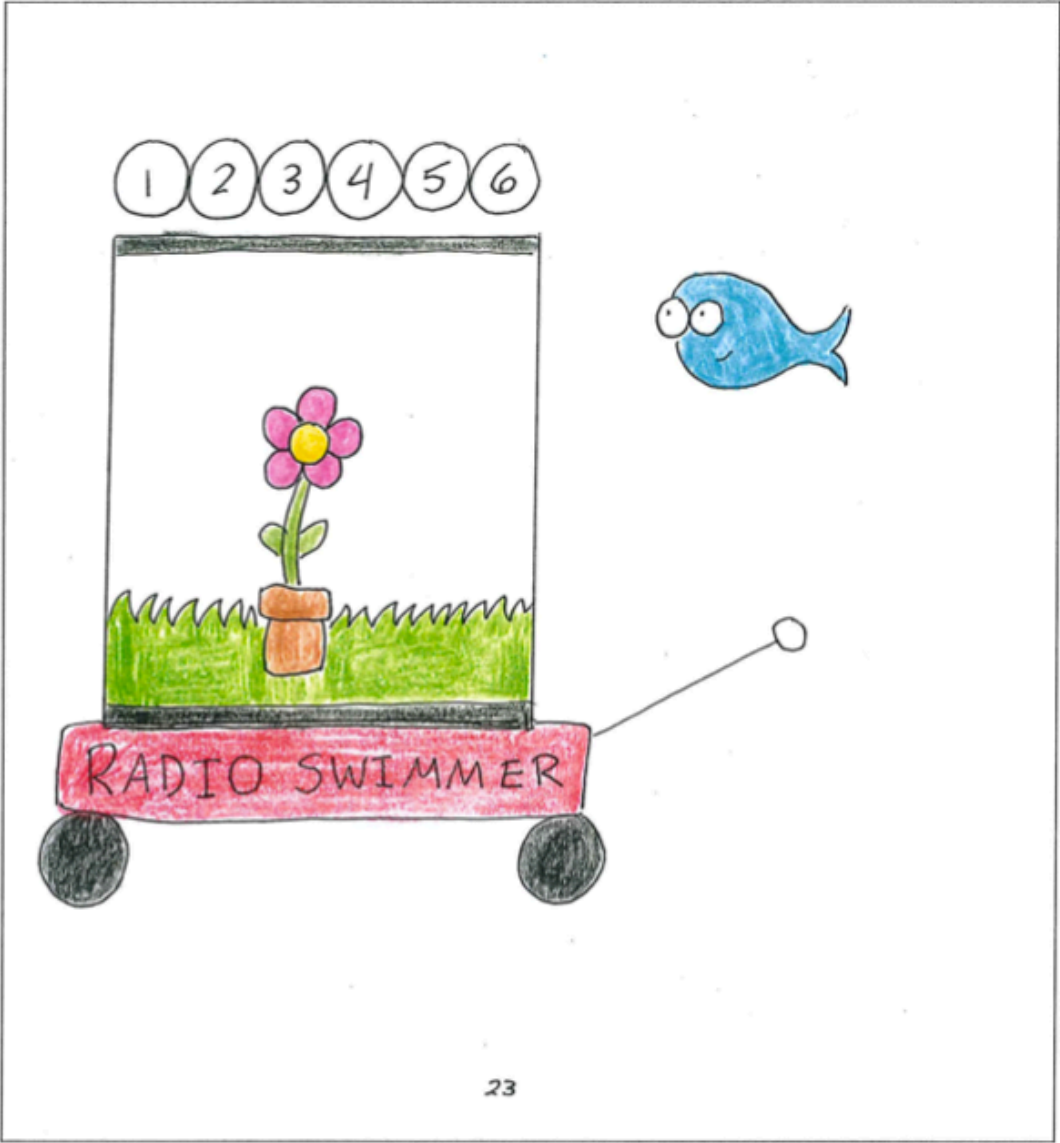
"The doorway is tall enough. Why won't my eartharium fit through?"

He swam to the top of his eartharium.

Then he swam across the top.

"I see! My eartharium is 6 shingles wide but the door is 3 shingles wide!"





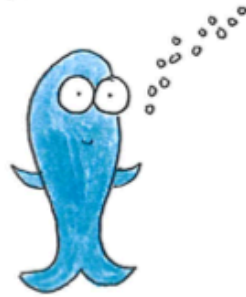
"I need to find an apartment building with a door that is at least 10 shingles high and 6 shingles wide."

