

Leaps AND Bounds TOWARD Math Understanding



**SAMPLE
MATERIAL
INSIDE**

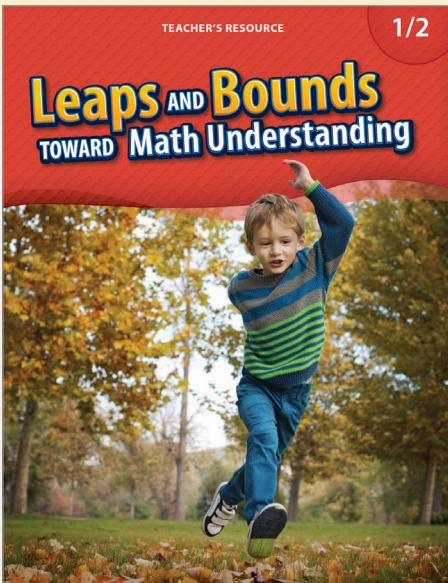
Strand: Number
Topic: Representing
Whole Numbers

Mathematics Intervention for the Primary Grades

About Leaps and Bounds

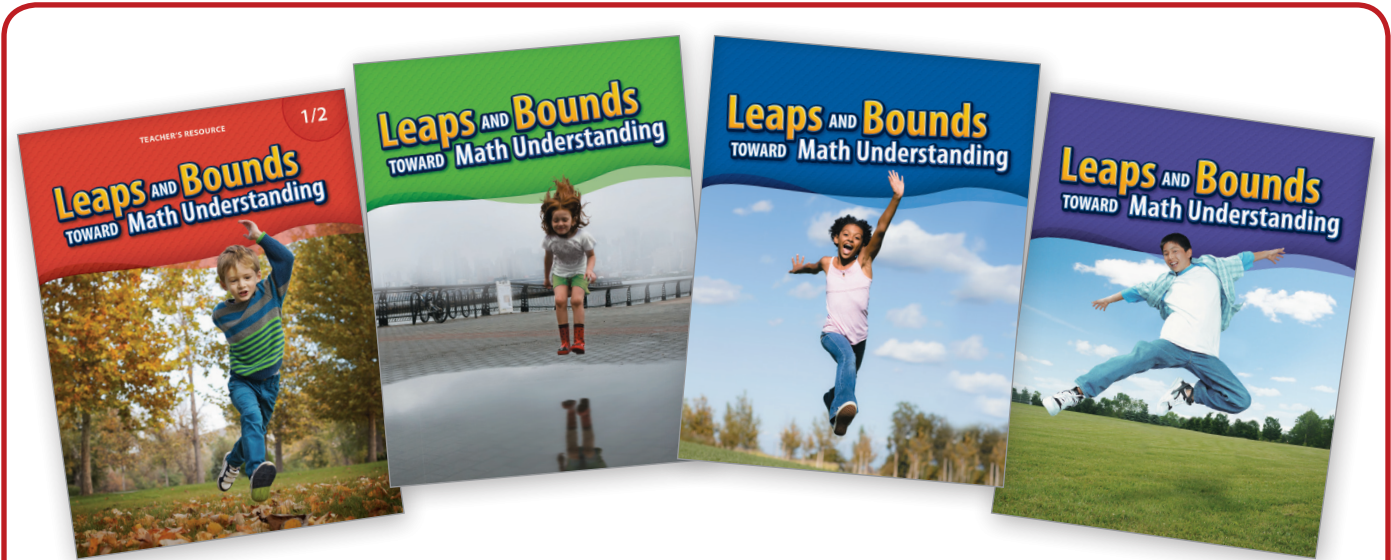
Leaps and Bounds Toward Math Understanding 1/2 is carefully developed to help teachers support primary students who are struggling in mathematics.

- An early-intervention approach based on research on how students learn math developmentally
- Diagnostic assessment for every topic to pinpoint gaps in students' understanding
- Strategic activities for differentiating instruction that enable teachers to build on students' knowledge and close gaps in understanding



Order Information

Leaps and Bounds 1/2	
Teacher's Resource	9780176715335
Teacher's Resource & Activity Cards	9780176715373

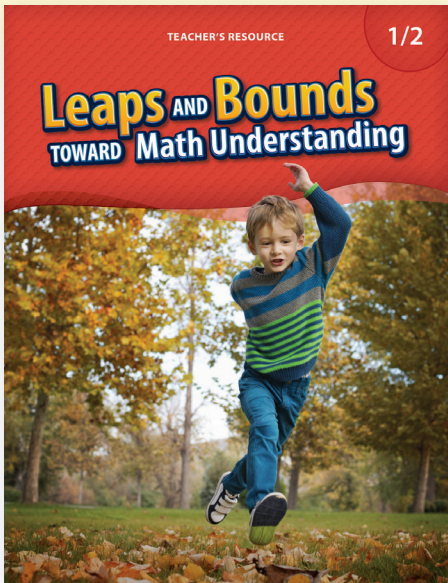


For more information about *Leaps and Bounds*, go to nelson.com/leapsandbounds

Components

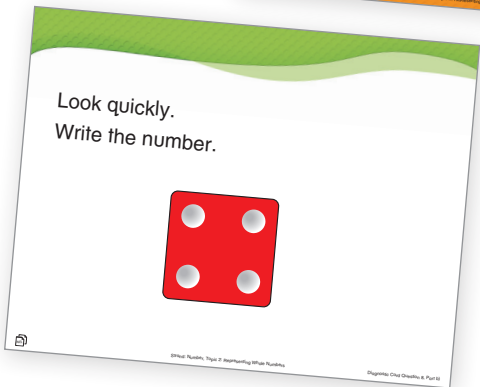
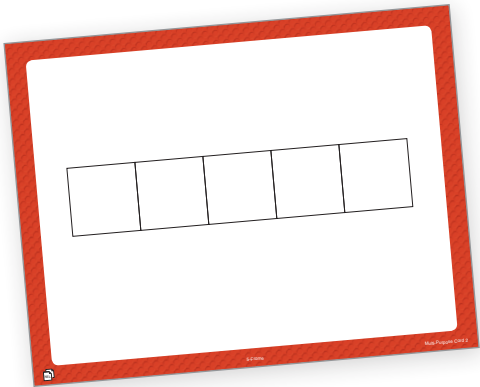
Teacher's Resource

