

Activity: Where Is Our Cabin?

Mathematics Content Focus:

- Understand and apply different counting sequences forward and backward from any number (skip counting 2's, 5's, 10's).
- Count from various numbers by 1's in both directions (more/less.)
- Reason and justify your thinking about a problem with multiple solutions.
- Make sense of problems and persevere in solving them.

Materials Needed:	Manipulative Possibilities:
<ul style="list-style-type: none"> • Tent Campsite Map 1 • Tent Campsite Map 1 Guide for Teachers • Tent Campsite Map 2 • Tent Campsite Map 2 Guide for Teachers • Cabin Campsite Map (at least 3 copies per student) • Cabin Information • Cabin Campsite Guide (Teacher Only) 	<ul style="list-style-type: none"> • Tiles • Cubes • Dry Erase or Vis-a-Vis marker (students can write numbers on tiles or cubes to move around) • Graph Paper (for students to create a number path) • Small post-its (students can write numbers on and move)
Resources Used: <ul style="list-style-type: none"> • Adapted from https://mathpickle.com/project/number-icicles/ 	

Preparing for the Activity:

- Print Tent Campsite Map 1 and Tent Campsite Map 2
- Print Cabin Campsite Map and Cabin Information for students
- Print extra copies of Cabin Campsite Map

Conducting the Activity: (1 hour 25 minutes)

Launching the Lesson: (20 minutes)

1. Explain to students that the Park Rangers need their help planning a new Math Camp-In site there are two campsites designated for tents. This is one of the campsites for tent camping. Show students Campsite Image 1. Ask students: *What do you notice?* Give students several minutes to look at the image, before they share ideas.

2. Have students share their thoughts and record their ideas on chart paper. Use the guiding questions below to support the discussion.

Teacher Note: Be sure to bring students attention to the skip counting patterns in the images as they unpack both Map 1 and Map 2. Also, it is important that students notice the following about the numbers:

- The count can go forward and backward
- Skip counts remain the same for the entire row and then it can change
- The numbers in the vertices (corners) of the image continue the counting sequence. Although one row might skip count by 5s and the other by 10s at the vertices, both counting sequences share a common number. For example, in Map 1 the common numbers are 15, 10, 0 and a mystery number.

Guiding Questions:

- What do you notice about the numbers?
 - How do the numbers change in the image?
 - How does the count change?
 - If these are the tent location numbers at the campsite, how might a camper know which tent is theirs if there are two number tens?
3. Next, show students Campsite image 2. Ask students: *What do you notice?* Give students several minutes to look at the image, before they share ideas.
 4. Have students share their thoughts and record their ideas on chart paper. Use the guiding questions below to support the discussion.

Guiding Questions:

- What did you notice about the numbers in this image?
- What counting sequence do you notice?
- If these are cabin numbers, and they follow a counting sequence, what do you notice about the corner tents locations at the campsite?
- What does this image have that might help a camper locate their tent? Does it impact the counting patterns? (Trails names like streets can be used to identify a camper's cabin. These do not impact the counting patterns.)



5. Have students consider both images. Discuss and record similarities and differences between the images. You may want to have both images visible for students to see and refer back to. This comparison will help them to make sense of the task in the next part of the lesson.

Teacher Note: Both images have counting patterns (skip counting by 2's, 5's or 10's) although they may be different and use different numbers. A commonality for both images is that the counting sequence can change forward or backward or change skip counts at a vertices (corner only).

6. Explain to students, now that they have had the opportunity to compare these images, what might the Mystery Campsite Numbers be on each campsite (circles with a ? mark)
7. Allow students several minutes to think about their own reasoning and justification. Then ask students to share their thoughts. Record student thinking in a variety of ways.

Teaching Note: It is important that you allow several students to explain their reasoning so all students can understand that there are multiple solution pathways to determine the mystery campsite numbers.

