Neighbor Facts

Strand: Computation and Estimation

Topic: Developing basic addition and subtraction fact strategies for "one more than", "one less than", "two more than", and "two less than"

Primary SOL: 1.6 The student will create and solve single-step story and picture problems using addition and subtraction within 20.

Related SOL: 1.1, 1.7

Materials

- Images for Plus 1/Plus 2
- Counters
- Paper/pencil or dry erase marker/whiteboard
- Frog problems
- Frog counters
- Log template
- Sample chart for Frogs Sitting on Logs
- Chart paper
- Markers
- Plus-1/Minus-1 Cover-up Game Board
- Spinner (Numbers 1–10)
- Spinner (Numbers 11–20)
- Paperclips for spinners
- Two-sided counters

Vocabulary

add, combine/join, difference, equation, minus, models, neighbor facts, number sentence, parts, plus, put together, strategy, subtract, sum, take apart, whole

Student/Teacher Actions: What should students be doing? What should teachers be doing?

Note: While this lesson is written as a single-day lesson, it could easily be spread over two or more days, depending on the needs of your students.

1. To begin the lesson and jumpstart student thinking about one more/one less and two more/two less, the teacher will flash cards with images of neighbor facts (plus one and plus two). Students will need counters, paper/pencil, or dry-erase markers/whiteboards.
2. Flash an "Images for Plus 1/Plus 2" card for about 5 seconds and then hide it. Give students time to re-create what they saw using counters, paper/pencil, or dry erase markers/whiteboards. Then, flash the image again and hide it after about 5 seconds. Students can finish their re-creation of what they saw. Finally, show the image again and leave it up so that students can check their work and make any necessary changes.
3. Facilitate a discussion with students by asking them what helped them remember what the image looked like. After a student explains their strategy, draw a sketch of the image

and record the student's ideas by circling how they saw the configuration. Focus on the parts of the image that the students saw and how they put parts together to make the whole. Ask students how this helped them to think about the total number, or the whole. Have several students discuss their strategies for remembering the image. Ask students to compare the various student strategies: "*How is (student's) way of remembering like (student's) way?" "How are they different?"* (If students have been introduced to the plus (+) sign and the equals (=) sign, this would be an opportunity to ask students what equation would represent how they saw the image.)

4. Repeat this with several other cards using "Images for Plus 1/Plus 2" or other similar pictures and discuss student strategies. Ask students what they notice about the total number of shapes in the images you flashed to them during this introduction. (Some may recognize that you were adding on one or two.)
5. Explain to students that today's focus will be working on what happens to a number when you add one more or take away one. Ask students to share what they notice about adding one to an amount. They can use pictures, drawings, and numbers to describe their ideas. Record their ideas on chart paper. (For example, some students may recognize that when adding one more it is the next number in a sequence or that when you take away one it is the previous number in a sequence. Some may not recognize this and may still need to count both of the addends to find the total amount.)
6. After discussing several student ideas about plus one, explain that students will be solving a problem and using plus one to help them figure it out. Pose the problem – **There were 7 frogs sitting on a log. One more frog hopped onto the log. How many frogs are sitting on the log now? Explain your thinking using pictures, numbers, and words.**
7. Have students determine what information is important in the problem and discuss what they are trying to figure out. It is important to ask students questions to get them talking about their reasoning. For example, *"Will your result be more or less than the amount you started with?" "How do you know?"*
8. Then, have students brainstorm strategies that they could use to solve the problem. "*What tools will you need?" "How have you tackled similar problems?" "Would it help to draw a picture or representation?"*
9. Give students time to work individually or with a partner to actually solve the problem. Have manipulatives readily available and/or whiteboards/markers for them to act out what is happening in the problem. Observe students while they are working to see what strategies they are using. *Are they working randomly? Are they starting at seven and counting up one? Are students counting out seven and counting out one and then figuring out the total? Do the students understand that adding one to a number is the next counting number (in this case eight)? What strategies are students using to add one? Can they write an equation to match the problem? Do they just know the combination and that it is the number after seven?* Use your observations and student work as you facilitate a discussion about how students solved the problem.
10. Ask several students to share strategies for solving the problem with the group while you record their thinking on chart paper/board. Have them include how they modeled

the story problem with manipulatives or drawings. Here are some possible questions to encourage student reflection: "*How did you get your answer?" "Can you describe how you solved the problem to us?" "Can you explain what you have done so far?" "Why did you decide to do this?" "What do you think about what _____ said? Do you agree? Why or why not?" "Does anyone have the same answer but a different way of explaining it?" "Does your answer make sense?" "How is (student's) strategy similar to (student's) strategy? How are they different?"* If there were student strategies that you would like to highlight, have those students share their thinking during the group discussion.