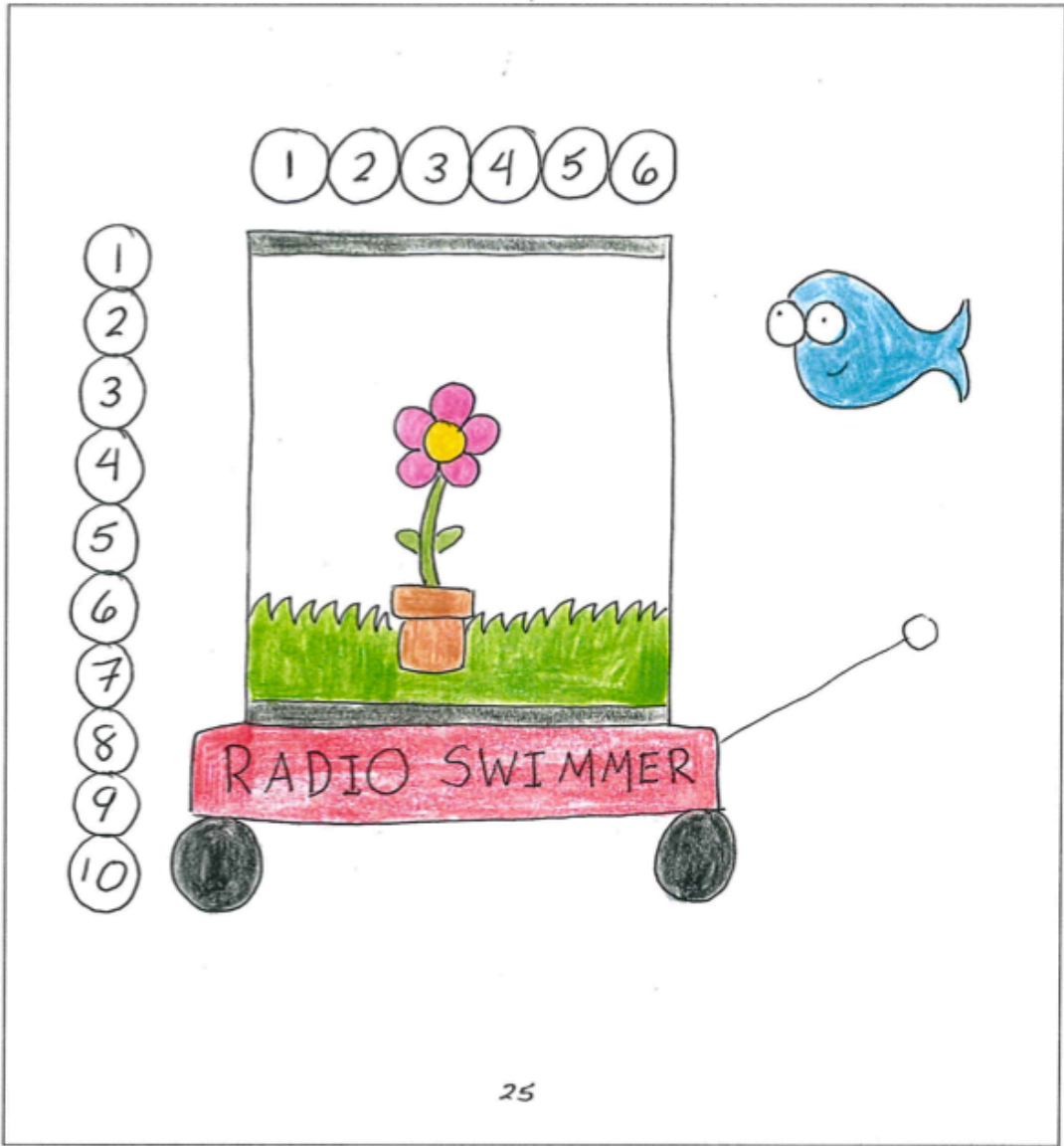
The hunt began again.

After days of searching once more, Franklin found it.

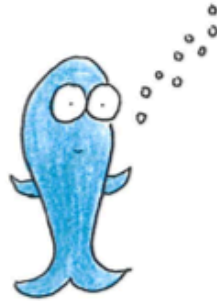
The front door was enormous, 15 shingles high and 12 shingles wide.

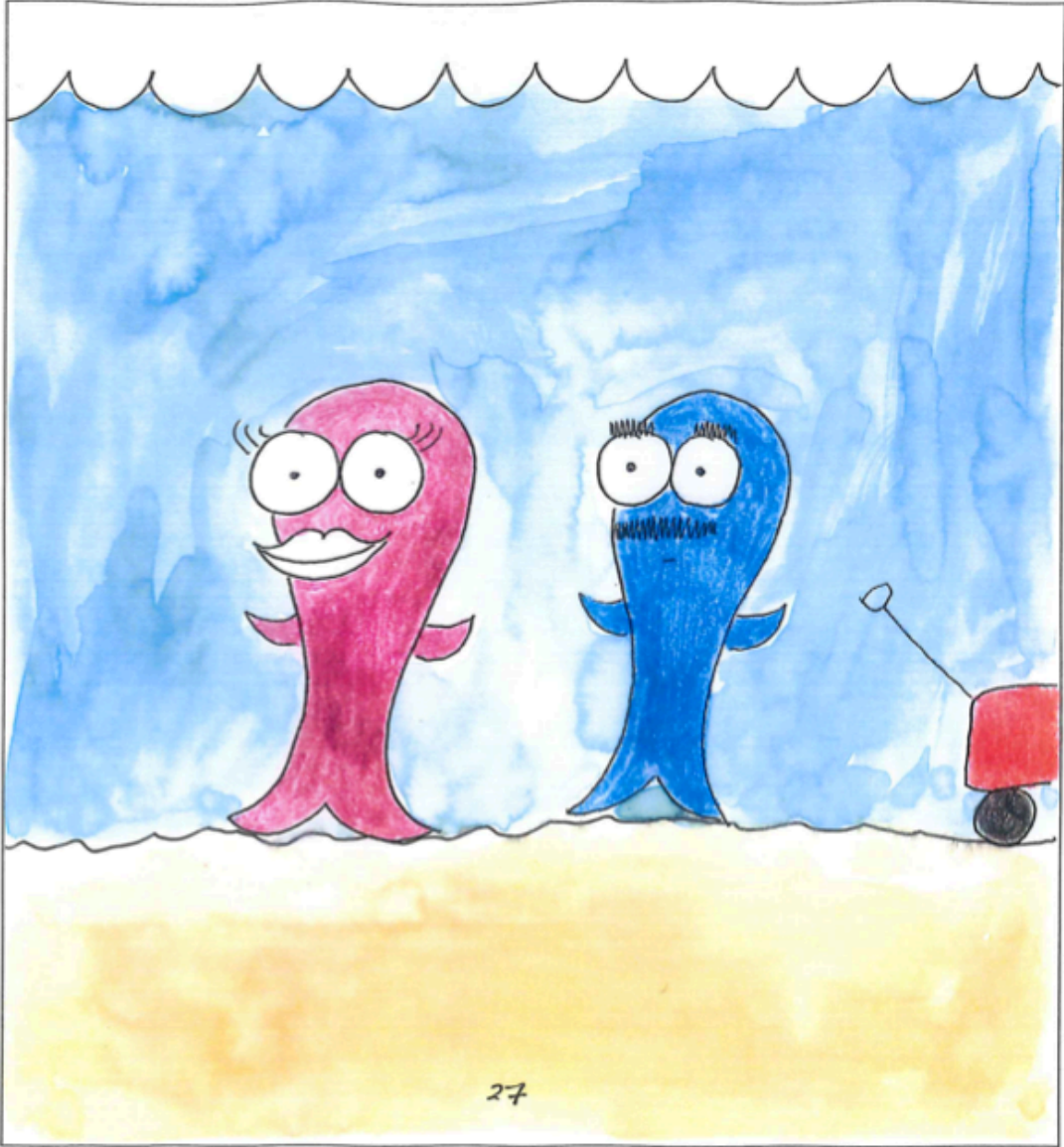
Franklin was so excited and he moved right in.