8. Ask students how they might explain to a camper how to get to the mystery tent located in the River Run tent campsite. Allow students to turn and talk to discuss and describe their thinking.

Exploring the Task: (45 minutes)

1. Share with students that at the new Math Camp-In site there are 3 different campsites designated for cabins that have similarities and differences to the tent campsites you just explored.
2. Explain to students that all campers upon arrival will pick up their cabin keys, receive cabin information, a campsite map, and receive a cabin number. Share with students the Cabin Information page.

Cabin Information: "Welcome to Camp!"(see attachment)

Welcome to Camp! There are three different campsites where cabins are located. On each trail, the cabin numbers are in order by 1's. The cabin numbers can go forward or backward on each trail.



The corner cabins connect the trails and share a number. All of the cabins on each campsite must connect in a counting sequence.

Note: The Park Rangers are still working at one of the campsites so that the cabins follow a counting pattern like the other two campsites.

3. After sharing this information, conduct a discussion about the cabins at the campsites. Use the guiding questions to support the discussion. You may want to record student thinking on chart paper for each of the questions.

Guiding Questions:

- What information did you find out?
 - What do you know about the cabin campsites?
 - How do the cabin campsites relate to the tent campsites? *(use the image of example trails, highlight the corners, change in counting, forward and backward)*
 - How is the counting sequence in the cabin campsites similar and different from the tent campsites? *(the sequence continues around the entire campsite like tents, count by 1s for cabins the tents counted by 5's, 10's, and 2's)*
4. After the discussion, share with students the Cabin Campsite Map. Ask students to examine the map, and discuss similarities and differences between the Cabin Map and the Tent Maps. Record student thinking.
 5. Provide students with a copy of the Cabin Information page and Cabin Campsite Map and explain that the Park Rangers could use their help to guide campers to their cabins. Read students the following task.

Task: At the new Math Camp-In site campers Odo, Ursus, and Graham are trying to find their cabins. Two of them are staying at the same campsite. Which campsite is their cabin located and where? How would you explain the cabin number trail so that each camper can find their cabin?

Odo is staying at cabin number 4

Ursus is staying at cabin number 12

Graham is staying at cabin number 18

6. Allow students time to grapple with the task, use trial and adjustment, and engage in productive struggle. You may want to encourage students to work in groups or partners and use manipulatives to help them use a counting sequence.
7. After several minutes, pause the learning and ask students what strategies they are using that are helpful and what strategies have not worked for them.

Teacher Note: This is a valuable conversation for students to have. This helps ground students in a growth mindset and understand that problem solving is about a process not an answer and that there are many solution pathways.

8. As students continue to solve the problem, use the guiding questions below to support student learning and thinking.

Teacher Note: As students work, it is important to understand that students may not find a solution. Regardless if students have a solution, their problem-solving process will allow them to have access and contribute to the discussion at the end of the lesson. This is just as important as having a solution and is an opportunity to connect the power of mistakes in learning.

Note: *Lakeview Cabin Campsite is where the Park Rangers are working, therefore none of the cabins will be on this campsite. As students work, you might need to ask the class if they found the location of the Park Rangers. You may want to direct students back to the information page, to clarify that Park Rangers are working at one of the campsites.*

Guiding Questions:

- Have you tried starting the cabin number in a different spot on the campsite?
- What did you notice about the campsites? What campsite do you think the park rangers are working?
- What might happen if you put cabin number 4 here? (Use the Cabin Number Guide to provide a location)
- Could the campers cabins be in multiple places? Where could they be? How do you know? Explain.
- What number range do you know you might work with? (support students to consider the cabin numbers they do have to determine

a number range. (at least 4-18 and how this might impact the numbers they choose)

9. Give students a 5 minute reminder about solving the task and assure students it is ok if they do not have the problem solved, together they will bring ideas, strategies and thinking for the class to discuss. During this time students may want to put their final thoughts on paper or construct their model, or sort through thinking that worked or did not work. Depending on how students approach the problem and where they are in the process, what they will have to share may be different, but is valuable to others.