11. After students have discussed the problem with adding one, ask them to consider what would happen with the following scenario. **There were 9 frogs sitting on a log. One frog jumped off of the log. How many frogs are sitting on the log now? Explain your thinking using pictures, numbers, and words.**
12. Give students some time to solve this new problem. Have manipulatives readily available and/or whiteboards/markers for them to act out what is happening in the problem. Observe students while they are working to see what strategies they are using. *Are they working randomly? Are they starting at nine and taking one away to solve the problem? Are students counting out nine and taking one away, then counting to figure out what amount is left? Do students relate this problem to the problem that they just solved? Can they write an equation to match the problem? Do they just know that eight is one less than nine?* Use your observations and student work as you facilitate a discussion about how students solved the problem.
13. Ask several students to share strategies for solving the problem with the group while you record their thinking on chart paper/board. Have them include how they modeled the story problem with manipulatives or drawings. Here are some possible questions to encourage student reflection: "*How did you get your answer?" "Can you describe how you solved the problem to us?" "Why did you decide to do this?" "What do you think about what (student) said? Do you agree? Why or why not?" "Does anyone have the same answer but a different way of explaining it?" "Does your answer make sense?" "How is the first problem about the frogs on the log similar to the second problem? How are they different?"* If there were student strategies that you would like to highlight, have those students share their thinking during the group discussion.
14. Explain to the students that they are going to act out situations with frogs sitting on logs while you record their findings on a chart. Give each student a problem-solving mat with a log and frog counters. Have them show one frog sitting on the log. Ask: *"What would happen if another frog hopped onto the log?"* "*How many frogs would there be?" "What number sentence would show us one more frog?"* Do this several times with situations where one more frog jumps onto a log. Record the number of frogs originally on the log and then write the number sentence that shows one more on the chart.
15. Have students repeat this starting with two frogs sitting on the log and one more hopping over. Record the number sentence for adding one more. Continue this until you get to 10 frogs sitting on the log.
16. Then, have students act out situations with one less and having one frog jump off the log. Have students begin with 10 frogs sitting on the log. Ask: *"What would happen if*

one frog jumped off the log?" "*How many frogs would there be?" "What number sentence would make sense for this?" "What number sentence would show us one less frog?"* Do this several times with situations where one frog jumps off the log. Record the number of frogs originally on the log and then write the number sentence that shows one less on the chart.

17. Have students repeat this starting with nine frogs sitting on the log and one jumping off the log. Record the number sentence for one less. Continue this until you get to no frogs sitting on the log.
18. Ask students to look at the number of frogs that were sitting on the log and compare it to what happened when you added one more. "*What patterns do you notice?" "Do you notice any patterns as you move down the chart?" "What is happening when you add one to a number?" "What happens when you add two to a number?" "What helped you to figure these problems out?" "How could you figure out the total number of frogs on the log without drawing a picture or using counters?"*
19. After discussing the frogs on the log activity with students, introduce a game which focuses on developing an understanding of one more than and one less than called Plus-1/Minus-1 Cover-Up. Students will work with a partner. Each pair of students will need a game board, a spinner, and two different-colored counters (one color for each student).
20. The objective of the game is to identify numbers that are one more or one less than a given number. The player with the most spots on the game board covered wins. Model this game for students before sending them with their partner to play.
21. Player 1 spins the spinner and decides whether to cover a number that is either one more or one less on the game board. Player 1 must say, **"<u>(the number spun)</u> and <u>(one more/one less)</u> is <u>(sum/difference)</u>."** (For example, if the student spins a 3, then he/she would say that 3 and 1 more is 4, or 1 less than 3 is 2.) Then, player 1 covers up the one more or one less number on the game board. Player 1 records the number sentence to represent one more/one less in his/her math journal.
22. Player 2 will spin and repeat.
23. Play continues with players alternating turns. If there is not a space on the board to cover, then the player loses a turn.
24. While students are playing the game with a partner, the teacher should be observing students as they work. Here are some questions to consider while observing students. *How are students figuring out one more and one less than a number? If there are any misconceptions, what are your next steps for that student(s)?*
25. After students have time to play the game, gather students for a discussion about the strategies they used to figure out one more and one less throughout the game. Ask students to share various plus-one and minus-one facts they figured out. Record the neighbor facts on chart paper/board. Use pictures, numbers, and words when recording student ideas on the chart. Here are some questions to consider as you facilitate discussion with students: "*How did you figure out the number that was one more or one less than the amount?" "How did you count?" "Did you use any other facts that you*

already found to help you with those you did not know?" "What patterns do you notice on our chart of one more and one less facts?"

