

Mapping!

Using Books and Stories to Work on Math and Sequencing

Creating maps of stories, picture books and novels is a wonderful exercise for any age - the older the child the more sophisticated the map. The concept of mapping can include house plans and land plots as well. The focus of the map determines the scale. If you are mapping a Tall Tale, say Paul Bunyan, the map may include an entire continent. Yet, if you are mapping Livingston Mouse, a wonderful picture book about a mouse explorer who never leaves his own backyard, your map is of a house and a yard. If you take on A Wrinkle in Time, you grid the universe.

Suggestions for Working with an Existing Text:

Start by showing your students a series of maps and explain how maps work. Show them the legend and the compass on the map. If they are old enough you can show them how the scale works. Now you might want to share with them a map you have drawn, or maps that students in the past have drawn. You might want them to try drawing a map of the classroom, or their room at home, or their house and yard as practice.

Now read the story that you want to map out loud slowly. Have the children listen for details for the map. They may want to take notes.

- Questions to answer:
- Where do the characters start from?
- Where do they travel to?
- Are distances mentioned?
- What do they see along the way?
- Who do they meet?
- Do various characters travel to different locations?

Talk the sequence of the story through with your children. Make a list on the board. You may have them make a list as well. Be sure to talk through details of what the characters see along the way. If you are working with a younger group, don't even worry about scale. Now have them draw a map and make sure that they include all of the locations and the sequence.

Mapping With Older Students:

Discuss distances in the story. Try to get a basic sense of the approximate distances between locales and events. Regardless, make sure that students choose specific distances prior to creating their map.

Scale:

Now it is time for math. Scale is most easily determined by roughly sketching out the shape of the journey on a piece of paper that is the same size as your final piece of paper. What is the basic shape? How will it fit on the paper. To make the map easy to read you will want to try to keep the paper horizontal or vertical with North moving away from the reader. Sketch the map out and you can figure the scale.

Take the longest distance in the story and then measure the number of inches that that distance takes up on the paper. Divide the distance in the story by the number of inches and you have your scale. 100 miles divided by 10 inches equals 10 miles per inch.

Activity: The Great Race of the Tortoise and the Hare – A Story Just Made For a Map

Younger Version:

A Hare bragged far too much. All of the animals agreed. They had a meeting down by the lake to decide what to do. “Someone should challenge him,” they said but everyone was afraid of losing. A Tortoise finally said, “I shall race him” and he did.

The race took them around the lake and back to the start. The Duck quacked, “Ready... Steady... Go!

The Hare took off running but the Tortoise just walked. The Hare looked back but saw no Tortoise. The Hare looked ahead and saw the deepest part of the lake. The Hare jumped in and went for a swim.

The Tortoise kept walking. The Tortoise caught up. The Tortoise passed by.

The Hare saw the Tortoise and took off running. The Hare passed the Tortoise. He looked back, no Tortoise. He looked ahead and saw Mrs. Pritchard’s lovely garden. The Hare jumped in and had a snack.

The Tortoise kept walking. The Tortoise caught up. The Tortoise passed by.

The Hare saw the Tortoise and took off running. He looked back but saw no Tortoise. He looked ahead and saw the finish line but he also saw a field of clover just to the right of the finish line. The Hare jumped into the clover and had a snooze.

The Tortoise kept walking. The Tortoise caught up. The Tortoise passed by. The Hare woke up. He looked back, no Tortoise. He looked ahead and saw The Tortoise about to win the race.

The Hare took off running. He was quick but the Tortoise there quicker and won the race.

After reading the children to help you list all of the details in the story. You might even wish to read the story again.

What they need to remember for their map.

- The race takes place on a lake.
- The race goes around the lake.

- Along with running the race, the Hare goes swimming, has a snack in Mrs. Pritchard's garden and snoozes in the clover patch which is right by the finish line in that order.

Now have them draw the map and ask them to indicate the locations of the deepest part of the lake, Mrs. Pritchard's Garden, the field of clover and the start and finish line. Also indicate the path of each of the runners.

Activity: A Challenge for Older Ambitious Cartographers.

Read them a simple version of the Tortoise and the Hare and challenge them to rewrite the story so that it includes

- At least three compass headings.
- Specific distances.
- At least five specific locations.

Then create a scale map on an 8 1/2" X 11" piece of paper making sure there is a track defining the path of each of the characters.

You might even want to indicate certain vocabulary words:

Bluff
Stream+
Dale
Glen
Forest

Activity: For Older Students

I would suggest you copy the next page and use it as a hand out.

The Tortoise and the Hare

A Hare bragged too much. "I am the fastest creature in all the world," he said. The animals were disgusted. They held a meeting on Beast Beach on the western shores of Fable Lake. "Someone should challenge him to a race," said Skunk. Everyone agreed. However no one volunteered. Everyone was afraid of losing.