Summarize the Learning: (20 minutes)

1. Bring students together for a whole group discussion about the problem.
2. Ask students, *Where do you believe Odo, Ursus, and Graham's cabins are located?* There are multiple solutions that could work. As students share their thinking, on a three-column chart (one for each camper) record and make a list of the possibilities students share.

Teacher Note: Be sure to record the Campsite and the Trail. You may also choose to replicate or record on the Cabin Campsite Map. This will give students enough information to determine if they agree or disagree with the cabin location.

If students did not find a solution. Ask them what solutions they know did not work. You can mark the map with X on these spots. If you conduct the discussion this way, it is recommended to focus on one of the Campers at a time. The other camper cabins will show up organically as solutions are created. Ask students *How could you use this information to determine where the cabins could be?*

Depending on what information and ideas students bring to the discussion, you could also provide a cabin number using the Cabin Campsite Map Guide (Teachers Only)

3. After you have several ideas recorded, allow students to use their campsite maps, choose a solution that you recorded and see if they agree or disagree with it.

4. Conduct a whole group discussion. Use the following guiding questions to support student thinking and problem solving. You can begin the discussion, by asking students

Guiding Questions:

- Do you agree or disagree with the solution? Explain.
 - Does anyone have a different thought about _____ solution?
 - What strategies did you use to determine if it worked?
 - How did you think about this differently?
 - How is this thinking similar or different from your thinking or solutions you tried?
5. After you agree on possible solutions, refer back to the task, ask *How would you explain the cabin number trail so that each camper could find their cabin?* Allow students several minutes to turn and talk with their partner, using the solutions you confirmed as a class.
 6. Have several students share their thinking and directions.

Instructional Supports

Models and Strategies to Consider:



this on graph paper.

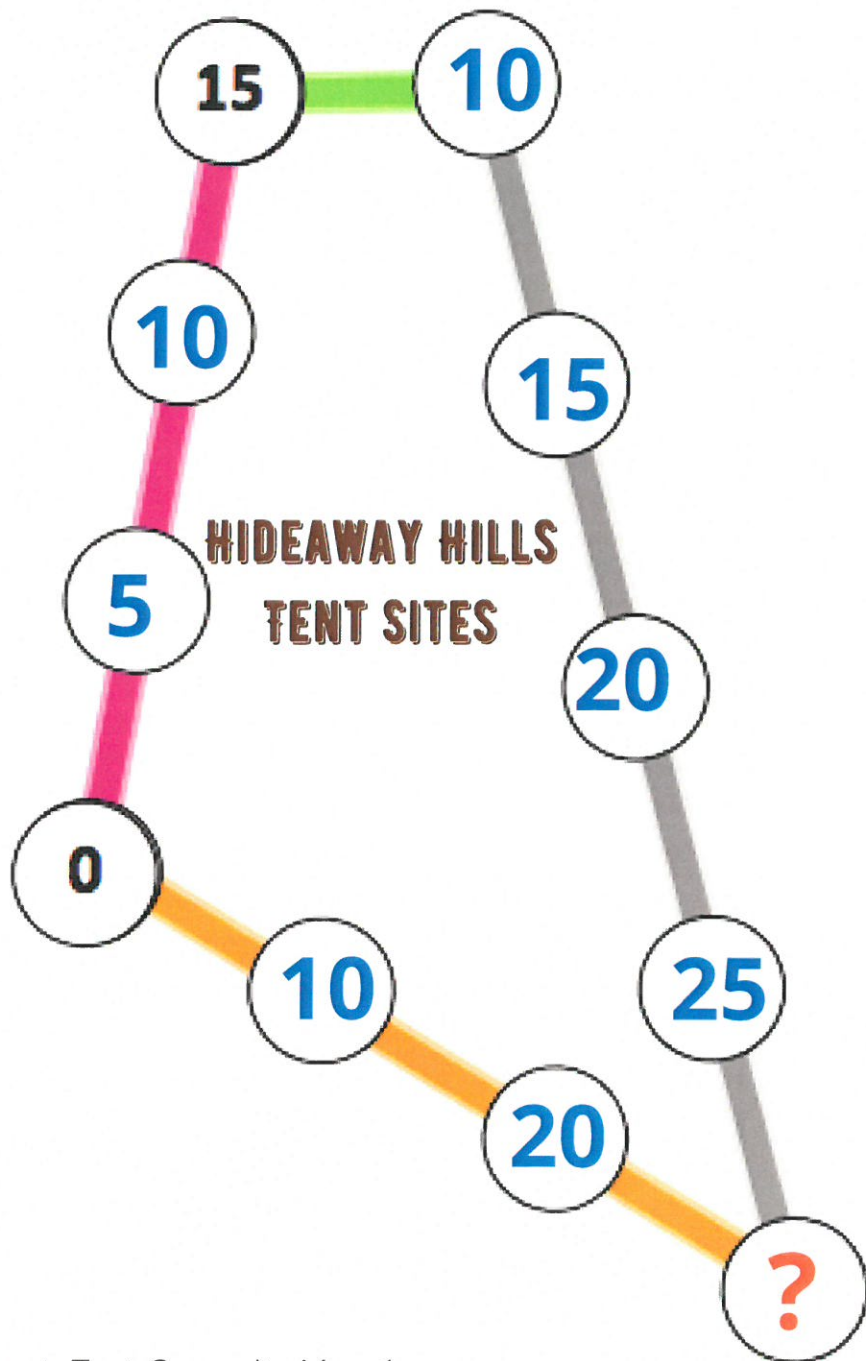
Here is an example of how students might use cubes or tiles to replicate the campsite counting sequence and find a place to begin counting that works. Some students may choose to use a strategy similar to



