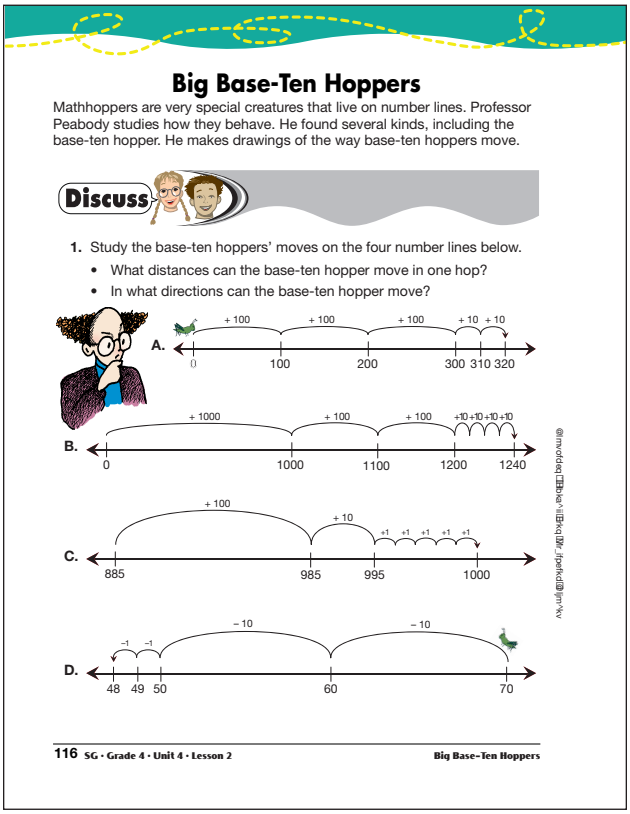

Big Base-Ten Hoppers

Mathhoppers are very special creatures that live on number lines. Professor Peabody studies how they behave. He found several kinds, including the base-ten hopper. He makes drawings of the way base-ten hoppers move.

Discuss

1. Study the base-ten hoppers' moves on the four number lines below.
   - What distances can the base-ten hopper move in one hop?
   - In what directions can the base-ten hopper move?

A. + 100 + 100 + 100 + 10 + 10 — 0, 100, 200, 300, 310, 320

B. + 1000 + 100 + 100 +10 +10 +10 — 0, 1000, 1100, 1200, 1240

C. + 100 + 10 +1 +1 +1 +1 +1 — 885, 985, 995, 1000

D. – 10 – 10 –1 –1 — 48, 49, 50, 60, 70

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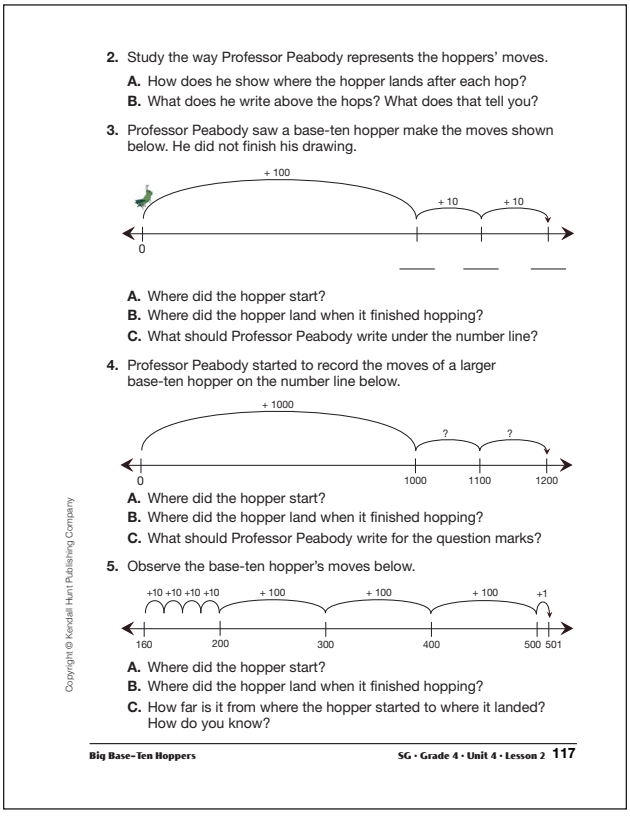

2. Study the way Professor Peabody represents the hoppers' moves.
   - **A.** How does he show where the hopper lands after each hop?
   - **B.** What does he write above the hops? What does that tell you?