26. After the game is introduced and students understand how to play, this game could be used as a station while you meet with small groups.
27. Once students have become fluent with one more/one less, you can develop the idea of two more/two less in a similar way.

Assessment

- **Questions**
  - When you add one more to a number, how do you know what the sum will be? Explain your thinking.
  - When you subtract one less than a number, how do you know what the difference will be? Explain your thinking.
  - There are 16 frogs sitting on a log. If one more hopped onto the log, how many frogs would be sitting on the log? Explain your thinking using pictures, numbers, and words.
  - There were 19 frogs sitting on a log. If one jumped off, how many frogs would be sitting on the log? How do you know? Explain your thinking using pictures, numbers, and words.
- **Journal/writing prompts**
  - Mike had five bouncy balls. His mom gave him one more. How many bouncy balls does Mike have now? Explain your thinking using pictures, numbers, and words.
  - There were six green apples and one red apple in the basket. How many apples were in the basket? Explain your thinking using pictures, numbers, and words.
  - There were 10 lightning bugs in the jar. One lightning bug flew away. How many lightning bugs were still in the jar? What is one less than 10? Explain your thinking using pictures, numbers, and words.
  - Barbara had some cookies. Kim ate one cookie. Now Barbara has 14 cookies. How many cookies did Barbara have to start with? Explain your thinking using pictures, numbers, and words.
  - Eight children were waiting in line for lunch. Some more got in line. Now there are nine children waiting in line for lunch. How many more got in line? How do you know? Explain your thinking using pictures, numbers, and words.
- **Other Assessments**
  - Provide a set of 10 frame cards. Have students identify how many dots are on the card. Next, ask students what number would be one more or one less. Repeat this with several different cards having students explain their thinking.
  - Provide a set of 10 frame cards. Have students identify how many dots are on the card. Next, ask students what number would be two more or two less. Repeat this with several different cards having students explain their thinking.

Extensions and Connections (for all students)

- The teacher could connect the one more/one less and two more/two less facts with number bonds and further discuss the numbers in terms of parts and wholes.
- Have students create story problems for one more/one less or two more/two less. Have them trade problems with another student and solve each other's problem.
- Students need many opportunities to develop an understanding of one more/one less and two more/two less strategies for solving problems. Additional activities that could be introduced and then placed in stations include:
  - **Spin It:** Put cards with the numbers 1–10 shuffled and in a stack face-down. Students will take turns turning over the top card on the deck and spinning a spinner to determine whether to add one or two or subtract one or two. Students will tell what number card they have and if they +1, +2, -1, or -2 and what the sum or difference would be. (For example, if a student turned over a 4 in the deck and spun -2, then he/she would say 4 – 2 = 2.)
  - **One More/One Less Dominoes:** Use a regular set of dominoes. Place the dominoes upside-down between you and your partner. Each player selects seven dominoes. Lay your dominoes out in front of you so that you can see the dots (pips). Choose one of the face-down dominoes to start the game. Players will take turns trying to play one of his/her dominoes by matching dots that show one more or one less and saying the number sentence that matches. (For example, one less than 5 is 4 or 5 – 1 = 4 and matching the dots.)
  - **Two More/Two Less Dominoes:** See directions above. In this version of the game, players will match dots that show two more or two less and saying the number sentence that matches. (For example, two more than 7 is 9 or 7 + 2 = 9.)
  - **More, More!:** Place counters and 10-frames in the center of a table and available for students to use. Each student will choose random numbers by tossing a number cube or selecting a card. Ask students to place the corresponding number of counters on their 10-frame to match the random number selected. Ask students to place one more counter, then two more counters for each number. Have students say how many counters there would be with one more and two more. Record those new numbers on a chart in math journal/whiteboard (see below). Students could play a variation of this with 1 less and 2 less.