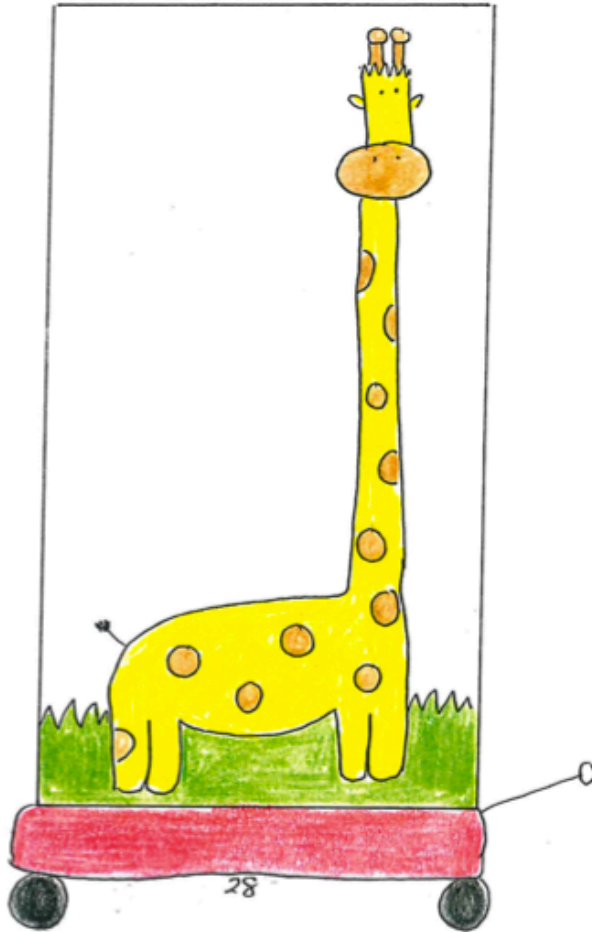


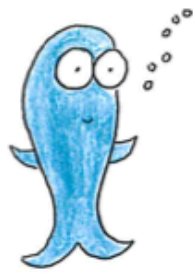
One day,
Franklin's mother and father surprised
him with a visit.
When he met them outside,
he couldn't help but notice what was
in his father's wagon.





*"I think its time to move back
to the country."*





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Franklin is Born:
The Writing Process

When I look back on my educational past, my strongest memory is of my math experience. I remember counting, sorting, exploring shapes, learning basic functions and facts, pre algebra, pre calculus and AP calculus. I remember spending free periods in high school with my math teachers and best friend mastering formulas and laughing. I remember the feeling of satisfaction when I proved an equation and when I could help a friend. I took pride in being known as "the one to be partners with," and I was happy to be considered a "smart kid." I just loved math.

A year into my time at Bank Street, I took the Math for Teachers course. I have not been in a "math classroom" since senior year of high school, and I had forgotten what it was like. I did not realize how much I missed it until I was back. Math had always been fun for me and it usually came easily. I did fine remembering steps and formulas. I did not really think about different ways to solve a problem, because I did not have to. I always understood what the teacher was saying. It also never occurred to me what it would be like to feel completely confused. Since I understood what was going on, I figured everyone else should too. My math instructor changed my perspective on mathematics and I will be forever grateful. It is not just about the answer. It is about the math. It is how you get to the answer that matters. He taught me that there are several different ways to get to the end result. He taught me that no two brains are the same. I had learned this in my child development course but it didn't click till this class. People learn differently, and as long as you understand how numbers work, it does not matter how you get the solution. In one session, the instructor said that there aren't enough children's books

that teach math concepts. That is when I knew I wanted to set a goal for myself. I want to be a published children's author who teaches math in an enjoyable way.

Then I enrolled in Language, Literature and Emergent Literacy. The final project for the course is to write a children's book. I had talked to the instructor about my love of mathematics before taking the course, and he mentioned that this would be the perfect time to create a math concept book for children. I took this course during the summer and I sat through each session completely enthralled. I learned that every aspect of children's literature is thoroughly thought out and every aspect has a purpose, the plot, the setting, the characters, the theme, the structure and the illustrations. Everything.