- Diagnostic tool for each topic to allow K–2 teachers to identify where students are struggling so they can address gaps early
- Answer Key that identifies gaps based on student responses
- Background information for each topic identifies common errors and misconceptions and addresses why students might be struggling with a particular topic
- Teaching Notes to support the implementation of each activity
- Multiple supporting activities to help close specific gaps in understanding
- Online access to the Teacher's Resource in eBook format and digital Activity Cards with a print option included



Activity Cards

- Hundreds of colourful, engaging Activity Cards in print, laminated format
- Activity Cards support and prompt student responses to questions in the diagnostic tools and supporting activities



Using Leaps and Bounds is as easy as 1, 2, 3!

Leaps and Bounds mathematics intervention resources were designed to be easy to administer and use.

Follow these three simple steps to diagnose, identify, and address gaps in students' math understanding.

Step 1: Administer the diagnostic assessment

Diagnostic Tool

Representing Whole Numbers

1. Use the 5-frame. Show 4.

2. Show 8.

3. Use the 10-frames. Show 14.

4. Use different materials. Show 6 in 3 different ways.

6

5. Use a counter. Show seven on the number line.

1

2

3

4

5

6

7

8

9

10

6. Use cubes.

a) Show a 5-train.

b) Show a 10-train and more cubes for 18.

c) Show 10-trains and more cubes for 31.

7. How many counters do you need to show 0?

Notes/Observations

Refer to the previous page for instructions and materials. Have all materials available for the Diagnostic Tool. Present the cards 1 of a time and read them to the students. Ask students to explain their thinking for all their answers.

Representing Whole Numbers

Diagnostic Tool

8. Look quickly. Write the number.

a)

b)

c)

d)

9. a) Take a handful of about 5 counters. Count to check.

b) Take a handful of about 9 counters. Count to check.

10. Look quickly. Which estimate is closer to the number of turtles?

about 4

about 6

11. Look quickly. About how many turtles do you think are there?

12. Match a dot card to each number.

2

5

10

8

two

five

ten

eight

13. Write the number.

a) nine

b) seventeen

14. Choose a number up to 10. Write the number and the word.

Notes/Observations

Solutions and Key to Subtopics

Diagnostic Tool

Representing Whole Numbers

1. Use the 5-frame. Show 4.

2. Show 8.

3. Use the 10-frames. Show 14.

4. Use different materials. Show 6 in 3 different ways.

6

5. Use a counter. Show seven on the number line.

1

2

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8

9

10

6. Use cubes.

a) Show a 5-train.

b) Show a 10-train and more cubes for 18.

c) Show 10-trains and more cubes for 31.

7. How many counters do you need to show 0?

Solutions

1. Students should place 4 counters on the 5-frame. Observe whether students fill the spaces from left to right.

2. Students should place 8 counters on the 10-frame. Observe whether students fill the top row from left to right and then continue with the bottom row from left to right.

3. Students should place 14 counters on the 10-frames. Observe whether students fill a full 10-frame and then move from the top-left of the other 10-frame.

4. Students could model 6 with materials such as counters, sticks, straws, or beads. Show 6 fingers on 6 dots, or write the number 6 on the word six e.g. I know this is 6 because I used 6 beads in one colour and 1 more bead in another colour.

5. Students could use 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 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Sample material from the *Representing Whole Numbers* topic and *Modelling Whole Numbers* subtopic is included in this sampler