Number	1 more	2 more
6	7	8

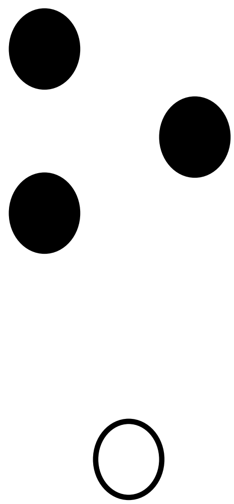
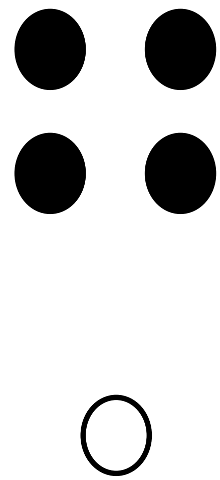
Strategies for Differentiation

- Allow students that are struggling with one more, one less, two more, and two less concepts to use manipulatives to act out problem-solving scenarios.
- Use numbers to 10 before advancing to higher numbers.

- Provide multiple manipulatives for students to use to figure out one more/one less and two more/two less.
- For students who are struggling, focus on one more before introducing one less.
- Provide a number path so that students can connect one more, one less, two more, two less with the sequence shown on the number path.
- For students who struggle with seeing things from a distance, provide the students the opportunity to see the image cards at their desks.
- Provide sentence frames or equation frames as necessary: ____ and one more is _____, ____ and one less is _____, ______ + 1 = _____, _____ - 1 = ______.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

Images for Plus 1/Plus 2

Image A	Image B
	
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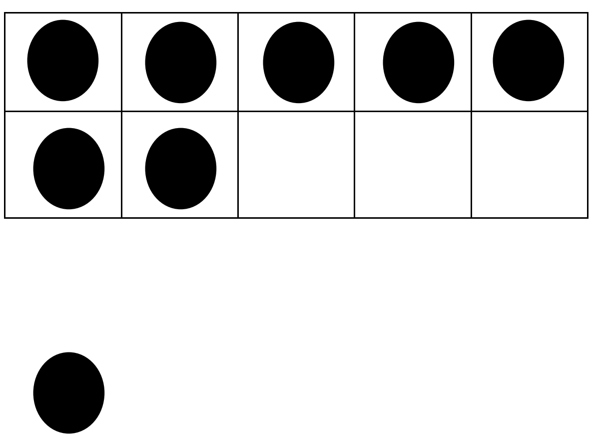
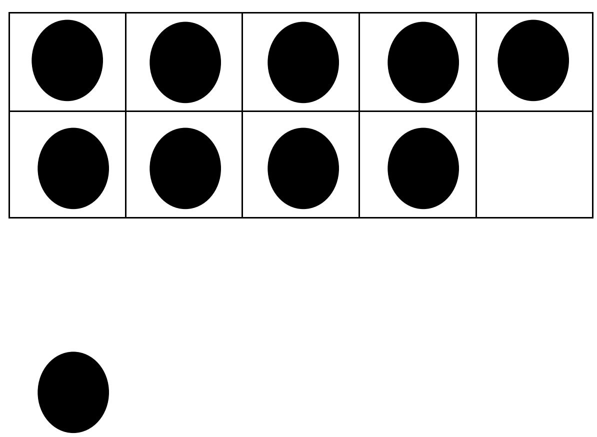
	

