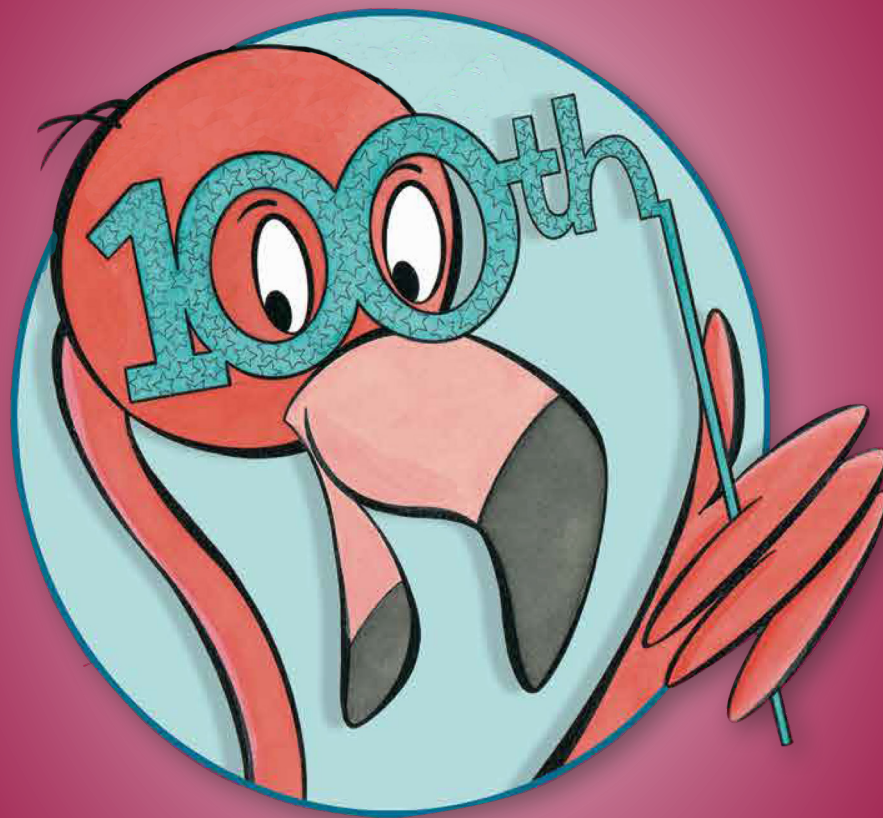# Miss Mingo
And the 100th Day of School
Written and illustrated by Jamie harper
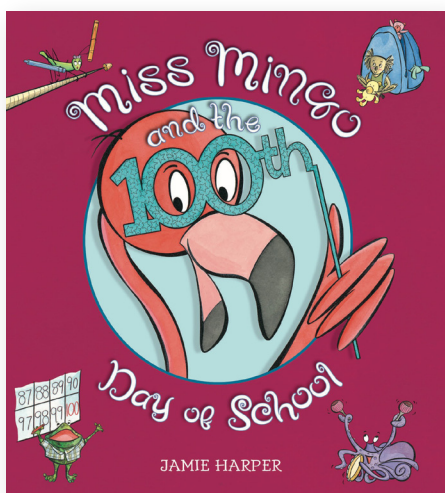
Teacher's Guide
written by Kate Narita

Miss Mingo
And the 100th Day of School
Written and illustrated by Jamie harper

About the Book

It's no ordinary day in Miss Mingo's classroom . . . it's the 100th day of school! Everyone has prepared 100 Day projects to share with the class: Octopus has brought 100 shells from his garden, and Panda has 100 shoots of bamboo. Centipede does 100 jumping jacks to get the class moving, and Alligator leads them all in 100 seconds of deep breathing to calm back down.

There are so many ways to get to the number 100, and the students in Miss Mingo's class demonstrate all kinds of combinations: ten sets of ten, two sets of fifty, five sets of twenty, and more.

With fascinating animal facts peppered in among the 100 the Day festivities, every creature in class has a chance to show off their knowledge and discover something new — after all, 100 days of learning is a lot to celebrate!

About this Guide

Teachers, MISS MINGO AND HE 100TH DAY OF SCHOOL is a STEM extravaganza. It's full of different visual representations of the number one hundred and jam-packed with scientific facts about all the various animals in the book.

But that's not all. There are also plenty of interactions between the characters that you can use as models to help you facilitate social-emotional-learning discussions in your classroom.

If you've been looking for another book to add to your 100th Day of School collection, grab a copy of MISS MINGO AND HE 100TH DAY OF SCHOOL.

This guide makes instruction easy for you. The tables on pages 2-7 list each activity in the guide, its corresponding page numbers and the standards it covers. The standards are listed again at the end of each activity.

TABLE OF CONTENTS

Common Core Reading Standards

ACTIVITY	PAGES	KINDERGARTEN STANDARDS	FIRST GRADE STANDARDS
Miss Mingo and the 100th Day of School Discussion Guide		CCSS.ELA-LITERACY. RL.K.1 With prompting and support, ask and answer questions about key details in a text.	CCSS.ELA-LITERACY. RL.1.1 Ask and answer questions about key details in a text.
		CCSS.ELA-LITERACY. RL.K.3 With prompting and support, identify characters, settings, and major events in a story.	CCSS.ELA-LITERACY. RL.1.3 Describe characters, settings, and major events in a story, using key details.
		CCSS.ELA-LITERACY. RL.K.7 With prompting and support, describe the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts).	CCSS.ELA-LITERACY. RL.1.7 Use illustrations and details in a story to describe its characters, setting, or events.