3. Professor Peabody saw a base-ten hopper make the moves shown below. He did not finish his drawing.

+ 100 + 10 + 10 — 0

   - **A.** Where did the hopper start?
   - **B.** Where did the hopper land when it finished hopping?
   - **C.** What should Professor Peabody write under the number line?

4. Professor Peabody started to record the moves of a larger base-ten hopper on the number line below.

+ 1000 ? ? — 0, 1000, 1100, 1200

   - **A.** Where did the hopper start?
   - **B.** Where did the hopper land when it finished hopping?
   - **C.** What should Professor Peabody write for the question marks?

5. Observe the base-ten hopper's moves below.

+10 +10 +10 +10 + 100 + 100 + 100 +1 — 160, 200, 300, 400, 500, 501

   - **A.** Where did the hopper start?
   - **B.** Where did the hopper land when it finished hopping?
   - **C.** How far is it from where the hopper started to where it landed? How do you know?

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Big Base-Ten Hoppers

Questions 1–19 (SG pp. 116–122)

1.* Hopper can move by 1000s, 100s, 10s, or 1s. Hopper can move right (+) or left (–).

2. **A.*** Path of hopper dips down to tick mark on number line. Under each mark he writes the number for where the hopper is on the number line; + or – and a number

   B.* Distance and direction of the hop.

3. **A.** 0

   B. 120

   C. 100, 110, 120

4. **A.** 0

   B. 1200

   C. +100, +100

5. **A.** 160

   B. 501

   C. 10 + 10 + 10 + 10 + 100 + 100 + 100 + 1 = 341 hops; Sum of hops

***Answers and/or discussion are included in the lesson.**

6. A.* Both hoppers start and end on the same numbers.

B.* The path each hopper takes from start to end is different. See discussion in Lesson Guide.

7. A.* They both start on 53.

B.* They both land on 152.

C.* The first hopper used 18 hops. The second hopper used 2 hops.

D.* First hopper:
53 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 152

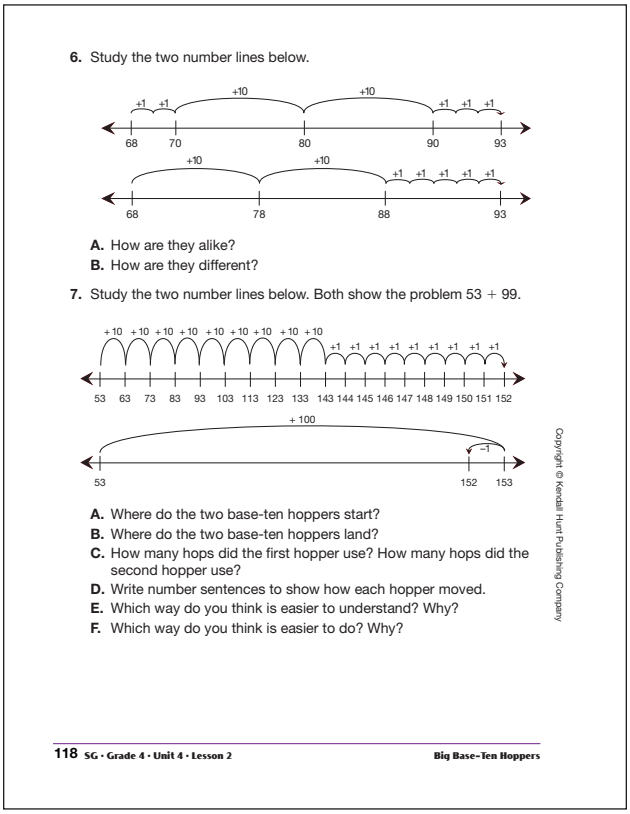
Second hopper:
53 + 100 – 1 = 152

E.* Responses will vary. One possible response: It's easier to understand if I skip count by ten and then count up by ones.

F.* Responses will vary. One possible response: It's easier to just add 100 and then subtract one.

8. A. Maya's number line is incorrect. She misread the problem and went back to 285 instead of going back 285 hops.

B. "Moving back 10" means to move to a number that is 10 less than where you started. "Moving back to 10" means to move to the number 10.