Finally, the Tortoise volunteered, "I shall race him." The animals all laughed but, as no one else was willing, they made plans for a race. They decided that the race would take place on the road that ran around the lake. The runners would run counter clock wise around the lake and back to Beast Beach.

Everyone thought this was going to be quite a race as the lake was rather large. Beast Lake was approximately 800 yards at its widest east to west and approximately 550 yards North to South.

When the Hare arrived the Tortoise made his challenge. The Hare laughed, bragged a little, and agreed.

The dog barked, "Ready... Steady... Go!"

The Hare hopped off southward at an average speed of 100 yards per minute. The Tortoise walked. After almost 5 and a half minutes, the Hare approached the turn to the east. He looked back but didn't see the Tortoise. When he rounded the corner and looked ahead he saw, about 500 yards ahead, a dock at the deepest part of the lake. The Hare jumped in and swam due North all the way to the far shore and back.

The Tortoise walked at a rate of 10 yards per minute which was rather quick for a Tortoise. After forty minutes, the Tortoise passed Eagle Rock on his left rising out of the lake. Eventually, he rounded the turn and approached the deepest part of the lake. As he passed by, he waved to the Hare who was doing the back stroke. The Hare took off running, passed the Tortoise and headed for the next turn.

As he approached the turn, he looked back, but saw no Tortoise. After the turn, the road headed north. About 125 yards away, on the eastern side of the road, Hare spied Mrs. Pritchard's garden. He snuck in and had quite a snack.

The Tortoise kept walking. After fifteen minutes he saw a large bale of hay and a raggedy scarecrow on his right. He stopped for a minute to rest.

Mrs. Pritchard had been napping. When she woke up and looked out of her bedroom window that faced south, she saw the munching Hare. She chased him out of the garden, around a tree, over a fence, and back to the road.

All this time the Tortoise had been walking. He walked for 25 minutes and along the way turned the corner and reached Mrs. Pritchard's garden. He continued to the corner 150 yards away.

As the Hare approached the road, he saw the Tortoise rounding the bend in the lead. The Hare took off, passed the Tortoise, and after running for six minutes, spied the finish line 200 yards away. However, half way between the Hare and the finish line was a lovely field of clover waiting just north of the road. The Hare jumped into the clover and had a snooze.

The Tortoise never stopped walking. The Tortoise tiptoed by the sleeping Hare. The Hare snored. The Tortoise giggled. The Hare awoke.

The Hare looked back, no Tortoise. He looked ahead and saw The Tortoise about to win the race. The Hare took off running. He was quick but as slow as the Tortoise was on this day he got there quicker. The Tortoise won the great race.

Question: How far did the Hare swim he went for a dip?

CREATING A MAP:

The tale as told is actually a giant word problem. The answer as to how far the Hare swam when he jumped into the lake is at the end of this lesson.

In order to get the answer, the reader has to carefully note all of the clues in the story and create a map. The first thing we want to do is study maps. Here are some aspects of a map which must be included: Scale, a Legend, and a compass indicating the direction of North.

This story has been carefully worked so that it will easily fit onto an 8 ½" X 11 Piece of paper.

FIGURING SCALE:

You can either suggest the scale or have each student work it out. I would suggest 1" equals 100 yards. If they wish to work it out on their own.

1. What is the best way to draw the object on a piece of paper?

In this case, with north pointing away from the cartographer, the lake is wider than it is tall. So, we put the paper sideways.

2. How wide and how tall is the object?

775 yards wide and 550 yards tall.

3. How large is the piece of paper leaving some space as a margin?

10" by 8"

Divide the inches into the yards and we have 77. To make it easier, round up 100. So, 1 inch equals 100 yards. Now check the width. Let's see, if 1" equals 100 yards and the paper is 8" then we have space for 800 yards pace. How wide is the lake at its widest? 300 yards. We have plenty of room. The Scale is 1" equals 100 yards.

Other possible map scales:

- Distance 1" – 1 ft (small tales)
- 1" – 1 yard
- 1" to ½ mile
- 1" – 1 mile
- 1" – 100 miles (For Tall Tales)

Drawing the map:

Cartographers will need a pencil, an eraser, a ruler and paper. It is suggested that you start to sketch on graph paper. The cartographer may need two pieces of graph paper and a piece of plain white paper (The plain paper should be thin enough to trace through from the graph paper.)

To begin, in the corner of the map, lightly sketch in the compass reading in pencil so we get our bearings. Which way is North?

Now let's carefully examine the story...

Question: Where is the starting place?

Answer: Beast Beach.