Next Generation Science Standards

ACTIVITY	PAGES	KINDERGARTEN STANDARDS	FIRST GRADE STANDARDS
Match 'Em Up with Miss Mingo		K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]	1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]
		K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]	

Common Core Math Standards

ACTIVITY	PAGES	KINDERGARTEN STANDARDS
Stack 'Em Up: Towers of Ten with Miss Mingo		CCSS.MATH.CONTENT.K.G.B.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes
		CCSS.MATH.CONTENT.K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.
		CCSS.MATH.CONTENT.K.CC.B.4.A When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
		CCSS.MATH.CONTENT.K.CC.B.4.B Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
		CCSS.MATH.CONTENT.K.CC.B.4.C Understand that each successive number name refers to a quantity that is one larger.
		CCSS.MATH.CONTENT.K.CC.B.5 Count to answer "how many?" 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.

COMMON CORE MATH STANDARDS

ACTIVITY	PAGES	KINDERGARTEN STANDARDS	FIRST GRADE STANDARDS	SECOND GRADE STANDARDS
Skip Count by Fives with Miss Mingo		K.MD.B.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	1.NBT.B.2 Understand that the two digits of a two-digit number represent amounts of tens and ones.	2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.
Skip Count by Tens with Miss Mingo		K.CC.A.1 Count to 100 by ones and by tens.	1.NBT.B.2 Understand that the two digits of a two-digit number represent amounts of tens and ones.	2.NBT.A.1.A 100 can be thought of as a bundle of ten tens — called a "hundred."
		K.MD.B.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.	1.NBT.B.2.C The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	2.NBT.A.2 Count within 1000; skip-count by 5s, 10s, and 100s.

COMMON CORE MATH STANDARDS

ACTIVITY	PAGES	SECOND GRADE STANDARDS	THIRD GRADE STANDARDS
Miss Mingo's Subtraction Math		CCSS.MATH. CONTENT.2.NBT.B.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/ or the relationship between addition and subtraction.	
Miss Mingo's Multiplication Turn Around Facts			CCSS.MATH. CONTENT.3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

STANDARDS FOR MATHEMATICAL PRACTICE

ACTIVITY	PAGES	STANDARDS FOR MATHEMATICAL PRACTICE
Triangular Towers with Miss Mingo		CCSS.MATH.PRACTICE.MP1 Make sense of problems and persevere in solving them. CCSS.MATH.PRACTICE.MP4 Model with mathematics. CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically. CCSS.MATH.PRACTICE.MP7 Look for and make use of structure. CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.
Pyramidal Towers with Miss Mingo		CCSS.MATH.PRACTICE.MP1 Make sense of problems and persevere in solving them. CCSS.MATH.PRACTICE.MP4 Model with mathematics. CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically. CCSS.MATH.PRACTICE.MP7 Look for and make use of structure. CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.

Miss Mingo and the 100th Day of School Discussion Guide

1. How does Miss Mingo make sure she celebrates each student's strengths?

Answers will vary but could include the following details: Miss Mingo makes sure to compliment students with phrases such as "Good thinking—a stupendous strategy," and "Great job." When Cockroach realizes he forgot his project, Miss Mingo tries to help him find a project in class. Miss Mingo lets her students take movement breaks like jumping jacks and yoga poses to help them relax.

2. What does Koala do to help Cockroach feel better? What can you do to help your classmates feel better?

Koala gave one of her teddy bears to Cockroach to help him feel better. Answers will vary for the second question but could include suggestions such as: ask someone if they want to play at recess, sit with someone at lunch, and greet them each day.

3. What does Alligator do to feel less stressed? How do you relax?

Alligator does deep breathing while demonstrating yoga poses. For the second question, answers will vary but could include information such as take a nap, read a book, take a walk, and play a game.

4. How are Bird, Spider, Frog and Elephant's feet alike? How are they different?

They all use their feet to move from one place to another. Bird and Spider use their feet to grab onto objects, but Elephant does not. Frog uses his feet to stick onto objects. Elephant walks on its tiptoes but the other animals do not.

5. What do ants use to move heavy objects? How do you and your classmates work together to get jobs done?

Ants use teamwork to move heavy objects. Answers will vary for the second question but could include information such as helping one another with assignments, helping clean the classroom and helping one another find items.

6. If you could be any animal in this book, which one would you choose and why?

Answers will vary.

Miss Mingo and the 100th Day of School Discussion Guide Standards

Kindergarten Standards

Key Ideas and Details:

CCSS.ELA-LITERACY.RL.K.1

With prompting and support, ask and answer questions about key details in a text.

CCSS.ELA-LITERACY.RL.K.3

With prompting and support, identify characters, settings, and major events in a story.

Integration of Knowledge and Ideas:

CCSS.ELA-LITERACY.RL.K.7

With prompting and support, describe the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts).

First Grade Standards

Key Ideas and Details:

CCSS.ELA-LITERACY.RL.1.1

Ask and answer questions about key details in a text.

CCSS.ELA-LITERACY.RL.1.3

Describe characters, settings, and major events in a story, using key details.

Integration of Knowledge and Ideas:

CCSS.ELA-LITERACY.RL.1.7

Use illustrations and details in a story to describe its characters, setting, or events.

Skip Count by Fives

Name:_____

Directions: Skip count by fives with Miss Mingo. She has started you off with the first number. You need to write the other multiples of five until you arrive at 100. Have fun!