When I began writing my book, I knew immediately that my main character had to be a fish. I never saw him in any other form. This wasn't just because of my love of aquatic creatures. An imaginary underwater setting sparked my imagination and sounded like more fun. It just happens to be a plus that kids respond well to stories with animals as characters.

I had the idea for Franklin ever since the beginning of the course. In my last student teaching placement I was in a third grade classroom, and there I gained experience teaching area and perimeter. I figured that would be a great place to start. Regardless of the math concept, I knew my character would be a fish so I thought to myself, how can I incorporate area and perimeter into this imaginary sea story. Somehow I recalled my experiences apartment hunting in NYC and how frustrating it can be. Then I thought, I should have Franklin look for a new apartment! But the question still was, how can I incorporate these specific math concepts? I explored the

idea of Franklin needing a certain amount of square footage, but then I was at a loss in figuring out why. I didn't want his reason to be based on budget because that would add more numbers and potentially cloud my initial math idea. Keeping with the idea of square footage, I invented the "eartharium." An "eartharium" is the underwater counterpart to what we know as an "aquarium." It wasn't long before I shifted the idea of floor space to door size.

During the early stages of *Franklin Finds a Home*, I considered enlisting my sister's help for illustrations. She is the artist of the family. For a brief time, I thought that maybe Franklin's story would work with fancy graphics and flawless artwork. But that seemed forced. It didn't fit with the initial vision I had for my story. Then I remembered a dance I choreographed in college about doodling. I love to doodle, so why can't Franklin be a kind of doodle? There is something about the simple nature of doodles that I find soothing and comical. That is the image I wanted for Franklin. So I took my black sharpie and colored pencils and got down to work.

As the course was nearing its end, I didn't feel done with Franklin. I wanted to do more. I wanted to explore ways to use *Franklin Finds a Home* in math curriculum and change my students' opinion about math. I decided that I wanted to find a way to positively support my students' journey as young mathematicians. I decided that I wanted to base my biggest project at Bank Street on Franklin, and I decided to make him the lead character of my thesis.

The book's first look was rough. I initially cut blank paper to the dimensions I wanted, then I cut and pasted the text and illustrations onto the blank paper. And when I say cut and pasted, I literally mean scissors and glue. After several readings,

the corners of the glued edges started curling up, and even some text started falling off. I knew that I would have to redo the book for my final project, but I didn't realize how many changes I would make. I figured I would stick to my sharpie and colored pencil idea and simply redraw the illustrations.

In order to make the layout compatible with the submission format, I had to make my book into single sided pages. This was hard for me because my original format was intentional. I wanted text on the left page with illustrations on the right. This is partly because looking from left to right is a natural movement of the eyes for reading English, and partly because many of my illustrations offer information that the text does not.

As I sat down to redo the illustrations, I had the sudden thought about switching to a finer pen for the outlines. After a trial doodle, I decided that I liked the outcome. The fine pen produced cleaner lines and I found myself pleasantly surprised. Franklin also went through a color transformation. In my initial draft, Franklin was salmon colored. I decided to change his color to a bright turquoise because that is an unusual coloring for a fish, which would add a touch of whimsy. My first draft was completely black and white while Franklin and the eartharium were in full color. I decided to add more splashes of color to enhance the playfulness of the story.

A second grader sparked my idea for the final two changes to my illustrations. One student did not quite grasp the idea that the whole story takes place underwater. She asked me how Franklin could breathe and how he could pull a wagon since he is a fish. I was slightly surprised to hear her confusion because no one else had been

unclear about the setting of the story. I decided to add waves to the landscape illustrations and after mulling it over for a bit, I decided to fill in the background with blue watercolor. I hadn't expected to add any background color at all, but I am extremely pleased with the outcome. I like how the water and sand is subtle, and the brushstrokes are visible which gives the illustrations an unexpected yet delightful texture. I also added bubbles coming out of Franklin on the text pages. I saw the bubbles as another opportunity to add a math element. It is subtle and unrelated to the concept of the story, and I am curious who will notice the pattern.

Throughout writing process I was also consulting references on the developmental connection in mathematics for children ages seven to nine. Section III describes what I discovered and how it relates to *Franklin Finds a Home*. Section IV describes how *Franklin Finds a Home* compares with other children's story books with embedded math concepts. During the writing of this thesis, I read *Franklin Finds a Home* to various classes within the school I teach. Section V describes their reactions.

The Developmental Connection of
Mathematics for Children Seven to Nine
Years of Age

I originally wrote the book for third graders. However, when I read *Franklin Finds a Home* to second grade and fourth grade, I saw that the book was suited to a wider age range than I initially thought. After this discovery, I decided to take a look back into my days in the child development course at Bank Street. Aside from undergraduate psychology, child development was one of my first experiences with Piaget. I will never forget when I discovered Piaget's theory of development and how his ideas shed new light on my own idea of child development. Piaget believed that learning couldn't be explained solely as either internal or external. Learning happens when children interact with their own environment. Children learn more when they "construct" learning for themselves by doing their own work and using their own creativity to gain understanding than they would with adult instruction (Mooney, 2000, p. 61-62).

Simply instructing a child how to do something, or telling a child how something works, is not an effective way to teach. This is because a child needs to learn first hand. "...Piaget believed children needed every possible opportunity to do things for themselves" (Mooney, 2000, p.62). This is why children's literature is a great addition a child's school day. The stories can spark curiosity and questions, encourage exploration, pose interesting questions, help solidify understanding, and provide a sense of enjoyment.