Image E	Image F

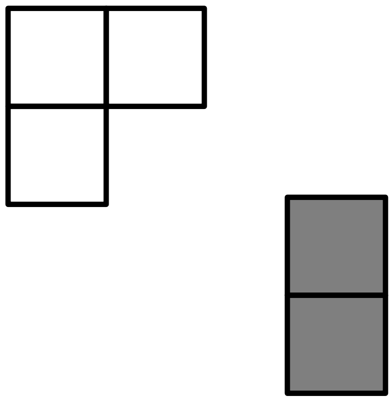
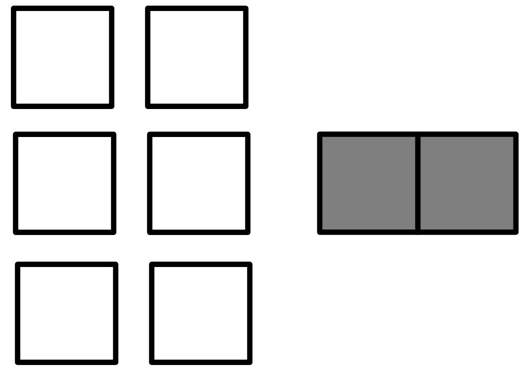
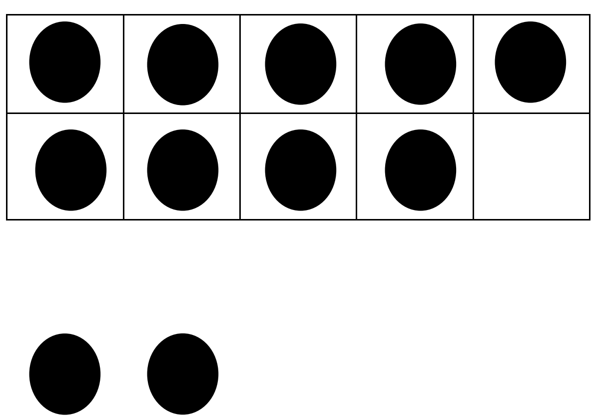