5

_____   _____   _____   _____   _____

_____   _____   _____   _____   _____

_____   _____   _____   _____   _____

_____   _____   _____   _____   _____

Directions: Color in some or all of the teddy bears below. Make sure the number you color is a multiple of five.
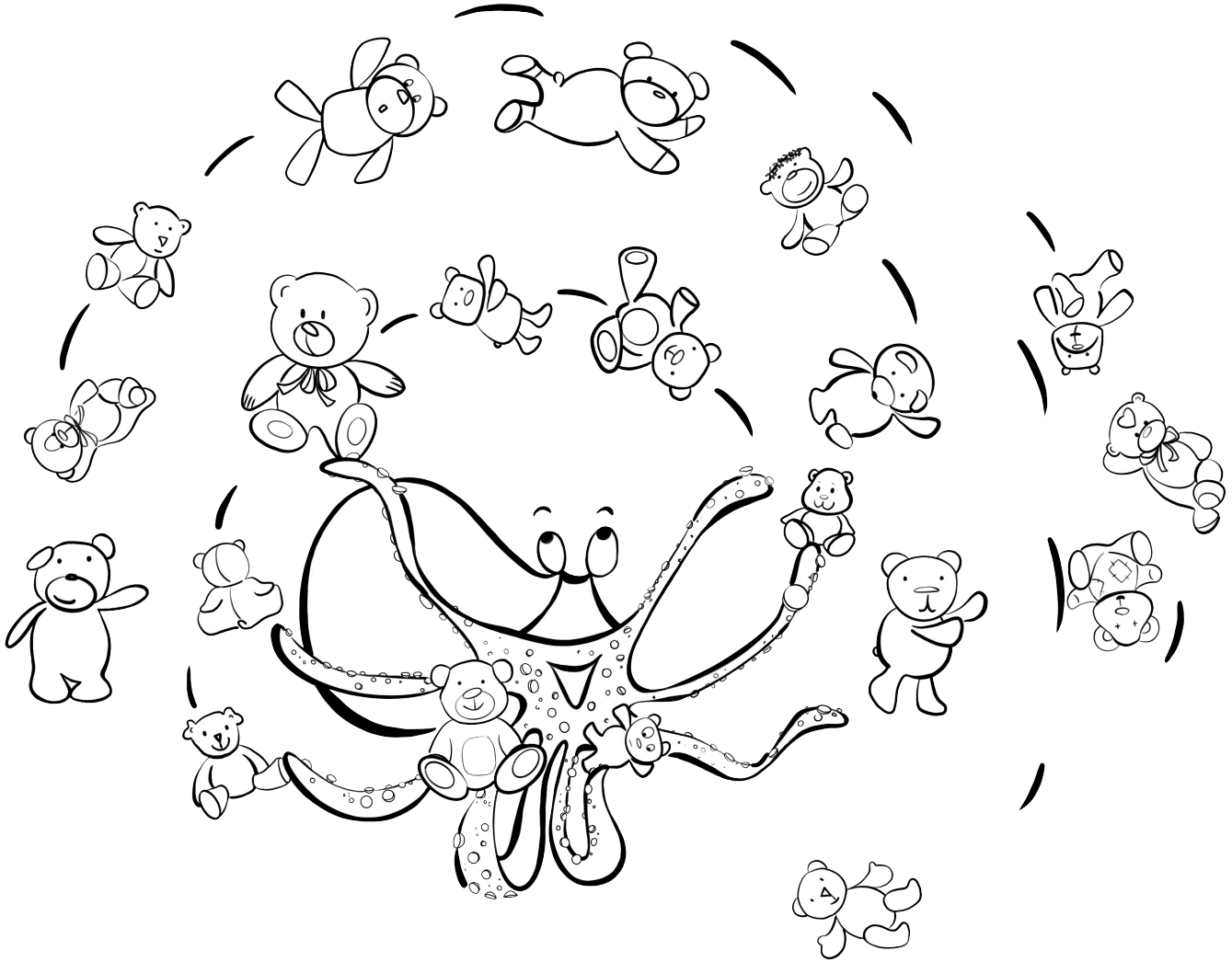
Skip Count by Fives Answer Key

5	**10**	**15**	**20**	**25**
30	**35**	**40**	**45**	**50**
55	**60**	**65**	**70**	**75**
80	**85**	**90**	**95**	**100**

Directions: Color in some or all of the teddy bears below. Make sure the number you color is a multiple of five.

Answer: Students could have colored five, ten, fifteen or all twenty of the teddy bears.

Skip Count by Fives Common Core Connections

Kindergarten Math Standards

Classify objects and count the number of objects in each category.

CCSS.MATH.CONTENT.K.MD.B.3

Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

First Grade Math Standards

Understand place value.

CCSS.MATH.CONTENT.1.NBT.B.2

Understand that the two digits of a two-digit number represent amounts of tens and ones.

Second Grade Math Standards

Understand place value.

CCSS.MATH.CONTENT.2.NBT.A.2

Count within 1000; skip-count by 5s, 10s, and 100s.

Skip Count by Tens

Name: _____

Directions: Skip count by tens with Miss Mingo. She has started you off with the first number. You need to write the other multiples of ten until your arrive at 100. Have fun!

10	_____	_____	_____	_____
_____	_____	_____	_____	_____

Bonus question: What does an octopus have in its garden? _____

Skip Count by Tens Answer Key

10   20   30   40   50

60   70   80   90   100

Bonus question: What does an octopus have in its garden? **Answer: Shells.**

Skip Count by Tens with Miss Mingo Standards

Kindergarten Math Standards

Know number names and the count sequence.

CCSS.MATH.CONTENT.K.CC.A.1

Count to 100 by ones and by tens.

Classify objects and count the number of objects in each category.

CCSS.MATH.CONTENT.K.MD.B.3

Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

First Grade Math Standards

Understand place value.

CCSS.MATH.CONTENT.1.NBT.B.2

Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

CCSS.MATH.CONTENT.1.NBT.B.2.C

The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

Second Grade Math Standards

Understand place value.