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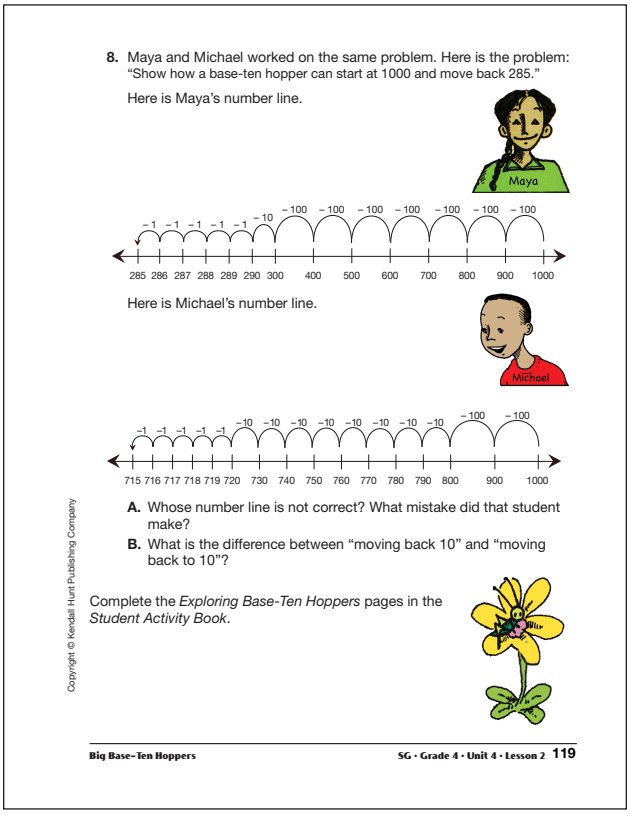

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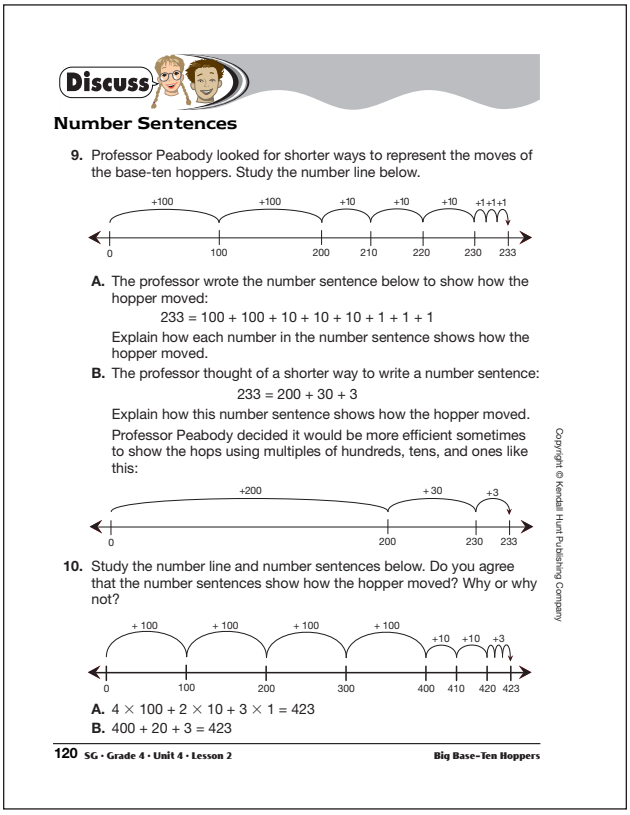
***Answers and/or discussion are included in the lesson.**



Discuss

Number Sentences

9. Professor Peabody looked for shorter ways to represent the moves of the base-ten hoppers. Study the number line below.

A. The professor wrote the number sentence below to show how the hopper moved:

233 = 100 + 100 + 10 + 10 + 10 + 1 + 1 + 1

Explain how each number in the number sentence shows how the hopper moved.

B. The professor thought of a shorter way to write a number sentence:

233 = 200 + 30 + 3

Explain how this number sentence shows how the hopper moved.

Professor Peabody decided it would be more efficient sometimes to show the hops using multiples of hundreds, tens, and ones like this:

10. Study the number line and number sentences below. Do you agree that the number sentences show how the hopper moved? Why or why not?