Question: Where is Beast Beach?

Answer: The western shore of Fable Lake.

Question: So which side of the paper do we start on?

Answer: Left.

Question: How far south do they run?

Answer: (This will take a little figuring – follow the Hare) 550 yards. So allow 5 ½ inches and space at the bottom for notes and such.

Tip: As the story tells up that running north to south the lake is no more than 550 yards then the western shore may be the longest shore running north to south.

Question: How many inches between the Beach and the corner?

Answer: 5 1/2 inches:

Instruction: Draw a line 5 ½ inches top to bottom

Question: How far is Eagle Rock?

Answer: 400 yards. How do we know this? Because the Tortoise walks at a rate of 10 yards per minute and he walked for 40 minutes.

Question: How far is the dock from the corner?

Answer: 500 yards

Instruction: Draw a 5" line from the corner right and make a mark for the dock.

Question: How far are the scarecrow and the hay bale?

Answer: 150 yards. Why? Because the Tortoise walks for 15 minutes at a rate of 10 yards per minute.

Instruction: Draw a line 1 ½" from the dock to the right and sketch in a hay bale and a scarecrow.

Question: How far is it to the next corner?

Answer: 125 yards. Why? This is the trickiest question but it can be figured out. Hare sees Mrs. Pritchard's Garden when he gets to the corner and the corner is 125 yards away. Tortoise takes 25 minutes (250 yards) to walk from the hay bale to Mrs. Pritchard. Therefore, if you subtract the distance from the corner to Mrs. Pritchard's (125) from the distance from the hay bale to Mrs. Pritchard's (250), we have an answer of 125 yards from the hay bale to the corner.

Instruction: Draw a line from the scarecrow mark to the right 1 ¼"

Question: How far is it from Mrs. Pritchard's to the corner?

Answer: 150 yards

Instruction: Draw a line 1 ½" from the corner away from you and sketch in Mrs. Pritchard's garden.

Question: Where is her house?

Answer: Just to the North of her garden. Why? She looks out of her South window onto the garden.

Instruction: Draw in Mrs. Pritchard's Garden, her house and the fence.

Instruction: Draw a corner 1.5" north of the house spot.

Question: How far is the Finish Line?
Answer: 800 yards away. Why? Because the Hare walked for six minutes (600 yards) and the Finish Line was an additional 200 yards.
Instruction: Draw a line connecting the corner to the finish line.
Question: How far away is the Field of Clover?
Answer: 100 yards from the finish line. Why? The Field of Clover is half way between the Hare and the Finish Line when the Hare stops.

Creating the Map:

Now you have the basic shape of the race course and the placement of all of the sites. Lay your second sheet of graph paper over the first and within the race course draw the shape of the lake. It can be roughly the shape of the course with the banks running along side the path. Now, following the line of the course draw in a path that indicates the race course. You will have to draw in Beast Beach, Start and Finish, Eagle Rock, the dock, the scarecrow and the hay bales, along with Mrs. Pritchard's garden, her house, the fence, the tree, and the field of clover.

You can make notes on the map telling us what each drawing indicates or you might use symbols that will be explained in the Legend. Remember to draw in something, maybe little waves, to indicate the water.

Now you have to indicate the route and direction of each of the characters. You might just use a "T" to indicate the Tortoise and an "H" to indicate the Hare. Don't forget Mrs. Pritchard. If you look ahead you will see the map that I drew and a little fancier way of doing it.

Now create a "Legend." It is a box on the map that includes all of the symbols used on the map. Remember to include: Beast Beach, Start and Finish, Eagle Rock, the dock, the scarecrow and the hay bales, along with Mrs. Pritchard's garden, her house, the fence, the tree, and the field of clover plus the paths of the runners and Mrs. Pritchard.

Somewhere else on the map you need to draw in the scale so we know how to use your map.

For finishing touches, you might add street names and signs telling us directions to other spots in the Enchanted Forest.

Activity: Map Follow Ups

- You may have a large display of your maps for the community to see or you could post the results to your web site.
- You might have students adapt folk tales into word problem for other young map makers to attempt.
- You may simply print out the story and the instructions and let children take them home and attempt the map
- If children enjoy the map making you may suggest they map their neighborhoods, their school, the library, their town but have them map for something special for instance, good hiding places at home or all the scary spots in town.

To answer the question: The answer is approximately 750 yards.

Why? If you measure from the dock straight north to the bank, it will be approximately 3 and $\frac{3}{4}$ inches and, remember, he traveled there and back.

A list of additional tales and stories that would be fun to map is included in the bibliography.

Preliminary sketch of just the measurements. This is also what the sketch looked like to help me prepare the map project

Final sketch of Tortoise and the Hare Map