CCSS.MATH.CONTENT.2.NBT.A.1.A

100 can be thought of as a bundle of ten tens — called a "hundred."
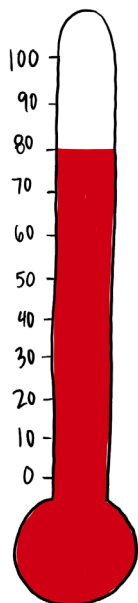
CCSS.MATH.CONTENT.2.NBT.A.2

Count within 1000; skip-count by 5s, 10s, and 100s.
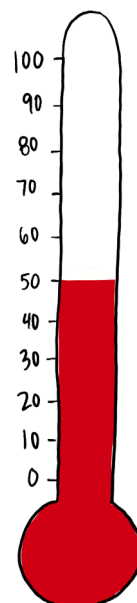
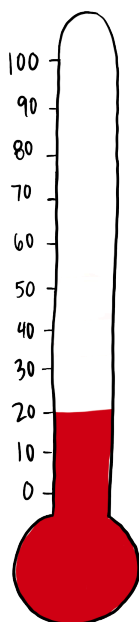# Miss Mingo's Subtraction Math

Name _____

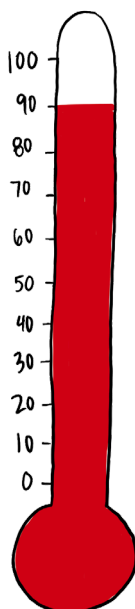Directions: Look at Miss Mingo's thermometers and determine how many more degrees would make 100.
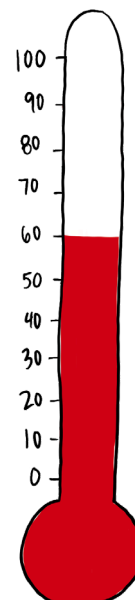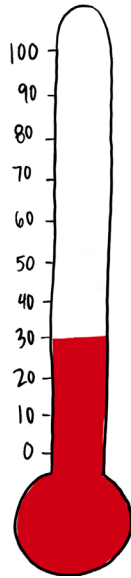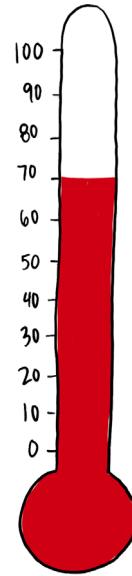

1. _____ more degrees
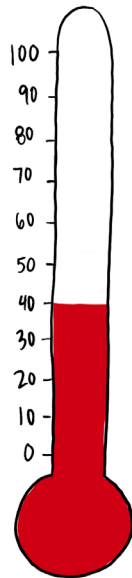
2. _____ more degrees

3. _____ more degrees

4. _____ more degrees

5. _____ more degrees

Who stays submerged underwater at this temperature?

_____

6. _____ more degrees

7. _____ more degrees
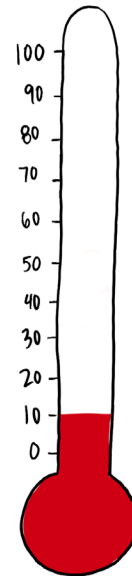
8. _____ more degrees

9. _____ more degrees

10. Look at the differences. Do you see a pattern? _____.

Miss Mingo's Subtraction Math Answer Key

1. 20 more degrees

2. 50 more degrees

3. 80 more degrees

4. 10 more degrees

5. 40 more degrees

6. 70 more degrees

7. 30 more degrees

Who stays submerged underwater at this temperature?
Answer: Alligator

8. 60 more degrees

9. 90 more degrees

10. Look at the differences. Do you see a pattern? There are three sets of three differences.
Answer: Within each set, the differences increase by 30 degrees until the end of the set.

Miss Mingo's Subtraction Math Standards

Use place value understanding and properties of operations to add and subtract.
CCSS.MATH.CONTENT.2.NBT.B.5
Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Miss Mingo's 100th Day of School Multiplication Turn-Around Facts

Name: _____

Directions: Find the product for each animal's given number sentence. Then, write the complete turn-around fact on the animal's blank sign.