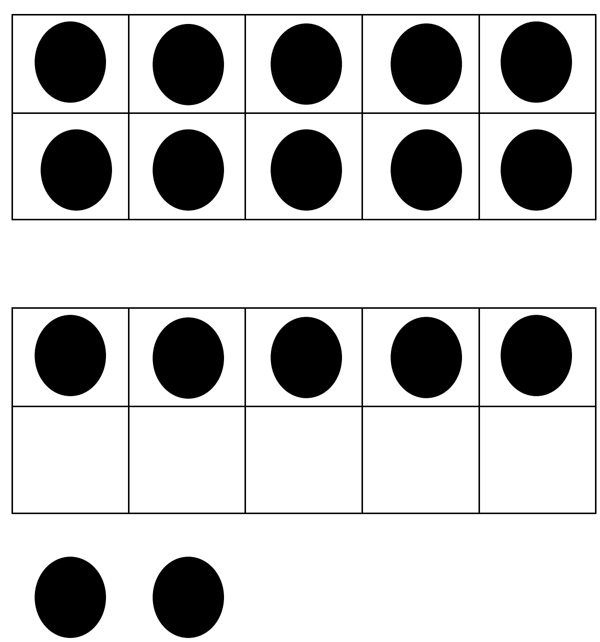
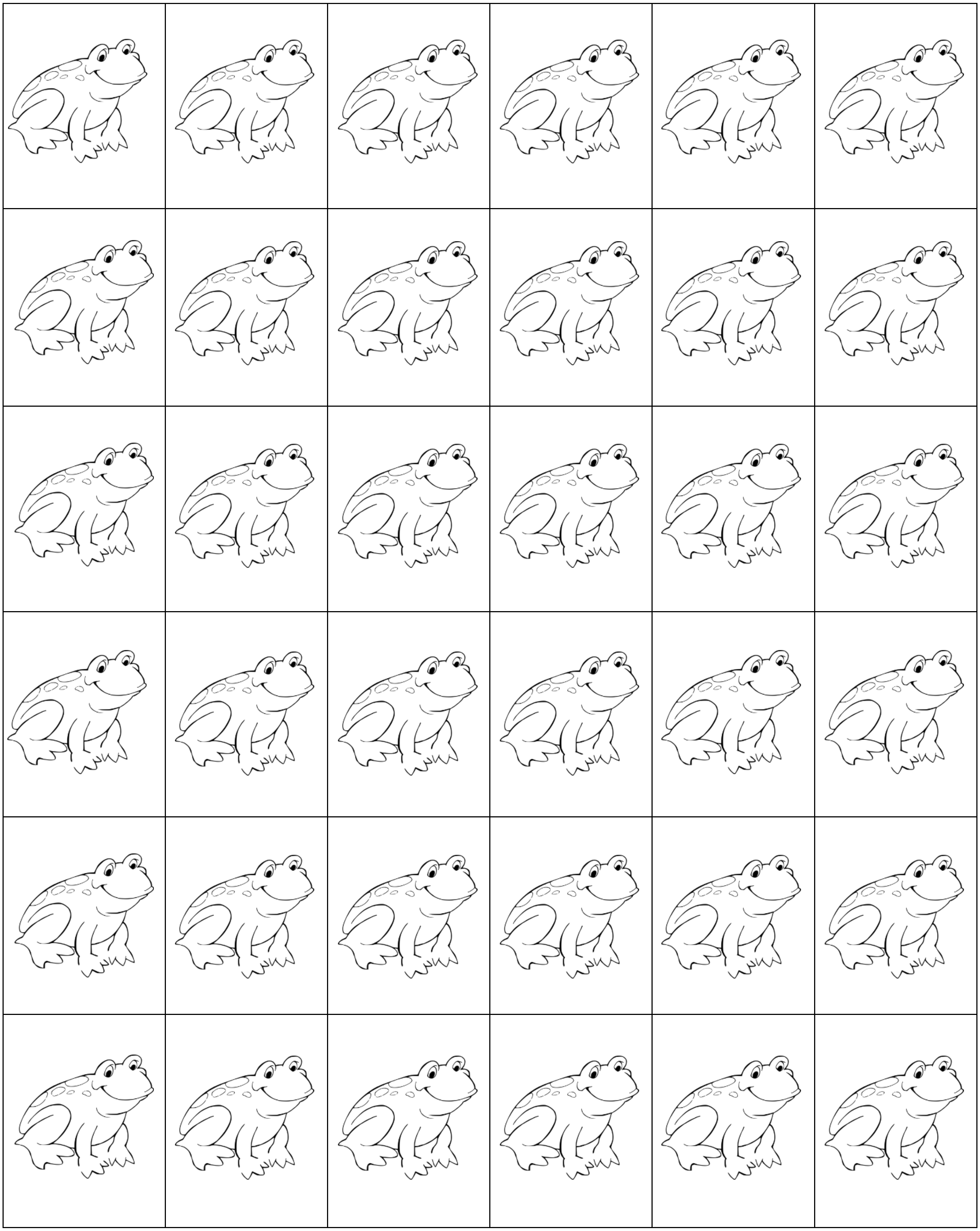
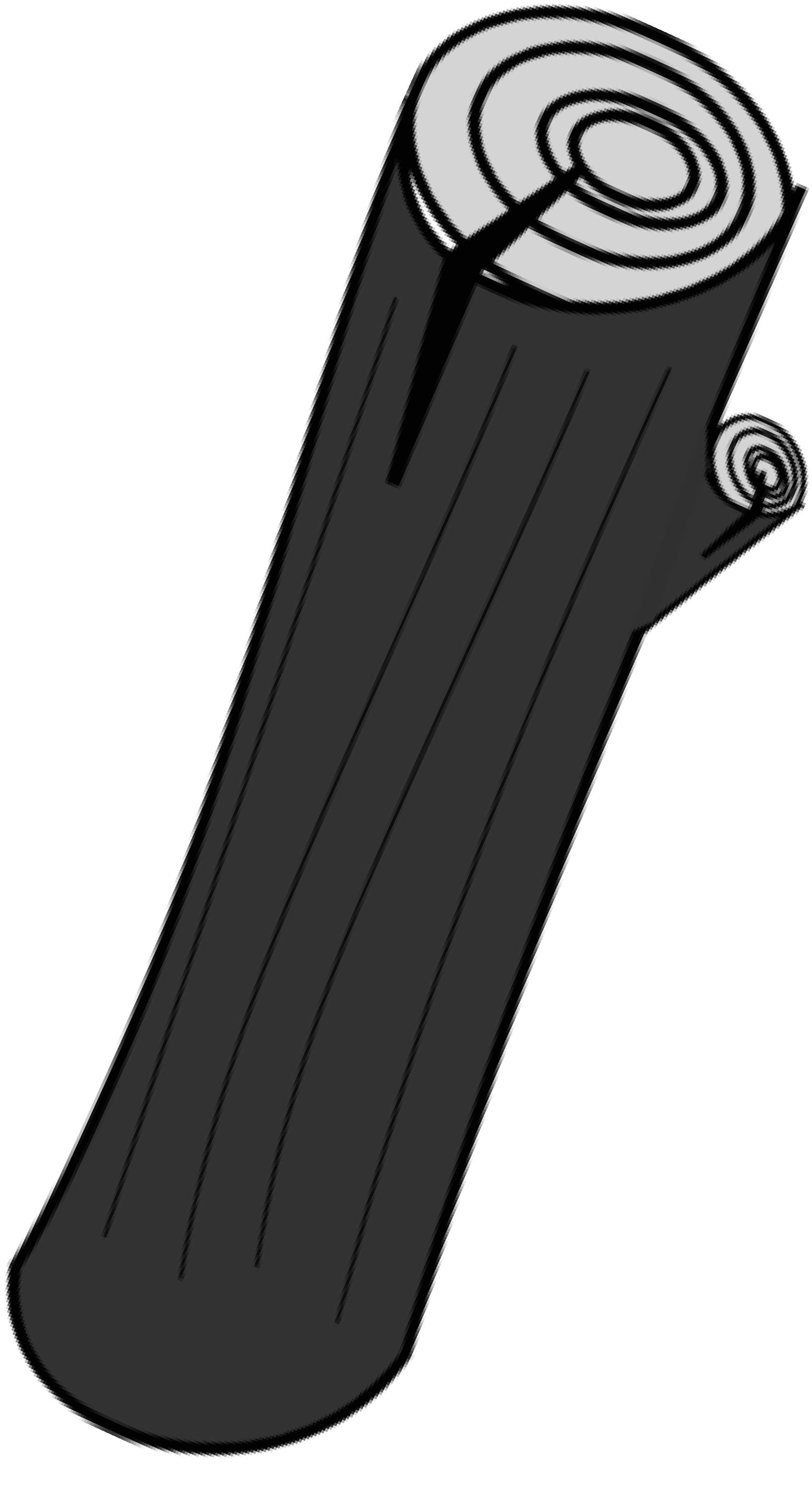