Children seven to nine years of age fall into Piaget's Concrete Operational Stage of development. Children within this stage are now able to perform mental operations like combining, separating, ordering and transforming objects and actions. There are different characteristics of children in this stage of development including

new features of thinking, declining egocentrism and changes in social relations (Cole et al., 2009, p 397). *Franklin Finds a Home* is a story in which concrete operational children are able to display those characteristics.

Children are beginning to shift the way they think. They are able to notice and think about more than one attribute of an object at a time. Franklin has a problem finding a new place to live because his eartharium is too big. That problem is introduced initially, but a reader does not yet know why the eartharium won't fit. As Franklin continues his hunt, characteristics about the eartharium are revealed. Students reading this book must be able to consider every attribute of the eartharium given in order to figure out what Franklin needs to do (Cole et al, 2009, p. 397).

Children ages seven to nine are no longer thinking in an exclusively egocentric way. They are now able to communicate about objects a listener cannot see. Since they can now consider multiple aspects of an object, they can tell someone about it. When I read the story to four classes ages seven to nine, all four classes were able to explain why Franklin's eartharium was not fitting through the door. The answers varied depending on the age of the child, because a nine year old is more developed than a seven year old. A seven year old only noticed the measuring aspect, while the older children were able to make computations, like perimeter and area.

Not only are children of this age group able to think more abstractly, they are also becoming more organized and flexible. They begin to think of alternative approaches and strategies for problem solving (Cole et al., 2009, p. 397). A younger child might be upset when Franklin cannot find a home. He or she might also not understand that the size of the eartharium and the size of the door both play a role in

Franklin's search. However, children ages seven to nine will realize that "the door is too thin!"

Franklin's eartharium has multiple characteristics. As the story evolves, the reader learns about the length and width. Picture clues also emerge as the story unfolds. "A more difficult classification ability that emerges during middle childhood is the capacity to categorize objects according to multiple criteria" (Cole et al., p. 399, 2009). Children ages seven to nine are able to think about all the characteristics of the eartharium at one time. This helps them solve Franklin's problem.

Planning is also important in the concrete operational stage. In middle childhood, children grow fond of games that require them to solve logical problems (Cole et al, 2009, p.400). When I read this story in four different classrooms, ages seven to nine, all four classes were actively engaged during the whole reading. There were whispers among friends hypothesizing how to solve Franklin's problem during the second reading. In all classes, students called out "Its too thin!" when Franklin found the apartment with a door 10 shingles high.

Marilyn Burns (2007) is in agreement with Piaget, "Children need direct and concrete interaction with mathematical ideas. Continual interaction between a child's mind and concrete experiences with mathematics in the real world is necessary" (p. 27). Children learn best when they can experience something first hand. With a topic as abstract as math, using manipulative materials and stories like *Franklin Find a Home*, are fun and engaging ways to construct understanding.

Perception is not always based on reality. Young children do not always base answers on logical reasoning, they answer based on what they perceive. For example,

they may state that when six objects are spread out, there are more than there actually are. This relates to Piaget's idea of logical necessity and the idea of conservation of numbers. A child perceives that there are more objects even when there are not. Once a person realizes he or she is incorrect, the feeling of misconception causes confusion. This state of confusion is what Piaget calls disequilibrium. This is when you have the most potential to learn something new. You must reorganize your current mental construct to take you out of this confusion. "When you come to new understanding—based on reality rather than on how you perceive reality—you no longer are confused" (Burns, 2007, p. 28). This is the state of equilibrium.

Franklin was in the state of disequilibrium when he did not know why his eartharium wouldn't fit. His perception of the size of his eartharium was false, so he was confused. Once he had reason to look at certain characteristics of his eartharium, he was able to gather information to help him figure it out. He studied his surroundings to understand the actual properties of his eartharium, and he no longer held onto what he perceived. This is when he came to new understanding. Children who read about Franklin's journey will also go through this process of studying and understanding the reality of the eartharium. The illustrations offer clues to help children come to their own understanding.

Many people are familiar with the phrase, "You learn from your mistakes." Once you make a mistake, you are more able to recognize what the problem was and then you learn from it. Burns (2007) agrees with this popular saying and states that, "learning often begins with the recognition of a problem" (p. 29). She believes that the process of equilibrium is essential to learning. Equilibrium a state in which there

is a continuous interaction between your environment and your mental conceptual structures. It is like a battle between what you perceive and what is actually true. The cycle of going from confusion to understanding facilitates the learning. “Confusion is essential to the process” (p. 29). Franklin exclaims, “How can this be?” numerous times throughout the story. Once he realized he needed a doorway at least 10 shingles high, he found one. He thought that would be the solution, but it did not fit again. Then he realized he also needed a certain width. Franklin went through a cycle of confusion and new understanding and he finally figured out how to find the perfect home.

Mathematics relies on logical structures. To successfully learn mathematics is to make sense of these structures. You need to use thinking and reasoning to discover meaning. “Learning mathematical ideas is all about sense making, and the source of the knowledge is internal; that is, it lies inside the learner” (Burns, 2007, p. 31).

Children ages seven to nine are coming to understand logical reasoning, and they are better able to understand the process of learning mathematics. They have built number sense, and have an idea of how the number of objects can stay the same even if their order is manipulated. The ability to understand all of this is inherent.

Children of this age are curious beings, and they want to make sense of numbers.

Burns (2007) believes that using literature in math instruction is beneficial to understanding mathematical concepts. She believes that children’s books can offer students something math textbooks cannot. It can give them a different context to entertain math problems and can do so in a lighthearted enjoyable way. Connecting literature to math can also help those who are struggling, or those who are not

interested. Literature gives these students a new way to look at math concepts. And children who already enjoy math, are able to look at stories in a new way.