$2 \times 50 =$ ___

___ $\times$ ___ $=$ ___

$5 \times 20 =$ ___

___ $\times$ ___ $=$ ___

$100 \times 2 =$ ___

___ $\times$ ___ $=$ ___
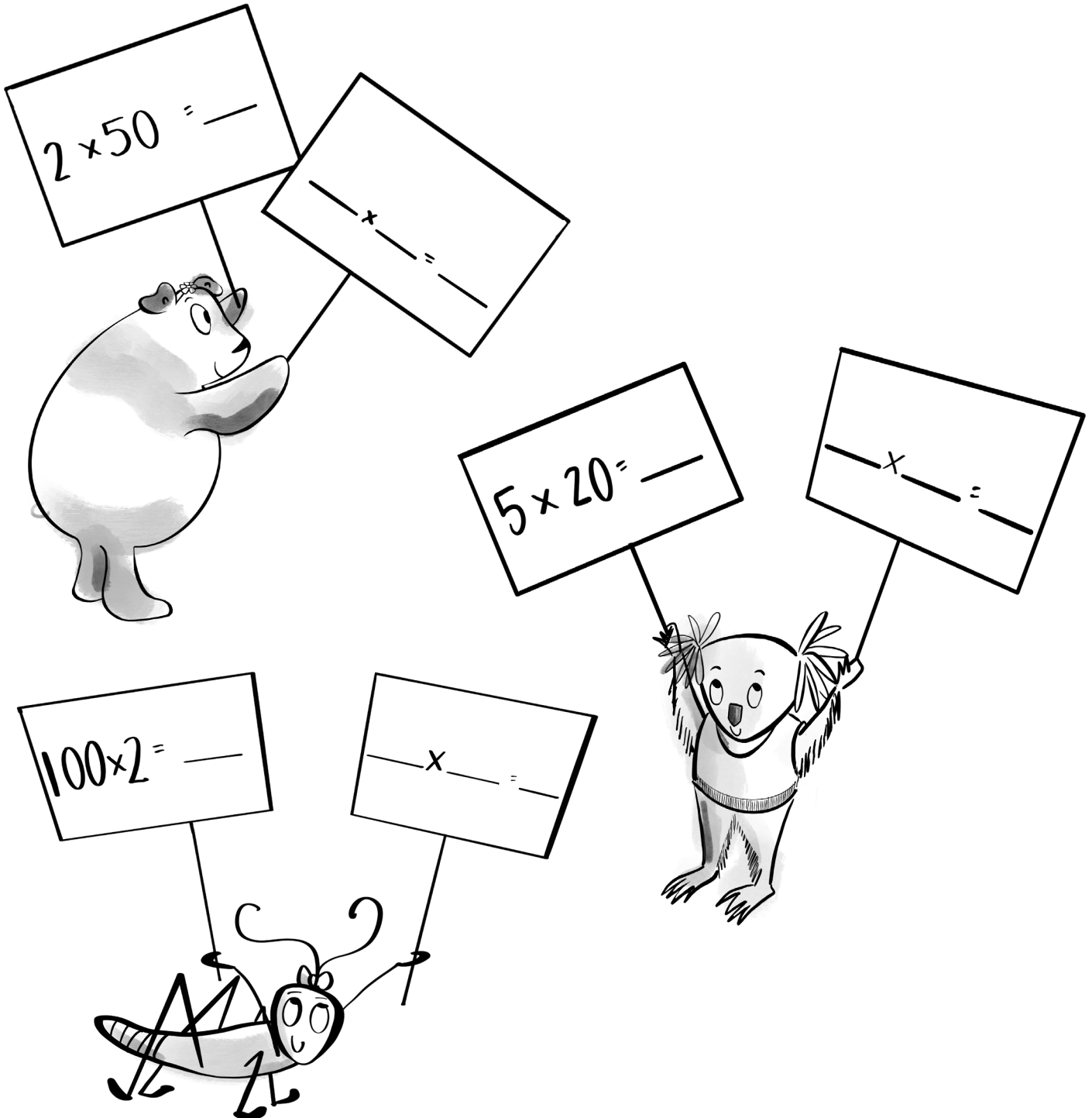
$4 \times 25 =$ _____

_____ $\times$ _____ $=$ _____
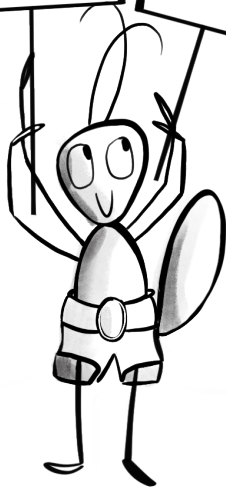
$10 \times 10 =$ _____

_____ _____ _____ $=$ _____
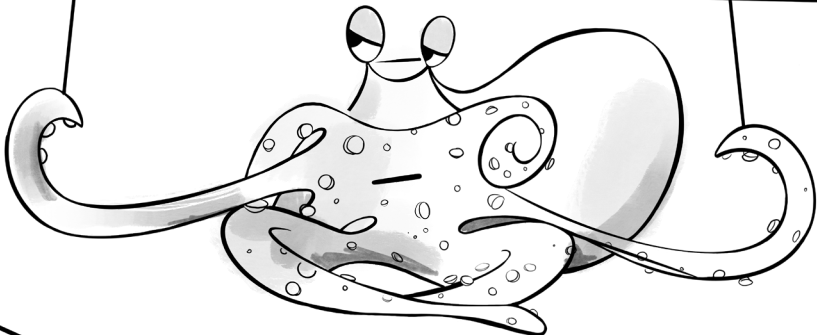
$100 \times 1 =$ _____

_____ $\times$ _____ $=$ _____

Miss Mingo's 100th Day of School Multiplication Turn-Around Facts Answer Key

Panda: The sign to the left says 2 x 50 = 100. The sign to the right says 50 x 2 = 100

Cockroach: The sign to the left says 1 x 100 = 100. The sign to the right says 100 x 1 = 100

Koala: The sign to the left says 5 x 20 = 100. The sign to the right says 20 x 5 = 100

Ant: The sign to the left says 4 x 25 = 100. The sign to the right says 25 x 4 = 100

Octopus: The sign to the left says 10 x 10 = 100. The sign to the right says 10 x 10 = 100

Cricket: The sign to the left says 100 x 2 = 200. The sign to the right says 2 x 100 = 200

Draw a picture of the other animal that had 200 of something on its body in Miss Mingo's class.
Answer: Students should have drawn a giraffe.

Match 'em Up with Miss Mingo

Name: _____

Directions: Each one of Miss Mingo's students is special and unique just like each student in your class. Draw a line from the each student's picture to their unique trait. Have fun!

This animal chirps by rubbing the scraper of one forewing on the comb-like file of the other forewing.

This animal doesn't like the smell of mint and other herbs such as rosemary, mint and catnip.

This animal travels 15 inches a second which is like a person running 58 feet in one second.

These animals rely on teamwork to move heavy objects. They take turns carrying, steering and leading.

Match 'em Up with Miss Mingo

Name: _____

Directions: Each one of Miss Mingo's students is special and unique just like each student in your class. Draw a line from the each student's picture to their unique trait. Have fun!

This animal can live for more than 100 years.

This animal has sticky pads on its toes which makes it an excellent climber.

This animal stays submerged underwater for hours or sometimes days if the air is cooler than 70 degrees Fahrenheit.

This animal has air sacs under its skin that act like cushions and protects it when it hits the water.

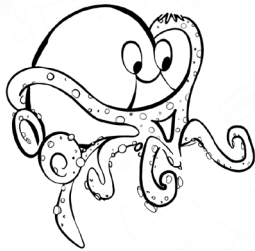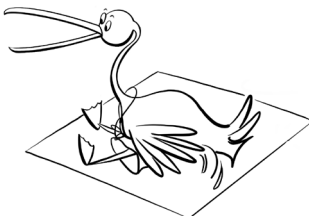This animal makes a "garden" out of empty crab and clamshells.

Match 'em Up with Miss Mingo

Name: _____

Directions: Each one of Miss Mingo's students is special and unique just like each student in your class. Draw a line from the each student's picture to their unique trait. Have fun!

This animal weighs about 100 pounds when it is born.
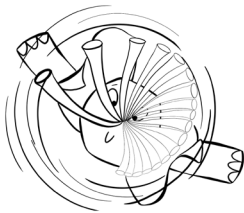
This animal can eat up to 40 pounds of bamboo a day.

This animal carries its young in a pouch until it's about sixth-months-old.