	

Image G	**Image H**
	

Frog Counters





Template for Frogs on Logs Problem

Plus-1 Frogs on Logs Problem

Frogs Sitting on Logs

There were 7 frogs sitting on a log. One more frog hopped onto the log. How many frogs are sitting on the log now? Explain your thinking using pictures, numbers, and words.

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Minus-1 Frogs on Logs Problem

Frogs Sitting on Logs

There were 9 frogs sitting on a log. One frog hopped off the log. How many frogs are sitting on the log now? Explain your thinking using pictures, numbers, and words.

Frogs Sitting on Logs

There were 9 frogs sitting on a log. One frog hopped off the log. How many frogs are sitting on the log now? Explain your thinking using pictures, numbers, and words.

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Sample Anchor Chart for Frogs Sitting on Logs Problem

Minus 1 Frog	Number of Frogs on Log	Plus 1 Frog (complete this first)
1 – 1 = 0	**1**	**1 + 1 = 2**
2 – 1 = 1	**2**	**2 + 1 = 3**
3 – 1 = 2	**3**	**3 + 1 = 4**
4 – 1 = 3	**4**	**4 + 1 = 5**
5 – 1 = 4	**5**	**5 + 1 = 6**
6 – 1 = 5	**6**	**6 + 1 = 7**
7 – 1 = 6	**7**	**7 + 1 = 8**
8 – 1 = 7	**8**	**8 + 1 = 9**
9 – 1 = 8	**9**	**9 + 1 = 10**
10 – 1 = 9	**10**	**10 + 1 = 11**

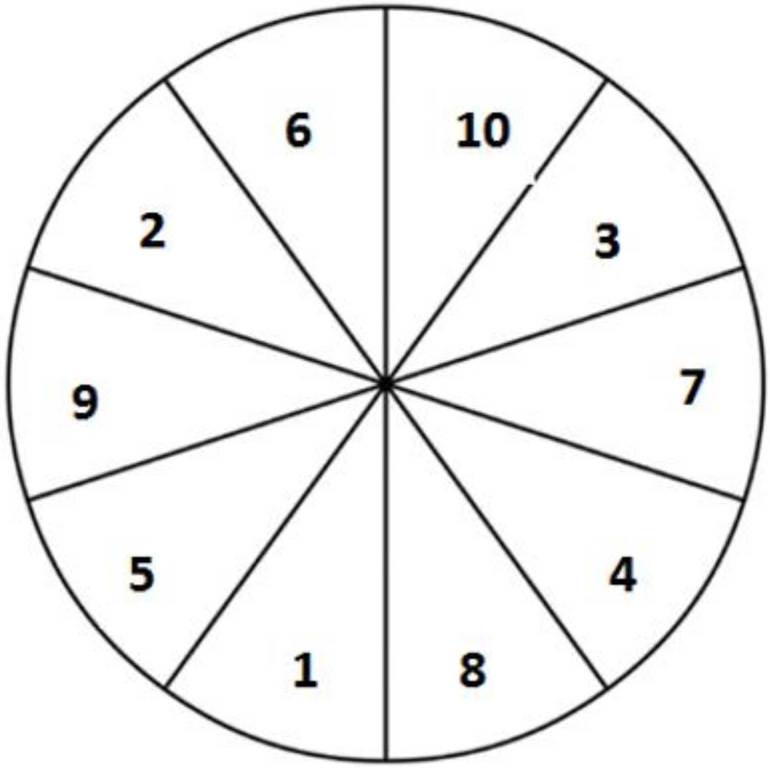
Plus-1/Minus-1 Cover-up Game Board (0–11)