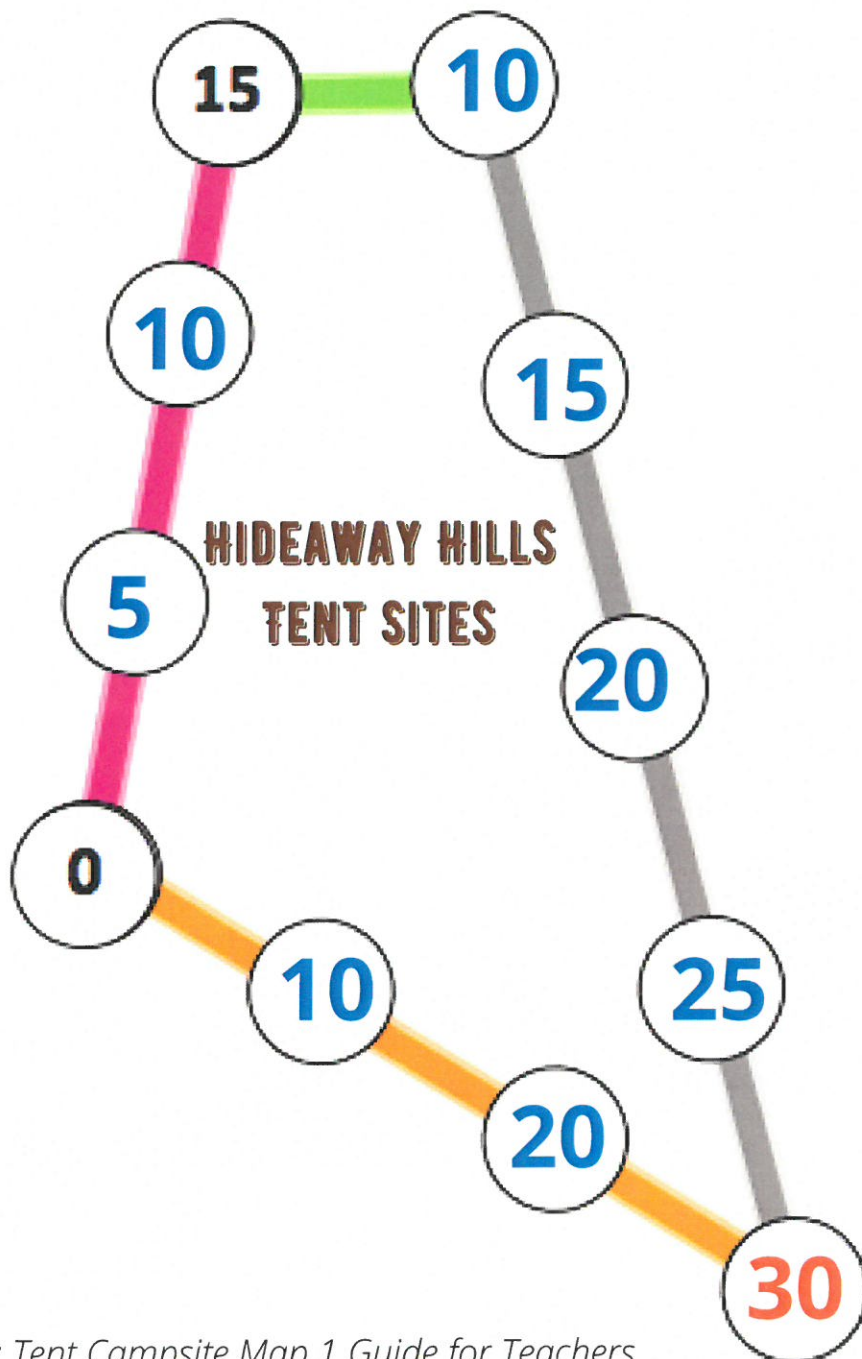
Here is an example of how students might use cubes or tiles to manipulate the counting sequence.