This animal lives in underground burrows complete with sleeping chambers, nursing chambers and toilet chambers.

This animal walks on its tiptoes because of the structure of its feet.

Match 'Em Up with Miss Mingo Next Generations Science Standards

K-Interdependent Relationships in Ecosystems: Animals, Plants and their Environments

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]

K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

1-LS3 Heredity: Inheritance and Variation of Traits

1-LS3-1.Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

Match 'em Up with Miss Mingo Answer Key

This animal chirps by rubbing the scraper of one forewing on the comb-like file of the other forewing. **CRICKET**

This animal doesn't like the smell of mint and other herbs such as rosemary, mint and catnip. **COCKROACH**

This animal travels 15 inches a second which is like a person running 58 feet in one second. **CENTIPEDE**

These animals rely on teamwork to move heavy objects. They take turns carrying, steering and leading. **ANTS**

This animal can live for more than 100 years. **ORCA**

This animal has sticky pads on its toes which makes it an excellent climber. **TREE FROG**

This animal stays submerged underwater for hours or sometimes days if the air is cooler than 70 degrees Fahrenheit. **ALLIGATOR**

This animal has air sacs under its skin that act like cushions and protects it when it hits the water. **BROWN PELICAN**

This animal makes a "garden" out of empty crab and clamshells. **OCTOPUS**

This animal weighs about 100 pounds when it is born. **HIPPOPOTAMUS**

This animal can eat up to 40 pounds of bamboo a day. **PANDA**

This animal carries its young in a pouch until it's about sixth-months-old. **KOALA**

This animal lives in underground burrows complete with sleeping chambers, nursing chambers and toilet chambers. **GROUNDHOG**

This animal walks on its tiptoes because of the structure of its feet. **ELEPHANT**

Stack 'Em Up: Towers of Ten with Miss Mingo

Name: _____

Directions: With your partner, build a tower with ten cups three different ways. The top row of your tower may only have one cup. Draw each of your towers below in the boxes. Good luck!
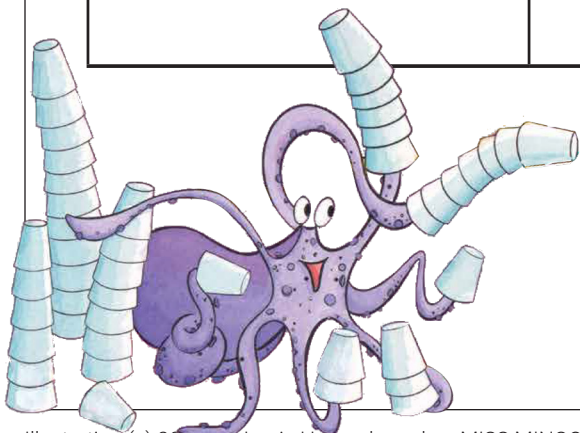
If your class builds ten towers of ten cups, how many cups will your class use?

_____cups

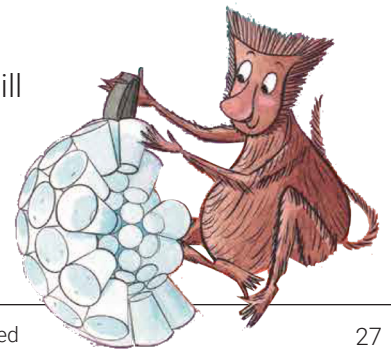# Stack 'Em Up: Towers of Ten with Miss Mingo Answer Key

Directions: With your partner, build a tower with ten cups three different ways. The top row of your tower may only have one cup. Draw each of your towers below in the boxes. Good luck!
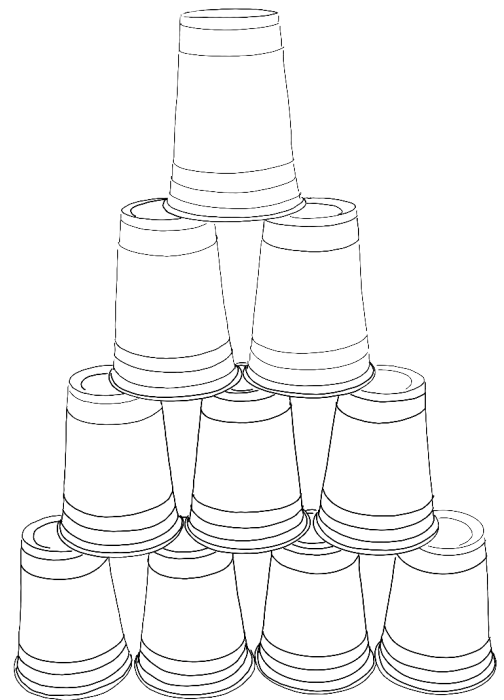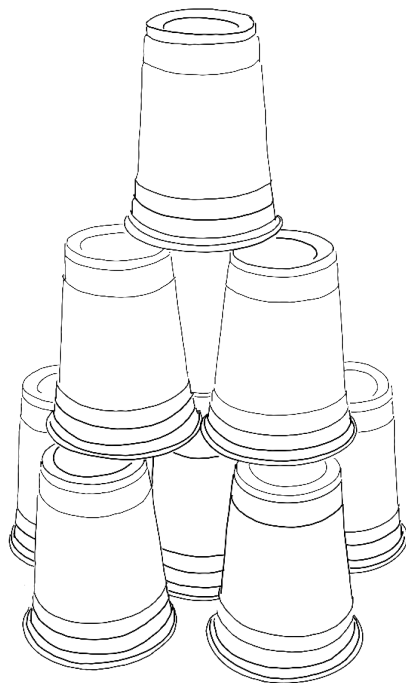
If your class builds ten towers of ten cups, how many cups will your class use?
Answer: 100 cups

Standards for Stack 'Em Up: Towers of Ten with Miss Mingo

Kindergarten Standards
Analyze, compare, create, and compose shapes.

