As the Trail Turns: Elapsed Time Averages

Developed by: Jennifer Reiter, 2014 Iditarod Teacher on the Trail™ **Revised: 9/15 UPDATED 12/17**

Discipline / Subject: Math

Topic: Elapsed time and averages

Grade Level: Four, others with modification

Resources / References / Materials Teacher Needs:

- Students' Musher Tracking Forms
- Copies of or internet access to all of the current race logs in case students are missing data
- Teacher copy of Musher Tracking Form
- Student worksheets (attached)

Lesson Summary:
Students will calculate the average time that mushers spent on several legs of the Iditarod and compare them.

Standards Addressed: (Local, State, or National)
Common Core Sixth Grade:
6-SP: Develop understanding of statistical variability. Understand that a set of data collected to answer a statistical question has a distribution that can be described by its center, spread, and overall shape.

Common Core Fourth Grade:
CCSS.Math.Content.4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Learning Objectives:	**Assessment:**
TLW calculate the elapsed time of mushers on the first seven legs of the race. TLW calculate the average time spent on the first seven legs of the race. TLW compare the average times of two mushers.	The students can be assessed on the included worksheets.

Procedural Activities:

Introduction:

1. Discuss with the students the idea that early in the race it is often difficult to figure out who is "winning" the race. Since the mushers started at staggered times and may not have not made up for the difference yet, arriving first at a given checkpoint doesn't automatically mean you are in first place.

2. One thing we can look at is the average speed for each musher on each leg of the race. We could then compare that data to get a sense of who is travelling the fastest.

Procedure:

1. The teacher will model finding Monica Zappa's average time on the first seven legs of the 2014 race.

2. Students complete the second portion of the chart for Nathan Schroeder.

   Note: Both Monica and Nathan were rookies in the 2014 Iditarod. Nathan went on to become Rookie of the Year, while Monica was in the mix for the Red Lantern.

3. Students then compare the two and make a judgment about who has the better time.

Summary:

Challenge the students to analyze whether or not this method is effective for determining who is "winning" the race at this point. Make sure that the students realize that some mushers rest along the trail. They may prefer to camp on the side of the trail instead of in checkpoints for various reasons. So there are still many variables to consider before determining who is really winning! It's usually really hard to tell this early in the race.

If time allows, they could compare the time on the trail for the musher they are tracking and compare it to Nathan's Rookie of the Year times or Monica's almost Red Lantern times and make a prediction about how their musher is faring in this race.

Materials Students Need:

Student worksheets (attached)

Technology Utilized to Enhance Learning:

Iditarod Website for tracking mushers: http://iditarod.com/race/

Other Information:

Modifications for Special Learners/ Enrichment Opportunities:

- Students could work in partners to do the calculations
- More advanced students could do more than seven legs, or track several mushers – perhaps a veteran vs. a rookie, etc.
- Students could be provided a calculator to assist with computation
- At the end of the race, students could calculate the average time spent ON trail for the first three finishers and see if the average time on the legs of the race correlated to their final finishing order. They could analyze the reasons for that.

Additional Information

As the Trail Turns: Average Elapsed Time

The mushers' ceremonial starts do not count towards their "official" race time. The official race times actually start on Sunday in Willow.
Look at the data for Monica Zappa's 2014 race for the first few checkpoints and complete the chart below:

Time Leaving…	Time Arriving…	Time Elapsed on Trail…
Willow – 3/2 14:32	**Yentna – 3/2 18:21**	
Yentna- 3/2 22:17	**Skwentna- 3/3 1:14**	
Skwentna – 3/3 9:22	**Finger Lake –3/3 13:57**	
Finger Lake- 3/3 19:07	**Rainy Pass- 3/3 22:59**	
Rainy Pass – 3/4 7:58	**Rohn – 3/4 12:50**	
Rohn – 3/4 17:01	**Nikolai – 3/5 9:37**	
Nikolai – 3/5 18:39	**McGrath – 3/6 00:21**	

What was Monica's average time for the first seven legs of her rookie race?

Average: _____

Look at the data for Nathan Schroeder's race last year and complete the chart below:

Time Leaving…	Time Arriving…	Time Elapsed on Trail…
Willow – 3/2 14:46	**Yentna – 3/2 18:25**	
Yentna – 3/2 18:30	**Skwentna – 3/2 21:23**	
Skwentna- 3/3 3:10	**Finger Lake – 3/3 7:37**	
Finger Lake- 3/3 11:02	**Rainy Pass – 3/3 14:22**	
Rainy Pass- 3/3 18:36	**Rohn- 3/3 23:25**	
Rohn- 3/4 5:15	**Nikolai- 3/4 15:06**	
Nikolai- 3/4 20:33	**McGrath- 3/5 1:55**	

What was Nathan's average time for the first seven legs of his rookie race?

Average: _____

Who had the better average time on the first five legs? How do you know?