Math Concepts while Problem Solving: Depending on student strategies, they may engage in the following concepts during the problem-solving process.
Doubling and Halving, Doubles plus, Equality, Counting in multiple ways, Skip Counting

TENT CAMPSITE MAP 1



TENT CAMPSITE MAP 1 GUIDE FOR TEACHERS



TENT CAMPSITE MAP 2



TENT CAMPSITE MAP 2 GUIDE FOR TEACHERS

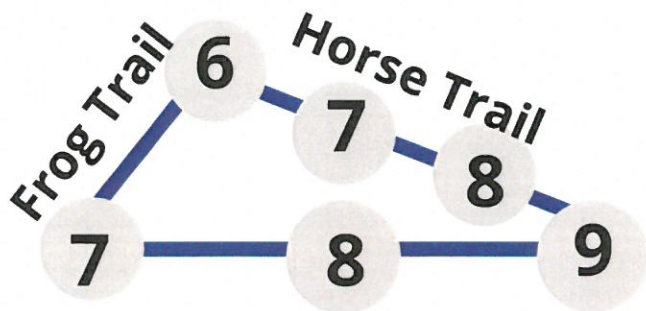




WELCOME TO CAMP!

There are three different campsites where cabins are located. On each trail, the cabin numbers are in order by 1's. The cabin numbers can go forward or backward on each trail.

The corner cabins connect the trails and share a number. All of the cabins on each campsite must connect in a counting sequence.



Raccoon Trail

Forward

Examples of how cabins could be numbered on a trail.