A. 4 × 100 + 2 × 10 + 3 × 1 = 423

B. 400 + 20 + 3 = 423

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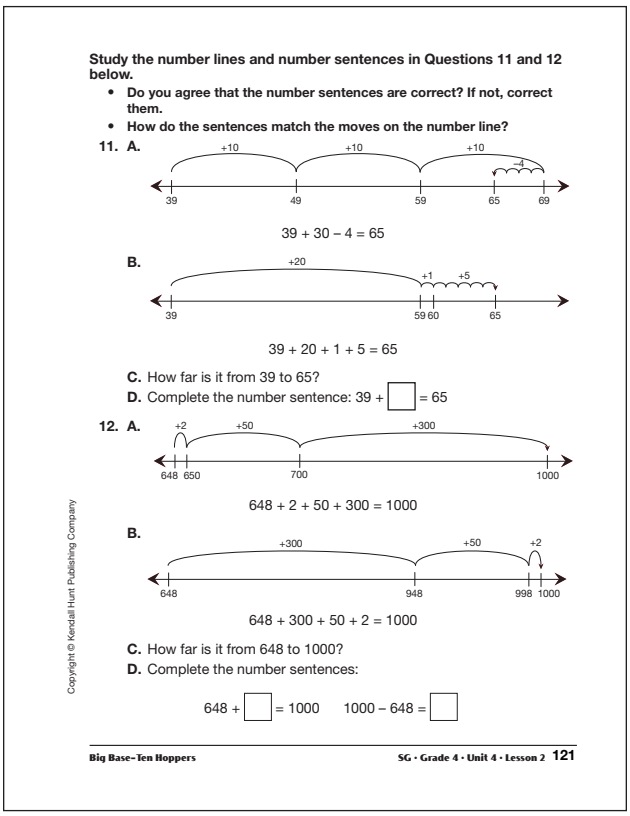

Study the number lines and number sentences in Questions 11 and 12 below.

- **Do you agree that the number sentences are correct? If not, correct them.**
- **How do the sentences match the moves on the number line?**

11. A.

39 + 30 − 4 = 65

B.

39 + 20 + 1 + 5 = 65

C. How far is it from 39 to 65?

D. Complete the number sentence: 39 + ☐ = 65

12. A.

648 + 2 + 50 + 300 = 1000

B.

648 + 300 + 50 + 2 = 1000

C. How far is it from 648 to 1000?

D. Complete the number sentences:

648 + ☐ = 1000 1000 − 648 = ☐

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9. A. Answers will vary. Each number moves the hopper by that much to the right, since all the numbers are added.

B. The hopper jumps all the 100s at once, all the 10s at once, and all the 1s at once.

10. A–B. A student may respond, the hopper started at zero and jumped four +100s, two +10s and three +1s for a total of 423. Both sentences do show how the hopper moved.

11. A.* Number sentence is correct. Descriptions will vary. A student may respond that the first number, 39, is the starting point, followed by three +10s for the 30, then 4 back for subtracting 4.

B.* Number sentence is correct. Descriptions will vary. A student may respond that the first number, 39, is the starting point, followed by one + 20 for 59, then a + 1 hop to 60 and 5 more + 1s to get 65.

C.* 26

D.* 26

12. A.* Number sentence is correct. Descriptions will vary. A student may respond that 648 is the starting point, followed by at 2 hop to 650, a + 50 hop to get to 700, followed by a + 300 hop to land on 1000.

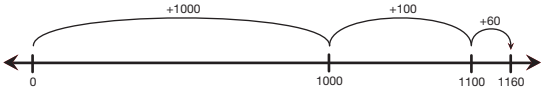
B.* Number sentence is correct. Descriptions will vary. A student may respond that the first number is the starting point, followed by +300 to get to 948, followed by +50 to get to 998, followed by +2 to get to 1000.

C.* 352

D.* 352, 352

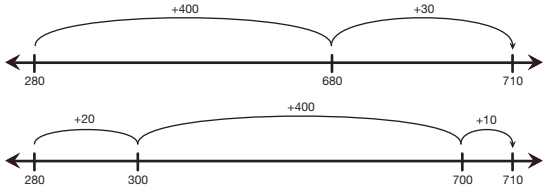
***Answers and/or discussion are included in the lesson.**

13. A. Possible response:



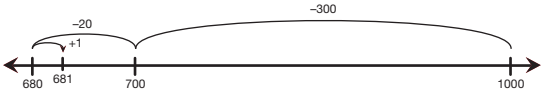
B. 1160 = 1000 + 100 + 60

14. A. Possible response:



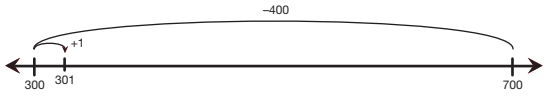
B. Stops at 710

15. A. Possible response:



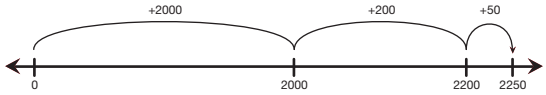
B. 681 = 1000 – 300 – 20 + 1

16. A.



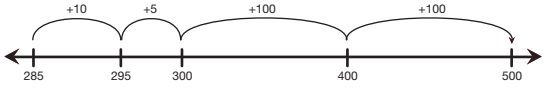
B. Stops at 301

17. A. Possible response:



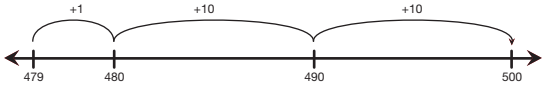
B. 2250 = 2000 + 200 + 50

18. A. Possible response:



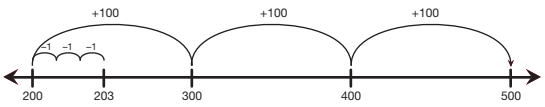
285 + 10 + 5 + 100 + 100 = 500
500 – 215 = 285