When using a story book in a math lesson, it is important to give students time to enjoy the book. Even though a math lesson is the goal, it is important not to jump into it. Let the students have time to absorb the story and look at the pictures. Good read-aloud experiences can have rich discussions afterward. Ask the students what they notice and what the book makes them think about. This is when it is okay to make a math connection, if a student hasn't already made one. It is also a good idea to make the book available after the lesson for students to take a second look (Burns, 2007, p. 45)

Using stories like *Franklin Finds a Home* offers another tool to aid in students developing conceptual understandings. When I read the book to my class of third and fourth graders, one student said, "I like it because it wasn't a real math book; it was fun while also teaching you a math lesson."

A Comparison of *Franklin Finds a Home* to
Other Children's Story Books with Embedded
Mathematical Concepts

I will always remember when my math instructor at Bank Street said that there aren't enough books within the world of children's literature that involve math. That statement was prominent in my mind while writing *Franklin Finds a Home*. In working on this thesis, I attempted to gather as many children's books as I could find that involve math and tell a good story. In my search, I found a handful of books that involve math, and a smaller handful that also has a good story. Since *Franklin Finds a Home* displays a clear math concept within a story, and uses certain literary elements such as a repetitive plot structure, humor, the unexpected, animal realism and illustrations, I selected books that also possess one or all of these qualities.

Franklin Finds a Home does not scream, "I am a math book!" Franklin's journey is focused on math while engaging the reader in an apartment hunting adventure. Franklin's apartment search is filled with problems he must solve. There is a problem on every page that both Franklin and the reader must solve. In the end, Franklin finds satisfaction with solving the problem, and readers will feel this satisfaction as well. There is a mathematical idea here without math being explicitly stated.

Amanda Bean's Amazing Dream, by Cindy Neuschwander (1998) and illustrated by Liza Woodruff, a little girl discusses her love for counting. Amanda tells the reader that she is learning multiplication in school and that her teacher says multiplying is like a faster way to count. She expresses her lack of confidence in her multiplication facts and when she is presented with math problems in her life, she resorts to the comfort of counting. She soon discovers that counting actually does take longer, especially when working with big numbers. As the story goes on,

Amanda gains confidence in her multiplication facts through silly events in a dream. In the end, she is filled with confidence and accomplishes her goal of learning her multiplication facts. Although this book does have an enjoyable story, the math concept is the obvious focal point of the story. As with *Franklin*, readers can follow along with Amanda as she masters her facts.

A story that is more similar to the style of *Franklin Finds a Home* is *The Doorbell Rang*, by Pat Hutchins. The story begins with two siblings and a fresh batch of cookies. Their mother says they can share the cookies between the two of them and they say, "That's six each." This tells the reader that the story started with a dozen cookies. As the story progresses, the doorbell rings and more people arrive. The mother repeats, "You can share the cookies," every time new guests arrive. The siblings always respond with the amount of cookies each person can have.

This book is similar to *Franklin Finds a Home* because the math is tied to the story's plot structure. In this story, the reader is also welcome to solve the math along with the characters. The doorbell rings right as the reader must turn the page. On the following page, the number of new guests is revealed. The fact that the reader must turn the page again to see how many cookies each person gets gives the reader a chance to solve the problem on his or her own.

Repetition in storytelling is important to children. For young children, repetition gives them the chance to follow along and make sense of a story. For an older child, repetition also remains important. In *Writing for Young Children* by Claudia Lewis (1981), she says that repetition is a way of learning. It is a game and a necessity for children. It is also fun. The repetitive structure of the plot within

Franklin Finds a Home is one of the reasons children find the story fun. Children start to see the pattern, which enables them to participate and solve the problem. Franklin repeats the phrase, “How can this be?” several times throughout the story. The first time Franklin asks this question, he looks for a new apartment. Each time, new information is revealed that leads to the solution. Franklin’s repetition of the phrase leads to predictability that helps children ages seven to nine stay engaged.

Anno’s Magic Seeds by Mitsumasa Anno (1995) is an example of a book that also uses repetition. The story begins with a farmer named Jack who receives two magic seeds. He is told to eat one seed that will leave him full for one year. He plants the other seed and it grows into a plant that yields two more seeds. He repeats this process year after year until he tries something new. He plants both seeds, and two plants grow, which yield a total of four seeds. He then eats one seed, and plants the rest. This pattern continues throughout the story and the amount of seeds multiply. As the story goes on, the amount of seeds becomes much greater which can be challenging to keep in the mind. The author adds questions such as, “How many fruits will grow in Jack’s garden next fall?” and “How many seeds did he bury?” to keep reader’s on track.

Franklin and Jack are different in the sense that Franklin has a problem he must solve, and Jack does not. Franklin uses repetition when he repeats the same phrase, “How can this be?” Jack repeats his action because he wants to. Regardless of this difference, the repetition allows readers of both books to follow along and be involved in the story.

Another example of a children's math concept book that uses repetition to help students follow along is *A Remainder of One* by Elinor J. Pinczes (1995) and illustrated by Bonnie Mackain. This is the story of an ant named Joe who is part of a troop called the 25th Army Corps. For a parade one day, the troop lined up in pairs to march along. Since there are twenty-five ants in the squadron, Joe was left partnerless. The queen was not pleased with the uneven arrangement. The next day the troop tried another formation, but again, Joe was still a remainder. This continues to happen day after day until Joe figures out a way for his troop to walk in a perfect array.