CCSS.MATH.CONTENT.K.G.B.5
Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
Count to tell the number of objects.

CCSS.MATH.CONTENT.K.CC.B.4
Understand the relationship between numbers and quantities; connect counting to cardinality.

CCSS.MATH.CONTENT.K.CC.B.4.A
When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.

CCSS.MATH.CONTENT.K.CC.B.4.B
Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.

CCSS.MATH.CONTENT.K.CC.B.4.C
Understand that each successive number name refers to a quantity that is one larger.

CCSS.MATH.CONTENT.K.CC.B.5
Count to answer "how many?" 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.

Triangular Towers with Miss Mingo

Name: _____ Date: _____

The challenge, should you choose to accept it, is to use as many of Octopus's 100 cups as you can to build a triangular tower with as many rows as possible and only one cup in the top row. Miss Mingo has provided you with space to record your data below. You may not need all of the space to record your data, but make sure you record each of your attempts. When you figure out the largest triangular tower you can build, draw it on the back of this sheet! Good luck!

First Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Second Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Third Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Fourth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Fifth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Sixth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Seventh Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Eighth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

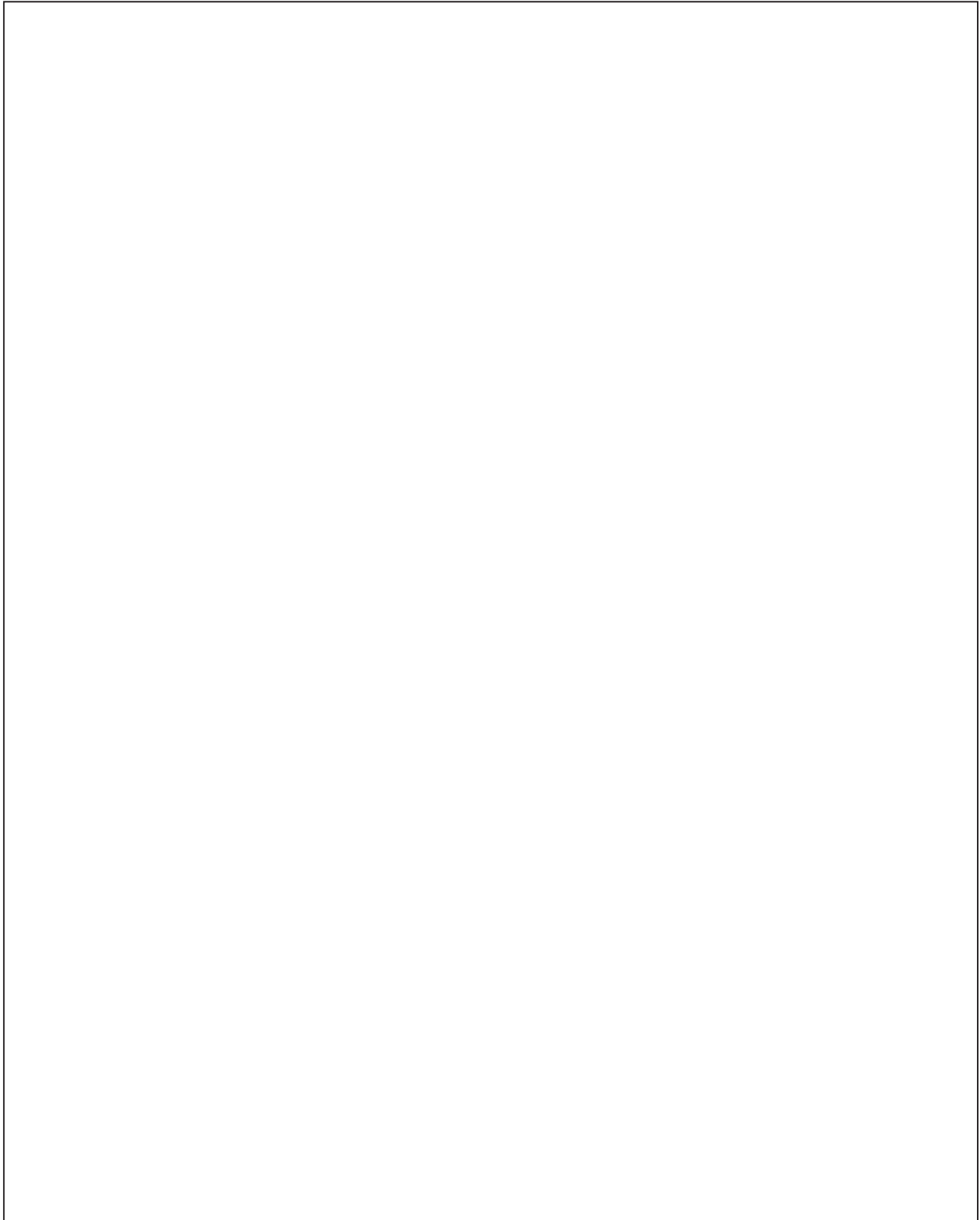**Ninth Attempt**

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Tenth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

What patterns do you notice in the data above?_____

What is the biggest triangular tower you can create with 100 cups? Sketch your answer below.

TRIANGULAR TOWERS WITH MISS MINGO ANSWER KEY

First Attempt

Number of cups in the bottom row: **4 cups**

Total number of cups used: **10 cups**

Number of cups left over: **90 cups**

Second Attempt

Number of cups in the bottom row: **5 cups**

Total number of cups used: **15 cups**

Number of cups left over: **80 cups**

Third Attempt

Number of cups in the bottom row: **6 cups**

Total number of cups used: **21 cups**

Number of cups left over: **79 cups**

Fourth Attempt

Number of cups in the bottom row: **7 cups**

Total number of cups used: **28 cups**

Number of cups left over: **72 cups**

Fifth Attempt

Number of cups in the bottom row: **8 cups**

Total number of cups used: **36 cups**

Number of cups left over: **64 cups**

Sixth Attempt

Number of cups in the bottom row: **9 cups**

Total number of cups used: **45 cups**

Number of cups left over: **55 cups**

Seventh Attempt

Number of cups in the bottom row: **10 cups**

Total number of cups used: **55 cups**

Number of cups left over: **45 cups**

Eighth Attempt

Number of cups in the bottom row: **11 cups**

Total number of cups used: **66 cups**

Number of cups left over: **34 cups**

Ninth Attempt

Number of cups in the bottom row: **12 cups**

Total number of cups used: **78 cups**

Number of cups left over: **22 cups**

Tenth Attempt

Number of cups in the bottom row: **13 cups**

Total number of cups used: **91 cups**

Number of cups left over: **9 cups**

What patterns do you notice in the data above?