10	6	9	3	7
1	8	0	11	5
5	3	2	10	1
7	11	4	9	8
4	9	5	6	2

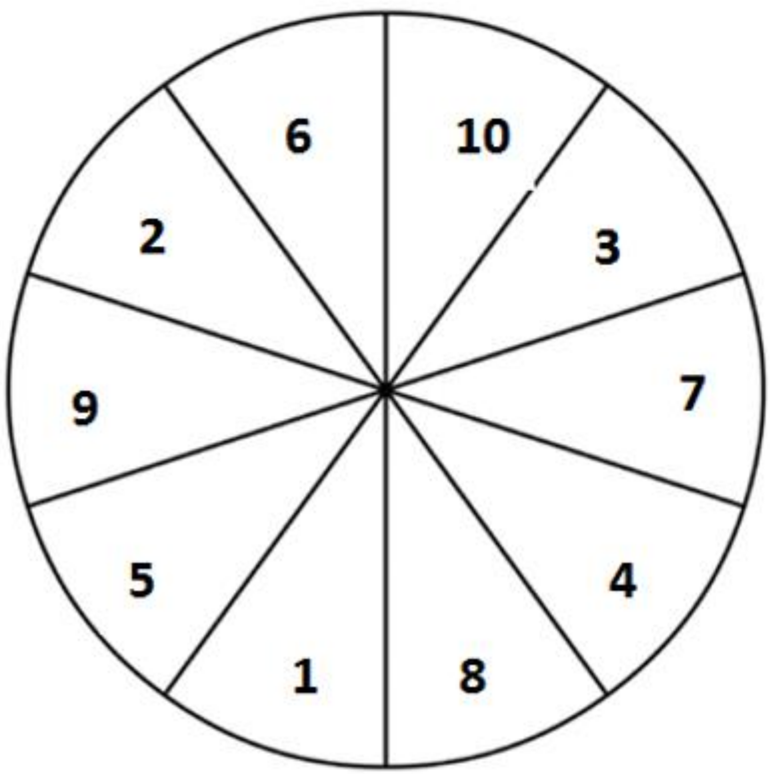
Plus-1/Minus-1 Cover-up Game Board (Numbers 11–20)

15	19	10	13	17
11	20	16	14	12
18	13	19	17	14
15	18	12	19	10
16	11	20	14	18

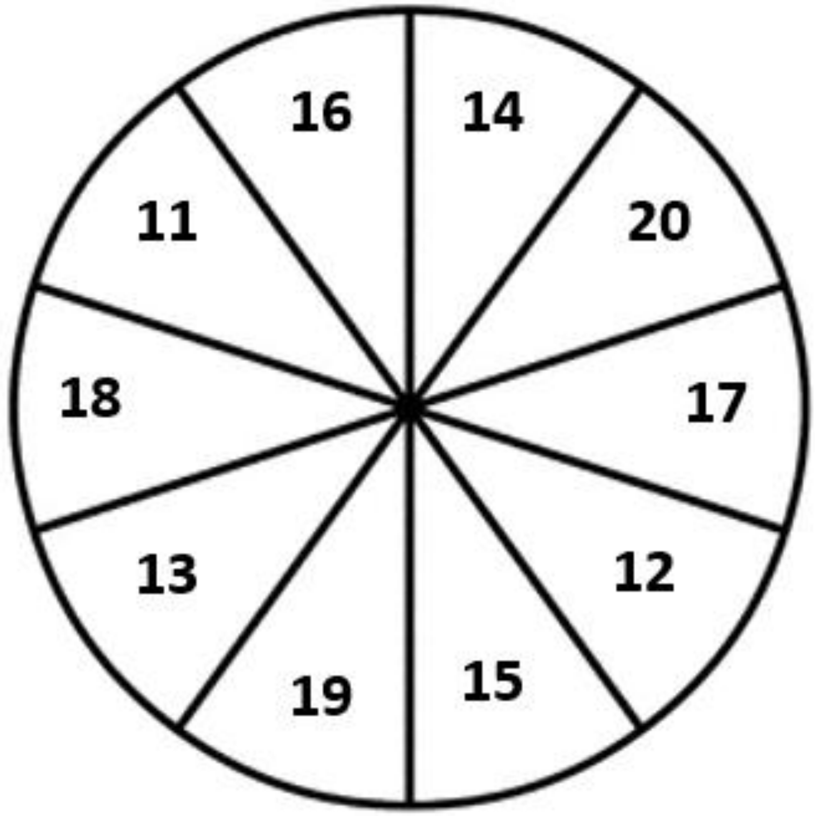
Spinner for Plus-1/Minus-1 Cover-up (Numbers 1–10)



Spinner for Plus-1/Minus-1 Cover-up (Numbers 1–10)



Spinner for Plus-1/Minus-1 Cover-up (numbers 11–20)



Spinner for Plus-1/Minus-1 Cover-up (numbers 11–20)