Just like *Franklin Finds a Home*, *A Remainder of One* is an enjoyable story with a prominent math element. Joe is faced with the problem of being the "remainder of one" in his squadron. He uses trial and error to eventually discover a solution. Like in Franklin's journey, Joe is faced with a problem that enables the reader to follow along. The use of repetition allows the reader to predict what is coming and stay a step ahead. Joe's different attempts at arranging the squad gives the reader a clue to which combination might be next, and it gives the readers a clue about what the solution could be.

I chose to make Franklin a fish partly because I love aquatic creatures and partly because children love stories about animals. Often characters in picture books are animals. Animals may be personified, or animals may be depicted realistically. Stories about personified animals are of particular interest to children. They are able to identify with the character while enjoying the emotional distance because the character is an animal. This gives children a sense of comfort and safety (Oppenheim

et al. 1986, p. 110). Franklin is dealing with a problem that is a mathematical problem children ages seven to nine might feel insecure about. The bombardment of numbers, symbols and equations that children of these ages experience can be overwhelming. When reading about a small fish grappling with multiple concepts, children tend to enjoy following Franklin on his journey. *A Remainder of One* is also a story that uses personified animals. Joe the ant soldier is struggling to find his spot in line. The desire to fit in can pose a struggle for children ages seven to nine. The fact that he is an ant helps children be removed enough from the story to sympathize comfortably. And this is not the only focus of the story. Math remains central because Joe uses math to figure out where his place in line is.

Elinor Pinczes and Bonnie Mackain (1993) have another book that uses personified ants and math. The book *One Hundred Angry Ants* begins when a group of one hundred ants excitedly state that they are going to a picnic. They start by walking in a single file line. The smallest ant says, “Stop. We are moving way too slow,” and suggests that walking in fifty lines of two will get them there faster. The ant stops the group again and again, and each time suggesting a pattern that shortens the line by walking in larger groups across. Unfortunately for the ants, but humorous for the reader, the ants arrive at the picnic too late.

Reading a picture book might seem easy and quick. But, sometimes it can take even longer to “read” the pictures than the text. Many times readers need to pay close attention, look for clues, and then piece the pictures and words together to understand the story (Lukens, 2007, p. 42). This is true of *Franklin Finds a Home*. If the text stands alone, the meaning of the story still exists, but the illustrations are

there to work in conjunction with the text. The pictures give the reader information the text does not. There are pages where the illustrations sit next to the relevant text and reinforce each other. For example when Franklin “looked at apartment after apartment after apartment,” and the picture on the opposite page is of three apartment buildings. There are also pages where the picture offers more information than the text. If you look closely the first time Franklin’s eartharium does not fit through, you can see that it is obviously too big.

All five of the books I selected use illustrations to work with the text. *The Doorbell Rang* uses illustrations to display what the text is saying. If you were to take away the text and tell the story simply with the pictures, the story would remain the same because Hutchins literally tells the story through pictures. The story takes place in the kitchen, the plate contains a dozen cookies, the mother repeatedly greets new guests, and all the children can be seen dividing up the cookies each time the doorbell rings. *Amanda Bean’s Amazing Dream* uses illustrations to add fun and color to her mathematical journey. The illustrations depict scenes full of opportunities for her to use multiplication. Not only do the pictures illustrate the equations she is working on within the text, but they offer additional chances for the reader to use math. *Anno’s Magic Seeds* uses illustrations as a tool for the reader to keep track of all the seeds Jack is growing. When the numbers become large and challenging to remember, the reader can use multiplication or consult the pictures for the correct number.

A Remainder of One and *One Hundred Hungry Ants* are geared towards older children because of the math concepts they contain. The illustrations in *A Remainder*

of One convey the math with crystal clarity. The pictures are there to help the reader see the arrays the groups of ants make and why Joe is the remainder of one. The illustrations *One Hundred Hungry Ants* engage the older reader because there are so many details the text does not address. Older children are able to focus on multiple aspects of a story. They can understand the math concepts, the storyline, and interpret the additional facts the illustrations provide. The ants are in a hurry to reach the picnic because the pictures tell the reader that other animals, bigger and faster animals are walking away with food in hand. *Franklin Finds a Home* is similar to both of these books because it also provides the reader with clear illustrations that do not distract from the math concepts while conveying more than the text. Additionally, the illustrations are humorous—a fish is looking for an apartment and ants march in a parade.

Children's Reactions to
Franklin Finds a Home

Before embarking on writing this thesis, *Franklin Finds a Home* was never read to a group of children. For my research, I read my book to four different groups of children in the New Jersey independent school in which I work. I read *Franklin Finds a Home* to two second grade classes, the interaged third and fourth grade class I teach, and the fourth grade math class which consists of the fourth graders from my class and the fourth graders from the other third/fourth grade. Here are some of their responses.

My initial instinct for my book was to gear it towards third grade mathematics, which I was then teaching. I had a specific vision, that the book involves multiplication and I would incorporate it into math lessons for my class. My thesis advisor asked me if I thought my book would work for fives, sixes and sevens. I thought that a kindergartener would enjoy the story but would not understand the main concept behind it. A first grader might have the same experience. I still was unsure about reading my book to younger grades so I decided to try reading it to second graders. I didn't know what to expect and I was pleasantly surprised with the outcome.

I have not worked with second grade and had little idea of what to expect. I was fortunate that both second grade teachers were very open to my coming in to read the book to their classes. I had considered the idea of having one of the classroom teachers read while I sat in the back and observed. The assistant teacher convinced me to read it myself. She said, "They are just going to wonder why you didn't read it yourself. I'll take notes for you. You should definitely read it." I am glad she talked me into it.