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Blackline Master 1

BLM 2: Number Cards from 11 to 20

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Blackline Master 7

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Strand: Number

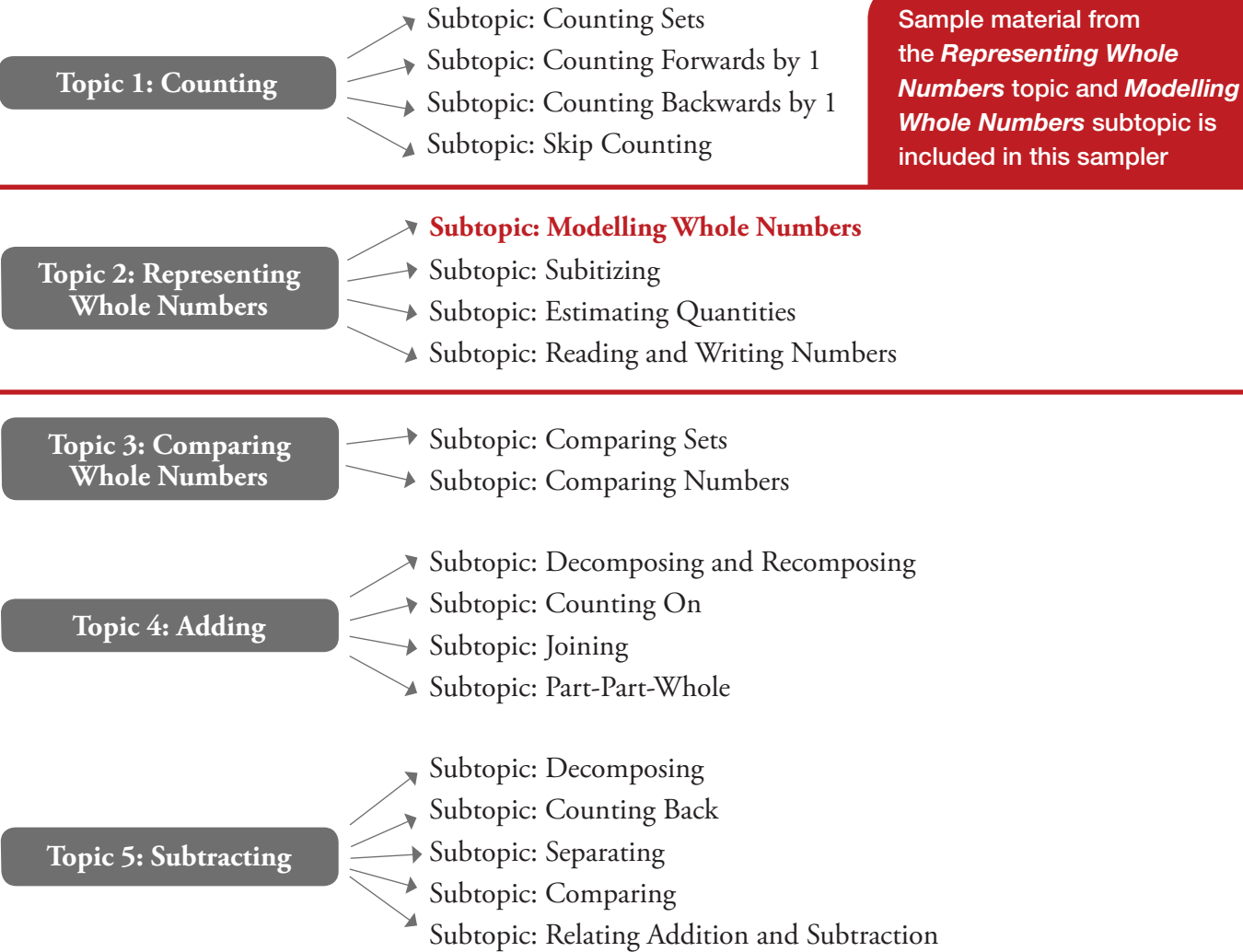
Number Strand Overview

This resource provides materials for diagnosing and supporting students as they explore the 5 number topics. The topics are drawn from curriculum outcomes and expectations for Kindergarten and Grade 1 and from literature about early math learning.

Each topic is divided into subtopics with intervention activities. The intervention activities are based on research about aspects of each subtopic that students may struggle with. The activities are designed to address gaps in understanding; they can be selected as required.

Margin notes indicating level are included with the intervention activities. This allows each activity to be tailored to the level of the students and to the curriculum.

Number Topics



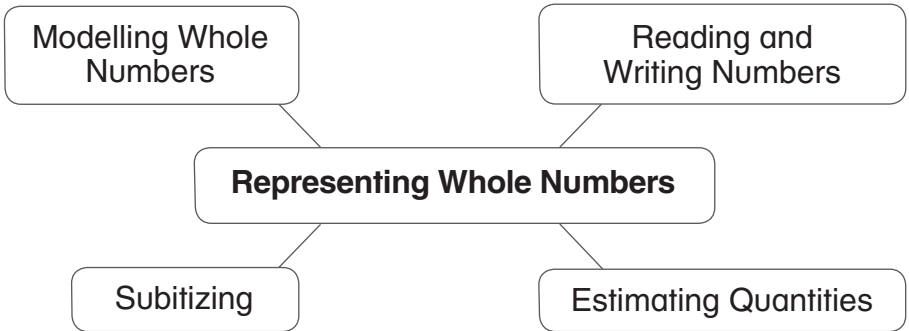
Professional Learning Connections

PRIME: Number and Operations: Background and Strategies (Nelson Education Ltd., 2005), pages 14–15, 35–40
Making Math Meaningful to Canadian Students: K–8, Second Edition (Nelson Education Ltd., 2013), pages 145–158
Big Ideas from Dr. Small: Grades K–3 (Nelson Education Ltd., 2010), pages 15, 20–26
Good Questions (dist. by Nelson Education Ltd., 2009), pages 15–21, 38–43

Planning Topic 2

Materials for helping students represent whole numbers consist of a diagnostic tool, a set of activities for each of the following subtopics, and activity cards. Choose the activities that are most suitable for your students’ needs and your particular circumstances.

Modelling a number in many ways helps students learn that a quantity is not related to the type, size, or position of objects. To subitize, students identify the number of objects in a model without counting. To estimate, students can use a benchmark or a referent to determine the approximate number of objects in a model.



Curriculum Connections

Kindergarten to Grade 2 curriculum connections for this topic are provided online. See www.nelson.com/leapsandbounds. In Kindergarten, the focus for representing whole numbers is numbers to 10. In Grade 1, the focus is numbers to 20 in British Columbia and WNCB, and numbers to 50 in Ontario. For subitizing, students use numbers to 5 in Kindergarten and numbers to 10 in Grade 1. For estimating, students use numbers to 10 in Kindergarten and numbers to 20 in Grade 1.