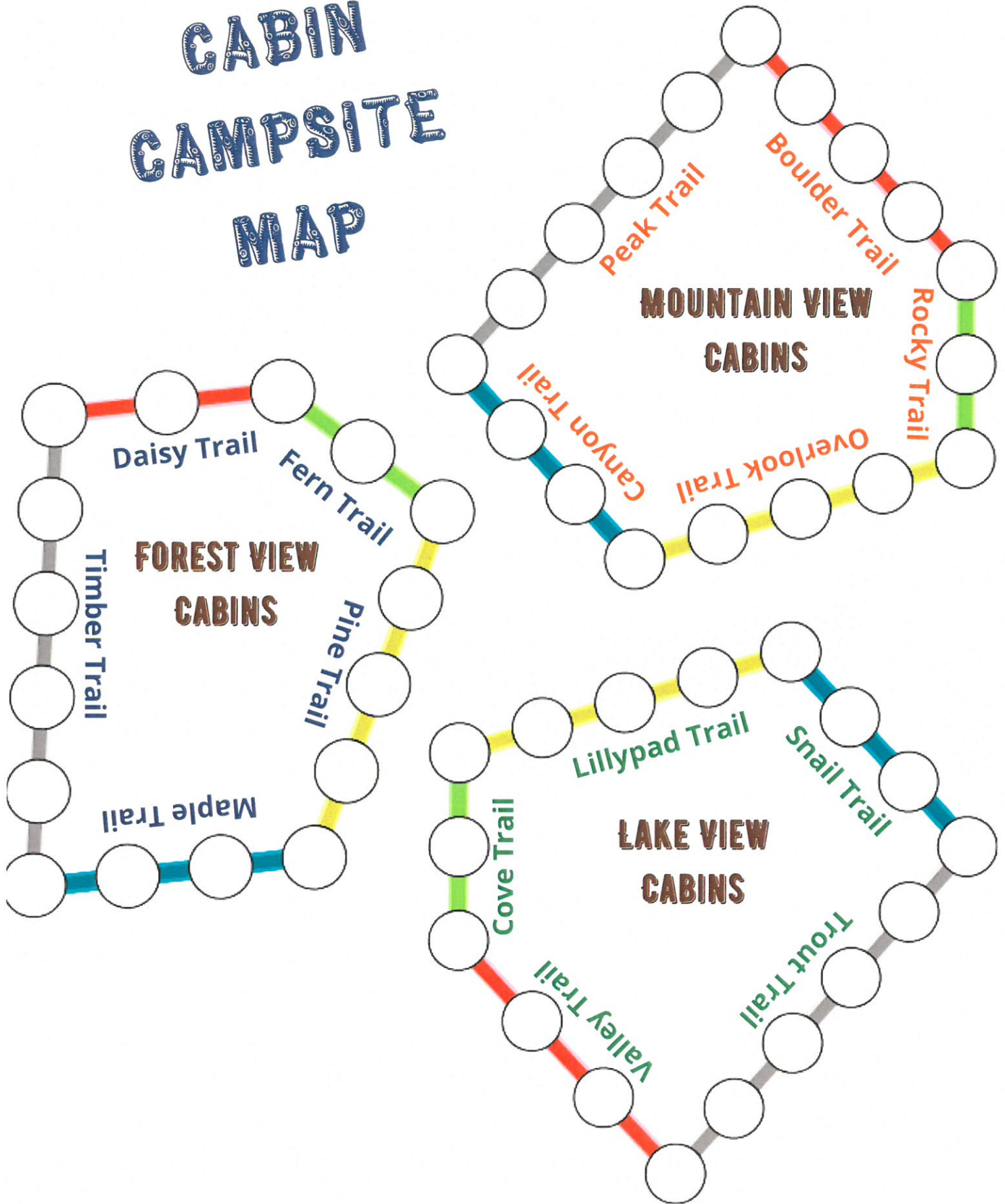
Raccoon Trail

Backward



NOTE: The Park Rangers are still working at one of the campsites so that the cabins follow a counting pattern like the other two campsites.