These second graders proved to be a great first audience. They were excited to hear an original story. Gasps and smiles emerged when I told them that I have never read my book to a class before, that they were the first. One girl said, "You haven't even read it to *YOUR* class yet?!" One student even said, "We are lucky!" With that, they settled into *Franklin Finds a Home's* debut. There were smiles and laughter throughout the entire reading. All eleven of the students were glued to the pages as I read. One boy sighed, "Aww," when Franklin's first apartment did not work. The same boy exclaimed, "I know why!" when the eartharium wouldn't fit through the second time. When Franklin's parents made an appearance, the class erupted with laughter. The father has a mustache and the mother wears lipstick and long eyelashes. They found their depiction fun—and so have the other classes. After the reading I asked what this book makes them think about. One student immediately raised her hand and said, "It reminds me of the measuring we are studying." When I heard that, I was relieved. Franklin is definitely connected to second grade math too.

However, this group was not focused on the mathematical aspect of *Franklin Finds a Home*. These children seemed to be more interested in the story itself. The class was eager to talk about Franklin the fish. They wanted to talk about why he lives in the ocean and how funny it was that a fish was looking for an apartment. I received a suggestion that I should add a friend, "Or a brother!" another student shouted. Giggling, one student said I should make a human in the eartharium instead of a giraffe.

My next reading was to the other second grade class. This time, I had a little more knowledge about the math curriculum and possible reactions they might have.

Even though I felt like I was prepared, this group discussed the book very differently from the first. One of these students also mentioned measuring, but the focus of this discussion was the literal meaning of the story. A few of these students were unclear that the story takes place under water. Again, in a class of seven year olds, it was clear that the focus of the discussion was the story and not the math. Even though the discussion proved these students were not focused on the mathematical aspect of the story, they were all as equally engaged as the first group of second graders. During the reading, some students quietly hypothesized with each other on how to solve the problem. During the discussion at the end, this group wanted to talk about what it is like to look for a new apartment and they asked several clarifying questions about terms and parts of a city.

The most rewarding experience was reading to my own class, which is an interaged third and fourth grade. I originally planned on reading it to just the third graders when they were in their third grade math class. I decided to include my fourth graders. I thought that if the second graders, who are younger than my initial intended audience were receptive and engaged, then perhaps children who are older would be as well. My whole class sat engaged the whole time. As with the second graders, there were smiles and giggles throughout. During my reading, students called out, “A flower!” “Haha eartharium!” and “It was too thin.” One of the fourth grade boys even muttered, “Oh no” when Franklin’s dad showed up with the giraffe.

Even though my students are used to my reading stories to them, reading my book to them was a completely different experience. I could tell that it was fun for them to have their teacher read an original book. They were engaged the whole time,

discussed the problem with each other as the story was happening, used the pictures as clues and made exclamations when they realized a solution.

What I found most interesting was the differences in comments among the different age groups. In the first reading to a second grade class, I read the page “Because math is the best.” I only got one math related comment from that class. The second time, I decided to omit that page and see what would happen. The discussion was rich with math related comments. For my class, I also chose to leave out that page. One of my students commented, “You should write math somewhere on the cover.” After his comment, I showed him page one. He responded with a smile and, “Oh good!”

I also noticed that the comments the third and fourth graders made were much more sophisticated than those from the second graders, which is to be expected. One boy went on to talk about the moral of the story. Another felt the need to explain the concept of an eartharium, “his eartharium, which is like an aquarium, but since he lives in the water, its like the earth.” The comments from the third graders were more similar to the second grade comments: “It made me think about math because it was 10 shingles high and 6 across.” And one of our third graders who struggles with math said the story reminds him of measuring. In talking about mathematical development, for ages seven to nine, Dorothy Cohen (1988) states that, “His grasp is at first limited to familiar experiences....He develops a general framework of concepts...length (long, short), area (big, small)...” (p. 200). The answers given by the younger children were limited to measuring because that seemed to be most familiar to them.

Once my new illustrations were completed with the new color and fine lines, I decided to read the book to my class again. They were extremely excited and wanted to know again if it had been published yet. One student commented on Franklin's color change and how he thought Franklin was cuter now. The class was just as engaged as when I read the book to them the first time. They were all extremely excited to hear it again. This is when I decided to read the book to the entire fourth grade during math class. My fourth graders were extremely proud to know the story already. I had to stop them from giving anything away to the other fourth graders. It was obvious that since I am their teacher, they felt a sense of ownership over *Franklin Finds a Home* and wanted to show off to their peers. The other fourth grade was just as engaged as my fourth graders. Again, many had the same reactions and smiles. However, the excitement of my students almost drowned out the voices of the others. But I was still able to see the smiles and hear the laughter coming from the group.

After reading *Franklin Finds a Home* to groups of students, I am confident that this story is best suited for children ages seven to nine. Of course, children younger and older can enjoy the story as well. Children seven years of age are able to enjoy the story and still have a mathematical connection, though it is limited compared to the older students. The youngest group proved to be most interested in the story itself. Eight year olds are a little more sophisticated in their thinking and are able to make deeper connections. Children nine years of age are able to discuss many aspects of *Franklin Finds a Home*. They not only engaged with the story, they also saw the deep mathematical connections. The oldest group of students did not offer

suggestions because they were too focused on all the hidden mathematical details of Franklin's adventure.

During one of the readings, a student suggested that I write a series involving Franklin. I wouldn't mind moving forward with that suggestion and taking Franklin on another mathematical journey.

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