Representing Whole Numbers at This Level

Depending on the grade and the curriculum, the supporting activities should lead students to say statements such as the following:

- I can show numbers with counters and 5-frames.
- I can draw pictures to show numbers.
- I can look at a picture of dots and tell what the number is. I don’t need to count the dots.
- I can write numbers.
- I can read the words for numbers.
- I can use a group of 5 to figure out about how many things are in a large group.

Why might students struggle with representing whole numbers?

Students might struggle with representing whole numbers for any of the following reasons:

- They might not be able to use different materials, such as counters with or without 10-frames, classroom objects, or pictures, to model numbers.
- They might lack experience with models, such as 10-frames and number lines.
- They might not understand that 0 means there are no objects in the set.
- They might have difficulty relating quantities to 5 or 10 for modelling, subitizing, or estimating.
- They might struggle with using part of a set to estimate the number in a whole set because they are still building an understanding of part-whole relationships.
- They might not be able to distinguish between similar-looking numbers, such as 6 and 9.

Diagnostic Tool: Representing Whole Numbers

Use Diagnostic Tool: Representing Whole Numbers on pages 30 and 31, as well as the corresponding diagnostic cards, to determine where students need support. Interview students, displaying the card for 1 question at a time and posing each question orally. Ask students to say what they are thinking as they respond. You might record notes, observations, and/or students’ responses on the diagnostic tool.

See solutions on pages 32 and 33.

Intervention Activities

The purpose of the intervention activities is to help students represent whole numbers. Use the following chart to determine which subtopics have activities that are appropriate for each student.

Diagnostic Tool Results	Intervention Subtopic
If students struggle with Questions 1–7	use Modelling Whole Numbers, pages 34–37
If students struggle with Question 8	use Subitizing, pages 38–41
If students struggle with Questions 9–11	use Estimating Quantities, pages 41–44
If students struggle with Questions 12–14	use Reading and Writing Numbers, pages 44–47

Diagnostic Materials

- **Topic 2 Diagnostic Cards**
- **Questions 1–3, 5, 7, 9:** counters
- **Question 4:** materials such as classroom objects, counters, linking cubes, rekenreks, bead number lines, 5-frames and 10-frames (Multi-Purpose Cards 10, 11), drawing materials
- **Question 5:** linking cubes
- **Questions 8, 10, 11:** counters, 5-frames and 10-frames (Multi-Purpose Cards 10, 11) (optional)
- **Questions 12, 14:** Dot Cards from 1 to 10 (BLM 3)

1. Use the 5-frame. Show 4.

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2. Show 8.

3. Use the 10-frames. Show 14.

4. Use different materials.
Show 6 in 3 different ways.

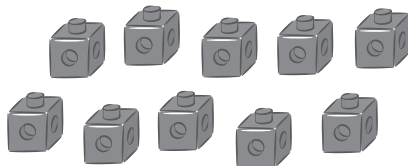
6

Sample Diagnostic Card for
this question included on
page 22 of this sampler

5. Use a counter.
Show seven on the number line.

1				5					10
---	--	--	--	---	--	--	--	--	----

6. Use cubes.



- a) Show a 5-train.



- b) Show a 10-train and more cubes for 18.

- c) Show 10-trains and more cubes for 31.

7. How many counters do you need to show 0?

Notes/Observations

Refer to the previous page for instructions and materials. Have all materials available for the Diagnostic Tool.

Present the cards 1 at a time and read them to the students.

Ask students to explain their thinking for all their answers.

8. Look quickly.
Write the number.

a)

b)

c)

d)

Sample Diagnostic Card for
this question included on
page 23 of this sampler

9. a) Take a handful of about
5 counters.
Count to check.

- b) Take a handful of about
9 counters.
Count to check.

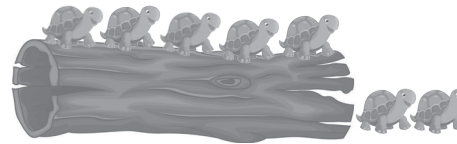


10. Look quickly.
Which estimate is closer to the number of turtles?

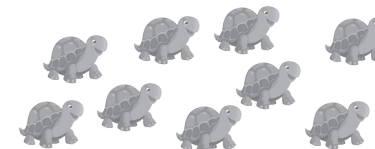
about 4

about 6

Sample Diagnostic Card for
this question included on
page 24 of this sampler



11. Look quickly.
About how many turtles
do you think are there?



12. Match a dot card to each number.

2
two

5
five

10
ten

8
eight

13. Write the number.

a) nine

b) seventeen

14. Choose a number up to 10.
Write the number and the word.

Modelling
Whole
Numbers

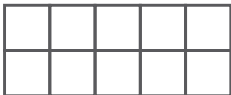
Diagnostic
Tool

Representing Whole Numbers

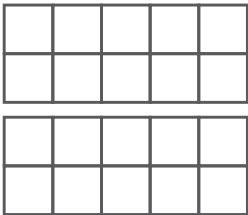
1. Use the 5-frame. Show 4.



2. Show 8.



3. Use the 10-frames. Show 14.



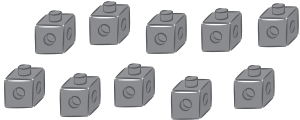
4. Use different materials.
Show 6 in 3 different ways.



5. Use a counter.
Show seven on the number line.



6. Use cubes.



a) Show a 5-train.

b) Show a 10-train and more cubes for 18.

c) Show 10-trains and more cubes for 31.