B. Possible response:

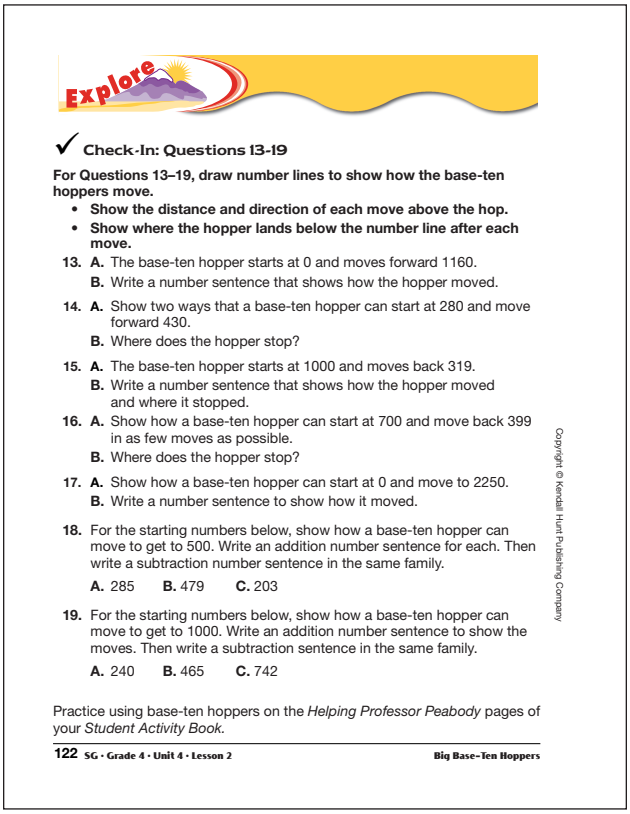


479 + 1 + 10 + 10 = 500
500 – 21 = 479

C. Possible response:



203 – 3 + 300 = 500
500 – 297 = 203



Explore

✓ **Check-In: Questions 13-19**

For Questions 13–19, draw number lines to show how the base-ten hoppers move.

- **Show the distance and direction of each move above the hop.**
- **Show where the hopper lands below the number line after each move.**

13. A. The base-ten hopper starts at 0 and moves forward 1160.
B. Write a number sentence that shows how the hopper moved.

14. A. Show two ways that a base-ten hopper can start at 280 and move forward 430.
B. Where does the hopper stop?

15. A. The base-ten hopper starts at 1000 and moves back 319.
B. Write a number sentence that shows how the hopper moved and where it stopped.

16. A. Show how a base-ten hopper can start at 700 and move back 399 in as few moves as possible.
B. Where does the hopper stop?

17. A. Show how a base-ten hopper can start at 0 and move to 2250.
B. Write a number sentence to show how it moved.

18. For the starting numbers below, show how a base-ten hopper can move to get to 500. Write an addition number sentence for each. Then write a subtraction number sentence in the same family.
A. 285 **B.** 479 **C.** 203

19. For the starting numbers below, show how a base-ten hopper can move to get to 1000. Write an addition number sentence to show the moves. Then write a subtraction sentence in the same family.
A. 240 **B.** 465 **C.** 742

Practice using base-ten hoppers on the *Helping Professor Peabody* pages of your *Student Activity Book*.

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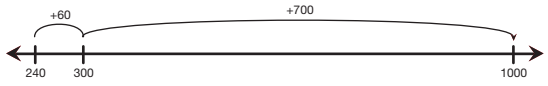
19. A. Possible response:

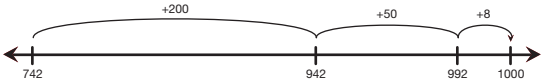


240 + 60 + 700 = 1000
1000 – 760 = 240

B. Possible response:

465 + 5 + 30 + 500 = 1000
1000 – 535 = 465

C. Possible response:



742 + 200 + 50 + 8 = 1000
1000 – 258 = 742