Answer: The total number of cups used increases by the number of cups in the bottom row. So, if there are 12 cups in the bottom row and a total of 78 cups used, when I increase the number of cups in the bottom row to thirteen cups, the total number of cups used will increase by 13 cups. 78 +13 = 91 cups.

Triangular Towers with Miss Mingo Standards for Mathematical Practice

CCSS.MATH.PRACTICE.MP1
Make sense of problems and persevere in solving them.

CCSS.MATH.PRACTICE.MP4
Model with mathematics.

CCSS.MATH.PRACTICE.MP5
Use appropriate tools strategically.

CCSS.MATH.PRACTICE.MP7
Look for and make use of structure.

CCSS.MATH.PRACTICE.MP8
Look for and express regularity in repeated reasoning.

Please note that in order to be a triangular tower, each consecutive row may only have one less cup than the row beneath it. Otherwise, the tower is not triangular.

Pyramidal Towers with Miss Mingo

Name: _____Date: _____

The challenge, should you choose to accept it, is to use as many of Octopus's 100 cups as you can to build a pyramidal tower with as many layers as possible and only one cup in the top layer. Miss Mingo has provided you with space to record your data below. You may not need all of the space to record your data, but make sure you record each of your attempts. When you figure out the largest pyramidal tower you can build, draw it on the back of this sheet! Good luck!

First Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Second Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Third Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Fourth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Fifth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Sixth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Seventh Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Eighth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Ninth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Tenth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Challenge: Compare the pyramidal tower data above to your triangular tower data. Do you notice any similarities?_____

What is the biggest pyramidal tower you can create with 100 cups? Sketch your answer below.

Pyramidal Towers with Miss Mingo Answer Key

First Attempt

Number of cups in the bottom row: **3**

Total number of cups used: **4**

Number of cups left over: **94**

Second Attempt

Number of cups in the bottom row: **6**

Total number of cups used: **10**

Number of cups left over: **90**

Third Attempt

Number of cups in the bottom row: **10**

Total number of cups used: **20**

Number of cups left over: **80**

Fourth Attempt

Number of cups in the bottom row: **15**

Total number of cups used: **35**

Number of cups left over: **65**

Fifth Attempt

Number of cups in the bottom row: **21**

Total number of cups used: **56**

Number of cups left over: **44**

Sixth Attempt

Number of cups in the bottom row: **28**

Total number of cups used: **84**

Number of cups left over: **16**

Seventh Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Eighth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Ninth Attempt

Number of cups in the bottom row: _____
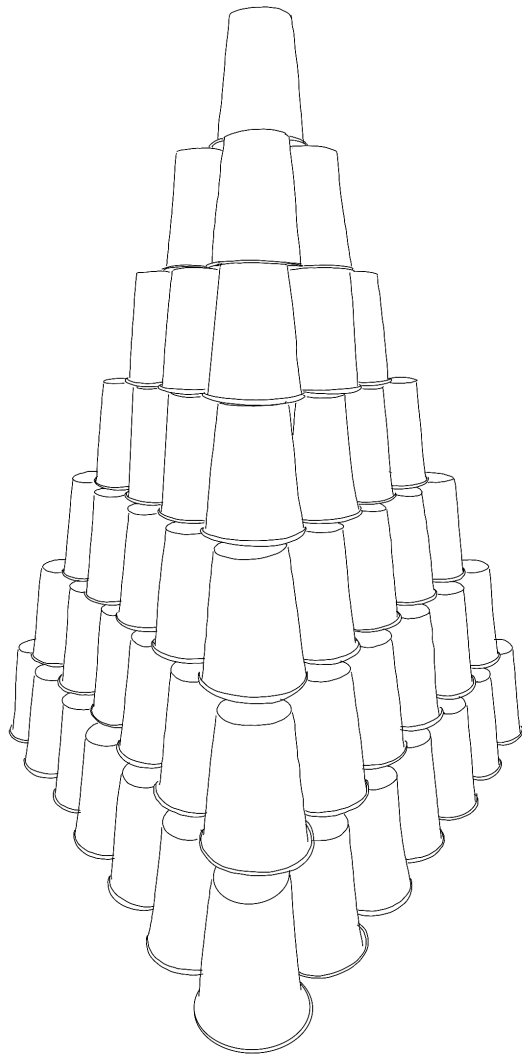
Total number of cups used: _____

Number of cups left over: _____

Tenth Attempt

Number of cups in the bottom row: _____

Total number of cups used: _____

Number of cups left over: _____

Challenge: Compare the pyramidal tower data above to your triangular tower data. Do you notice any similarities?

If you subtract the total number of cups used in the second attempt from the total number of cups used in the third attempt, there is a difference of ten. Ten corresponds to the total number of cups used in a triangular tower with four cups in the bottom row. This pattern continues. 35-20=15, which is the total number of cups in a triangular tower with five cups in the bottom row. That's because each time you expand the base of a pyramidal tower, you're essentially adding a triangular tower to one of the sides of the pyramidal tower.

Pyramidal Towers with Miss Mingo Standards for Mathematical Practice

CCSS.MATH.PRACTICE.MP1 Make sense of problems and persevere in solving them.

CCSS.MATH.PRACTICE.MP4 Model with mathematics.

CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically.

CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.

CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.