7. How many counters do you need to show 0?

Solutions

1. Students should place 4 counters on the 5-frame. Observe whether students fill the squares from left to right.
2. Students should place 8 counters on the 10-frame. Observe whether students fill the top row from left to right and then continue with the bottom row from left to right.
3. Students should place 14 counters on the 10-frames. Observe whether students fill a full 10-frame and 4 more from the top left of the other 10-frame.
4. Students could: model 6 with materials such as counters, cubes, crayons, or beads; draw 6 things or 6 dots; or write the number 6 or the word six; e.g., I know this is 6 because I used 5 beads in one colour and 1 more bead in another colour.
5. Students locate 7. e.g., I knew this was 5, so I counted 6, 7.
6. a) 5 cubes linked together
b) 10 cubes linked together and 8 more cubes
c) 3 10-trains and 1 more cube; e.g., I counted by 10s for 3 10-trains to get 30, and used 1 more cube to get 31.
7. 0 or none



Representing Whole Numbers

Diagnostic
Tool

Subitizing

8. Look quickly.
Write the number.

a)

b)

c)

d)

9. a) Take a handful of about 5 counters.
Count to check.

b) Take a handful of about 9 counters.
Count to check.



Estimating
Quantities

10. Look quickly.
Which estimate is closer to the number of turtles?

about 4

about 6



11. Look quickly.
About how many turtles do you think are there?



Reading and
Writing
Numbers

12. Match a dot card to each number.

2

5

10

8

two

five

ten

eight

13. Write the number.

a) nine

b) seventeen

14. Choose a number up to 10.
Write the number and the word.

Solutions

8. a) 3
b) 4; e.g., I've used dice like this and I know it's 4.
c) 5; e.g., The 5-frame is full, so the number is 5.
d) 8
Students who struggle with Parts c) or d) might need practice with 5-frames or 10-frames.
9. a), b) Students do not need to take exactly 5 or 9 to make a good estimate.
10. About 6 is closer. e.g., I see 5 turtles on the log and some more, so that's more than 5.
Observe whether students recognize the quantity as 5 and some more. Students who do not realize that 5 turtles are on the log might need practice with 5-frames.
11. e.g., There are about 10 turtles in the picture.
Observe whether students know that there are more than 5 and fewer than 10 without counting.
12. Students should place a matching dot card on each number.
13. a) 9
b) 17
14. Students could choose their own number or the number on any dot card; e.g., 7, seven.



SUBTOPIC: MODELLING WHOLE NUMBERS

The following 4 activities focus on different ways to represent numbers. Using a variety of models to represent numbers helps students understand the meaning of the numbers.

Each activity begins with numbers to 5 or 10 and then moves to numbers to 20 or 50. Each model is designed to help students relate numbers to 5 and 10. For example, students learn to think of 6 as a little more than 5, or as 5 and 1 more, or as 4 fewer than 10. Recognizing these relationships provides a foundation for work with addition (Topic 4) and subtraction (Topic 5).

Choose any of these activities to address students' needs for this subtopic:

Activity: Using 5-Frames and 10-Frames Students relate numbers to objects in the classroom and model numbers on 5-frames and 10-frames.

Activity: Modelling with Cubes Students model numbers with linking cubes, using 5-trains, 10-trains, and loose cubes. This helps students relate numbers to 5 and 10.

Activity: Using Sounds and Actions Students model numbers with sounds and actions. For example, they clap a number or move to a space on a walk-on number line.

Activity: Exploring Different Models Students model numbers with materials such as counters, linking cubes, rekenreks, or bead number lines. They might write the number or draw a picture.



"I made a bead number line to show 10."

Activity Materials

- Support Cards 2.1, 2.2
- Multi-Purpose Cards 10, 11, 12, 14
- counters

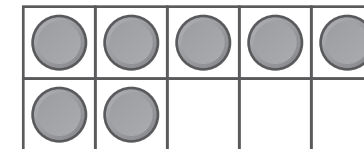
numbers to 5

Activity: Using 5-Frames and 10-Frames

Present situations for representing numbers on 5- and 10-frames. Display Support Card 2.1: The Artist. Ask, "How many spaceships do you see? Show me with counters." (1) "What else does the artist have one of?" (e.g., *1 paintbrush*) Then ask, "What do we have one of in our classroom?" (e.g., *1 teacher, 1 door*) Present Multi-Purpose Card 10: 5-Frame. Have students show the number 1 on the 5-frame.

Next ask, "How many paint colours are on the artist's palette or paint tray?" (5) "How can you show this with fingers?" Say, "Look around. What else do you see in 5s?" (e.g., *5 fingers, 5 toes*). Ask students to show this number with counters. Then ask them to put the counters on Multi-Purpose Card 10: 5-Frame. Repeat with other numbers from the picture, such as 2 shoes, 4 legs on the easel, and perhaps 0 astronauts.

Ask students to show 7 using Multi-Purpose Card 11: 10-Frame.



numbers to 10

Ask, "What number do the counters show?" (7) Continue for modelling numbers up to 10 with counters. For example, have students model 8. Then ask, "Where do you see 8 of something in the classroom?" For some numbers, have students model the same number with and without a 10-frame.

numbers to 10

For numbers to 20, extend the activity using Support Card 2.2: Art Supplies and Multi-Purpose Card 12: Double 10-Frames. For numbers to 50, extend the activity using Multi-Purpose Card 14: 10-Frame Mats.

numbers to 20 or 50

Observe whether students realize that the counters represent the same number with or without a 5-frame or 10-frame.