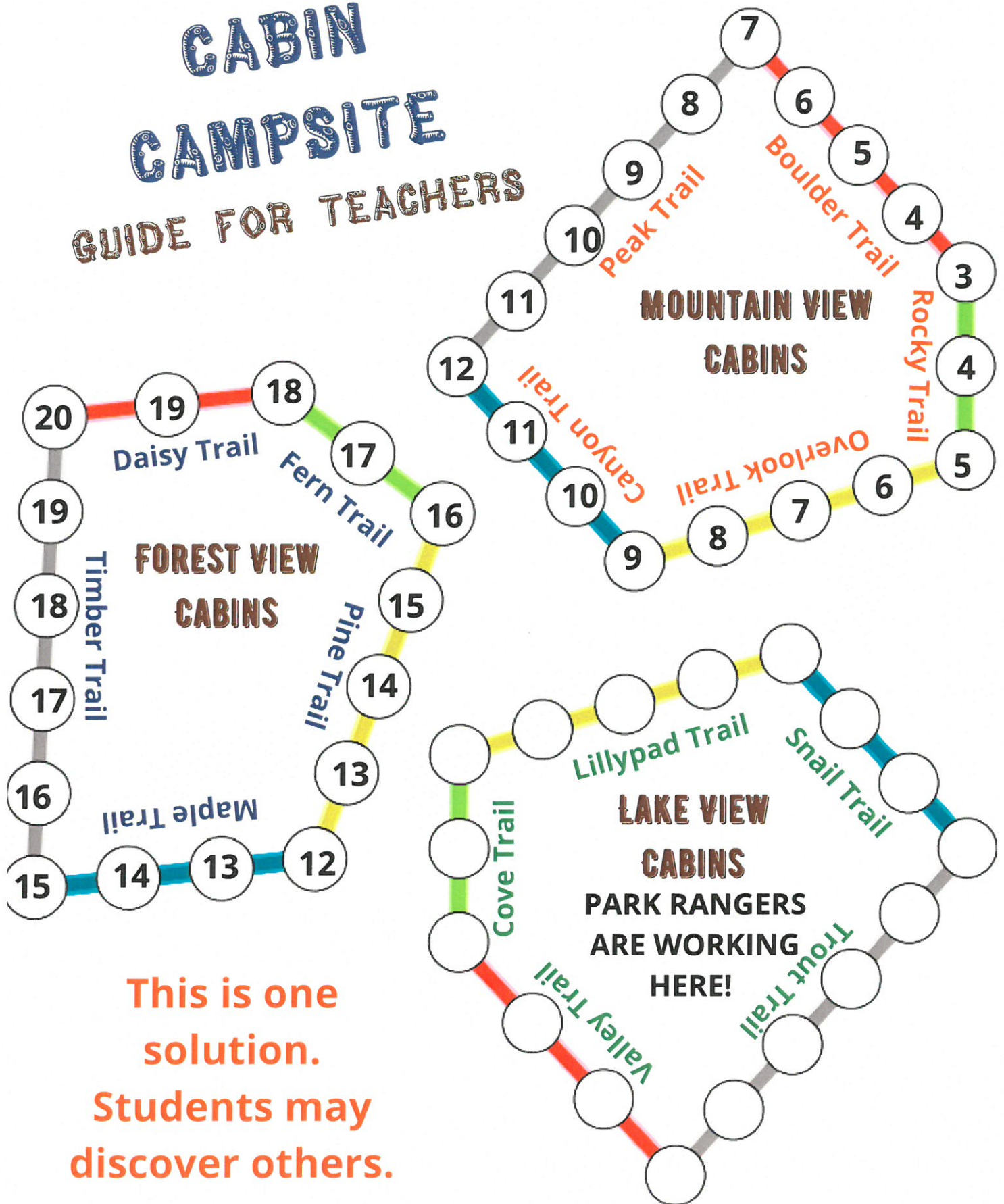
CABIN CAMPSITE MAP



Lesson Attachment: Cabin Campsite Map

CABIN CAMPSITE

GUIDE FOR TEACHERS



This is one solution.
Students may discover others.