Questions to Support the Activity

- How do you know there are [4]? (e.g., *I counted them.* OR *It's 5 and 1 fewer.*)
- How can you tell there are [6]? (e.g., *I know a row on the 5-frame is 5 so I can just count 1 more. That's 6.* OR *I can count like this: 5, 6.*)
- How did you use a 10-frame to show [8]? (e.g., *I filled 5 and then put 3 counters here.* OR *I put 4 on the top and 4 on the bottom. I can count the 8 counters.*)
- Is it easier to tell how many are on the 10-frame when you fill the spaces in order or when you put counters all over the place? Why? (e.g., *It's easier when you fill the spaces in order. You can see right away you have more than 5 or fewer than 5.*)
- Would you need counters to show 0 on a 10-frame? (e.g., *No. It would be empty.* OR *Zero means there aren't any counters.*)

Activity: Modelling with Cubes

Present situations for representing numbers with cube trains. Provide linking cubes and show Support Card 2.3: 5-Train. Count the engine and cars with the students to determine that the train has 5 parts. Ask, "How many cubes are in the cube train?" Invite students to model three 5-trains, each a different colour. Then say, "Now put two 5-trains together. How many cubes do you think will be in the long train?" Have students put the 5-trains together to make a 10-train and count the cubes.

Activity Materials

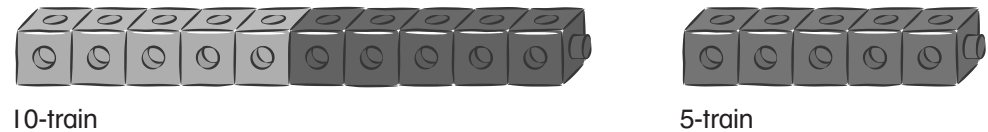
- Support Card 2.3
- BLMs 1, 2 (optional)
- linking cubes

numbers to 10

Sample Support Card for this activity included on page 26 of this sampler

Representing Whole Numbers

Finally, have students count out 9 loose cubes to use with the 5-train and 10-train for building trains as they continue the activity.



For the next train, show a number card from BLM 1: Number Cards from 0 to 10 or write a number from 6 to 10, and ask students to build a cube train to show the number. Students can use trains or loose cubes (e.g., to show 8, students could use 8 cubes, a 5-train and 3 ones, or a train of 8 cubes). Repeat with other numbers from 6 to 10.

numbers to 20 or 50

For greater numbers, use number cards from BLM 2: Number Cards from 11 to 20 or write numbers to 50.

Observe whether students understand how to use a 5-train or 10-train to model numbers (e.g., to model 12, they might use a 10-train and 2 cubes).

Questions to Support the Activity

- How do you know your train has [9] cubes? (e.g., *I counted them.* OR *I started with 10 and took 1 away. 9 is right before 10.*)
- How can you use a 5-train to help you build a [7]-train? (e.g., *I know 7 is more than 5, so I can count on: 6, 7.* OR *I can keep putting cubes on the 5-train until I get to 7.*)
- How many cubes do you need to show 0? Why? (e.g., *None, because 0 means “none.”*)

Activity Materials

- Support Card 2.4
- Multi-Purpose Cards 1, 2
- rhythm instruments (e.g., drums, tambourines)
- walk-on number line (optional)

numbers to 10

Activity: Using Sounds and Actions

Present situations for representing numbers with sounds or actions. Provide rhythm instruments. Show Support Card 2.4: The Band. Ask, “How many children are in the band?” (7) Print the number 7. Invite students to model 7 with sounds or actions (e.g., clap 7 times, tap a drum 7 times, hop 7 times).

Repeat with other numbers from the band picture. For example, students could model 2 guitars, 1 hat, 6 instruments, or maybe 0 trumpets. Each time, ask students to choose a sound or an action.

Next, introduce a large walk-on number line with 10 spaces and labelled numbers. Say a number, such as 3, and have a student move to the space for this number. Alternatively, students could “walk” their fingers on Multi-Purpose Card 1: Number Line from 1 to 10 to model a number.

Sample Support Card for
this activity included on
page 27 of this sampler

For numbers to 20, provide Multi-Purpose Card 2: Number Line from 1 to 20 for them to “walk” their fingers, or a walk-on number line to 20. For numbers to 50, use a walk-on number line to 50.

numbers to 20 or 50

Observe whether students know which direction to walk on the number line for counting up.

Questions to Support the Activity

- How could you show the number [4] with actions or sounds? Let’s try that. (e.g., *Take 4 steps.* OR *Tap a drum 4 times.*)
- How do you know where to stand on the number line to show [9]? (e.g., *I counted: 1, 2, 3, 4, 5, 6, 7, 8, 9.* OR *I stood on the number just before 10.* OR *I counted up from 5.*)
- Listen while I play this tambourine. What number did I play? How could you act out this number a different way? (e.g., *8. Touch your toes 8 times.* OR *Tap a pencil 8 times.* OR *Move to 8 on a number line.*)

Activity: Exploring Different Models

Provide a variety of materials for modelling numbers, as well as materials for writing or drawing. Students will also need Multi-Purpose Card 10: 5-Frame, Multi-Purpose Card 11: 10-Frame, Multi-Purpose Card 12: Double 10-Frames, as well as Multi-Purpose Card 1: Number Line from 1 to 10 and Multi-Purpose Card 2: Number Line from 1 to 20.

Display Support Card 2.5: Flower Friends. Ask what number the flowers show. Then ask, “What are other ways to show 5?” Encourage students to use a variety of materials. Repeat the activity with Support Card 2.6: Lemon Tree for numbers up to 10.

To show numbers to 20 or 50, use 5-trains or 10-trains and loose cubes.

Observe whether students can use a variety of materials to show numbers.

Questions to Support the Activity

- Look around our classroom. Where do you see 5? (e.g., *5 fingers on one hand* OR *5 chairs at a table*) What could you use to make a model for 5? Show this. (e.g., *5 cubes* OR *5 counters* OR *a full 5-frame*)
- How could you show 5 on paper? (e.g., *Write 5.* OR *Draw a picture of 5 things.* OR *Colour a different colour in each square on a 5-frame.*)
- How do you know a model shows 5? (e.g., *I can count the cubes.* OR *I can match up the counters.* OR *There are 4 and 1 more.*)
- Where do you see 12? (e.g., *12 windows* OR *the clock*)

Activity Materials

- Support Cards 2.5, 2.6
- Multi-Purpose Cards 1, 2, 10, 11, 12
- materials for modelling numbers (e.g., classroom objects, counters, linking cubes, rekenreks, bead number lines)
- materials for writing or drawing

numbers to 10

numbers to 20 or 50

Name: _____ Date: _____

BLM 3: Dot Cards 1 to 10

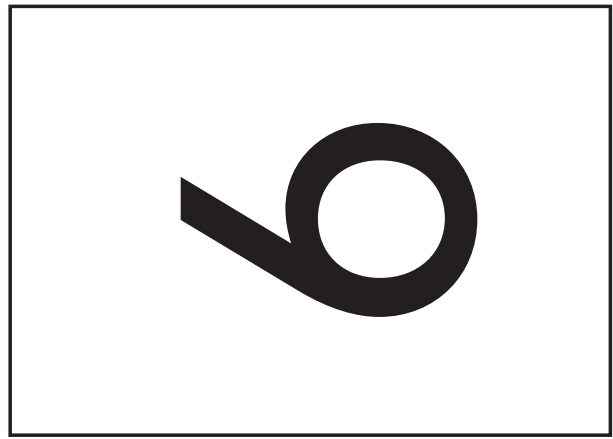
1 dot	2 dots	3 dots
4 dots	5 dots	6 dots
7 dots	8 dots	9 dots
10 dots		



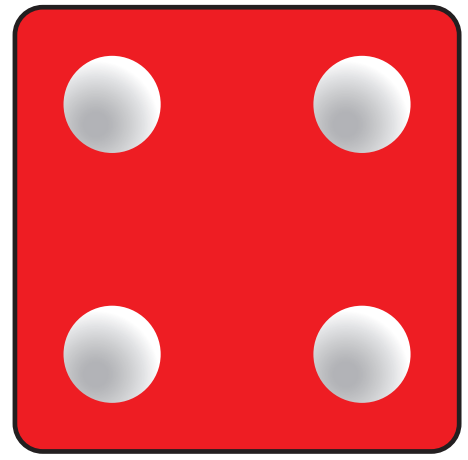


This Multi-Purpose Card can be used with the *Using 5-Frames and 10-Frames* activity on page 16 of this sampler.

Use different materials.
Show 6 in 3 different ways.



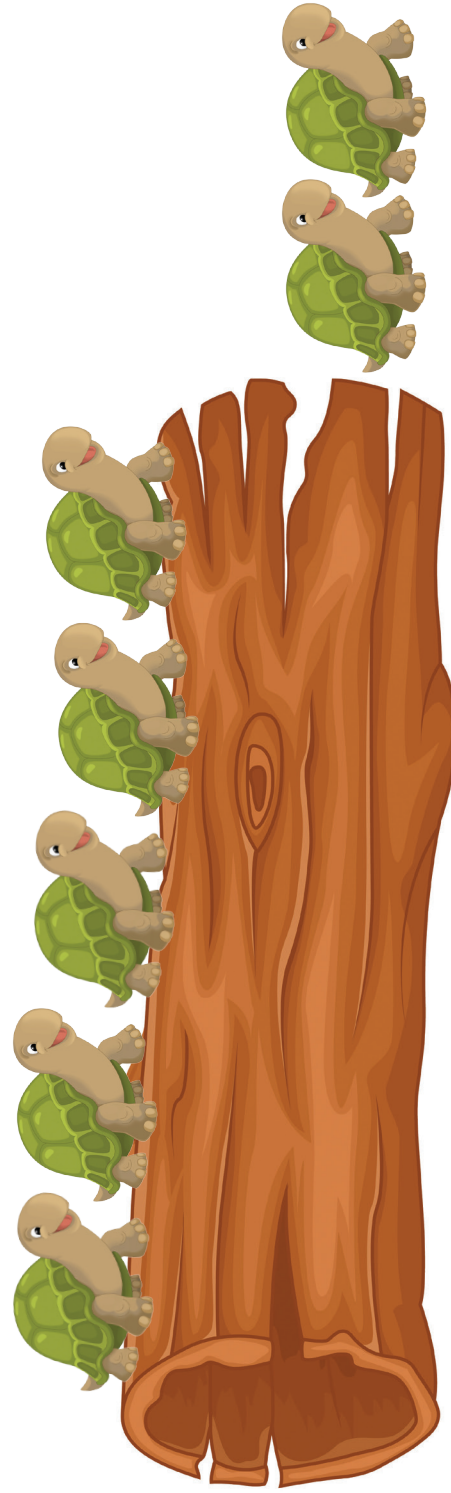
Look quickly.
Write the number.



Look quickly.
Which estimate is closer to the number
of turtles?

about 4

about 6



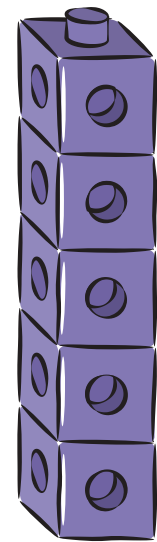
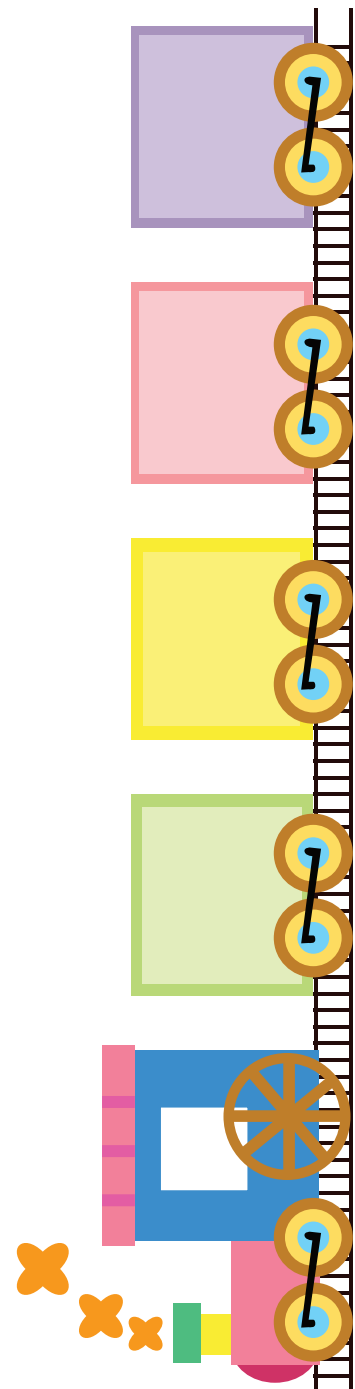
Strand: Number, Topic 2: Representing Whole Numbers

Diagnostic Card Question 10



Strand: Number, Topic 2: Representing Whole Numbers

Support Card 2.1



Strand: Number, Topic 2: Representing Whole Numbers

Support Card 2.2

This Support Card can be used with the *Modelling with Cubes* activity on page 17 of this sampler.

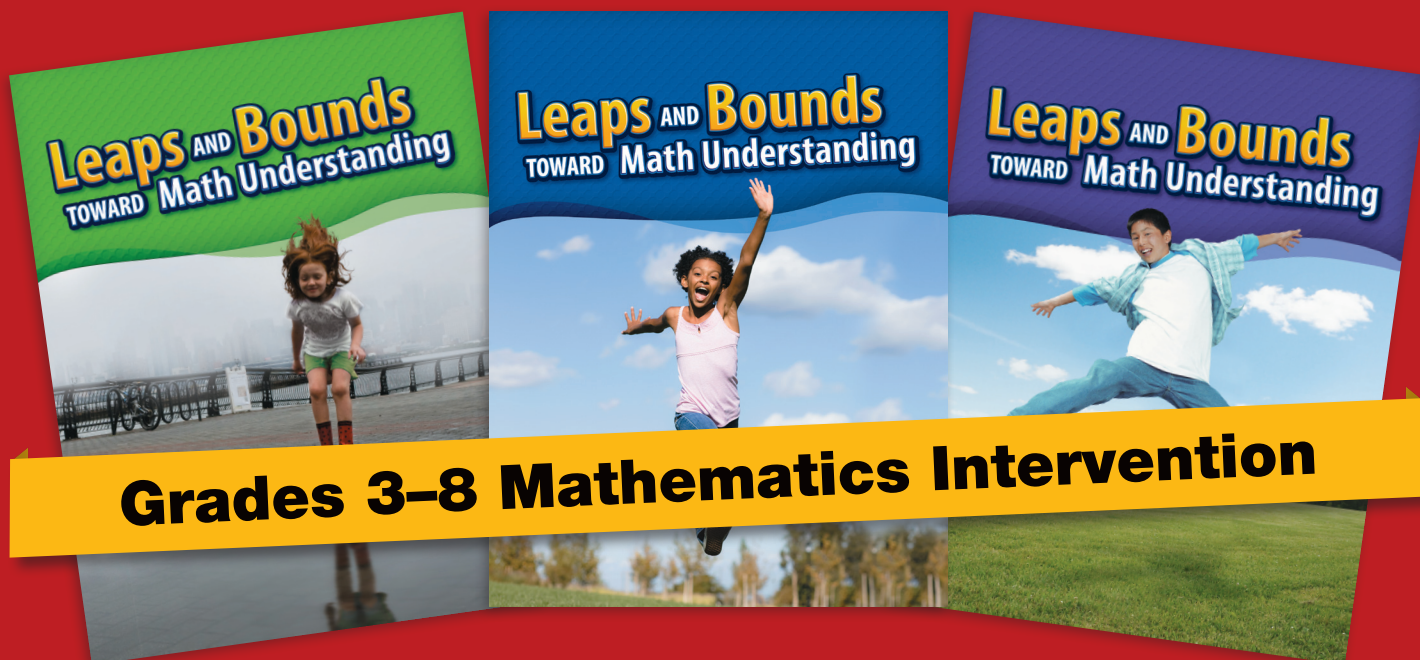


Strand: Number, Topic 2: Representing Whole Numbers

Support Card 2.3

This Support Card can be used with the *Using Sounds and Actions* activity on page 18 of this sampler.

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