# What is an Average Leg?

**Developed by:** Jennifer Reiter, 2014 Iditarod Teacher on the Trail™

**Discipline / Subject:** Math

**Topic:** Mean, Median, Mode, and Range

**Grade Level:** Fourth, others with modifications

**Resources / References / Materials Teacher Needs:**

**Lesson Summary:**
Students will determine what an "average" leg on the Iditarod Trail is in terms of length.

**Standard's 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.

| Learning Objectives: | Assessment: |
| --- | --- |
| TLW calculate the average distance of a leg on either the Northern or Southern Route.<br><br>TLW compare the average distance of a leg on the two routes. | Students can be assessed on their class assignment sheets. |

**Procedural Activities:**

## PRIOR KNOWLEDGE:

Students need to have an understanding of how to calculate the mean, median, mode and range. This assignment could be an assessment of those skills.

## INTRODUCTION:

1. Remind the students that there are actually TWO routes for the race that alternate every year.

2. Refer to the Iditarod page to explain the reason for the two trails:

> Why does the trail go one way in even years *(northern)* and the other way in odd years *(southern)*?
>
> Both sections of trail are a part of the Iditarod National Historical Trail which was used in early years for all winter travel. Dog sleds delivered the mail, the preacher, the groceries, and hauled out gold and furs all the way to Anchorage or Fairbanks.
>
> During the early years of the Iditarod Race, the mushers only traveled the northern trail. After several years, the Iditarod Board of Directors realized that the smaller villages were being heavily impacted by the race coming through their village year after year. It was decided to use both sections of the trail.
>
> This decision had a threefold effect. The northern villages of Ruby, Galena and Nulato only had to deal with the large group of mushers, press, and volunteers every other year. The second effect was that the race was able to pass through the actual ghost town of Iditarod. Lastly, the villages of Shageluk, Anvik, and Grayling were able to participate in the race.

3. Explain that today we are going to determine the length of an "average leg."

## PROCEDURE:

1. Split the class into two groups.

2. One group will find the mean, median, mode, and range of the legs on the Northern Route. The other group will do the same for the Southern Route.

3. When all of the calculations have been completed, have the students share their findings with the other group.

## SUMMARY:

Have the students explain in writing which route they would most like to race on and why. I ask them to take into consideration the data they have analyzed today, but they may include other information they have learned in their reasoning.

**Materials Students Need:**
- Route Maps
- Checkpoint distances charts
- Student worksheets (attached)

**Technology Utilized to Enhance Learning:**

**Other Information:**
Here is another mean, median, mode, range activity dealing with dogs.  In this activity, the students are testing dogs intelligence in four different tests:
http://files.pbslearningmedia.org/dlos/tpt/landmarks/index.html

**Modifications for Special Learners/ Enrichment Opportunities:**

More advanced students could calculate both the Northern and Southern Routes instead of just one or the other.

Older students could use this theme to spur a discussion about why the legs aren't even.  Could they replan the race course so that the legs are all the same?

**Additional Information**

# What's The Average?
# Vocabulary

**RANGE:**

The range is the difference between the highest and the lowest numbers in a set of data.

**MEAN:**

The mean is the average of a set of numbers.  To find this, add the numbers and then divide by the number of addends.

**MEDIAN:**

The median is the middle number in the set of numbers when the numbers are arranged in order from the least and greatest.

**MODE:**

The mode is the number that occurs most often in a set of numbers.  It is sometimes easier to find the mode if the numbers are arranged in order from least to greatest.

# What is an Average Leg?

**The Most Common Question Asked About the Trail**

Why does the trail go one way in even years *(northern)* and the other way in odd years *(southern)*?
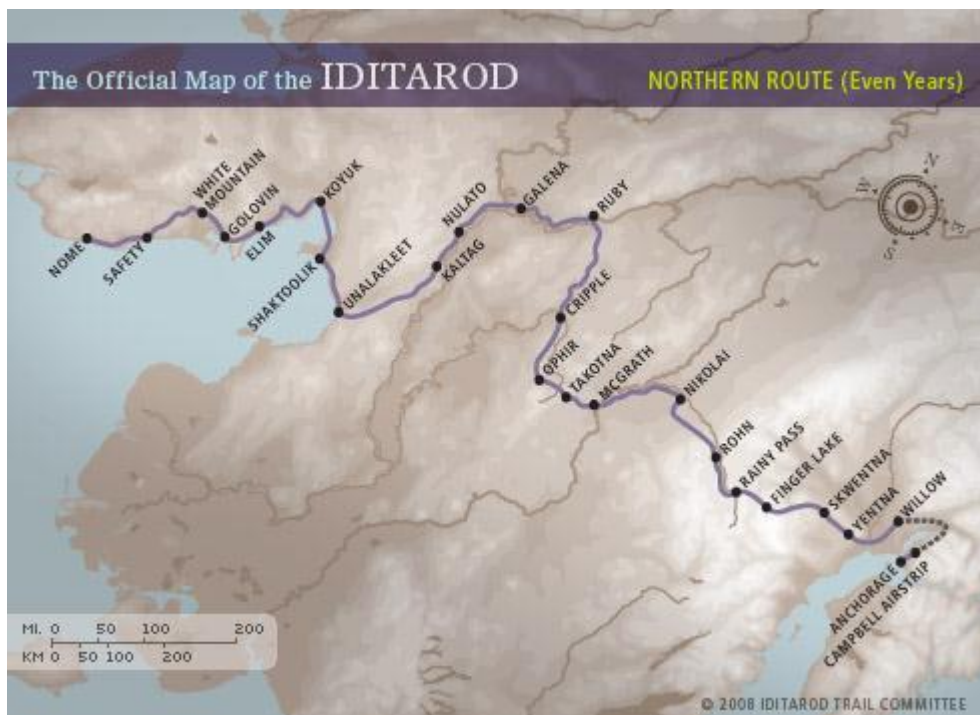
Both sections of trail are a part of the Iditarod National Historical Trail which was used in early years for all winter travel. Dog sleds delivered the mail, the preacher, the groceries and hauled out gold and furs all the way to Anchorage or Fairbanks.

During the early years of the Iditarod Race, the mushers only traveled the northern trail. After several years, the Iditarod Board of Directors realized that the smaller villages were being heavily impacted by the race coming through their village year after year. It was decided to use both sections of the trail.

This decision had a threefold effect. The northern villages of Ruby, Galena and Nulato only had to deal with the large group of mushers, press and volunteers every other year. The second effect was that the race was able to pass through the actual ghost town of Iditarod. Lastly, the villages of Shageluk, Anvik and Grayling were able to participate in the race.

Your challenge today is to determine what an "average leg" on the Iditarod run is. Using the data, complete the chart. Remember, you are looking at the distance BETWEEN checkpoints.

## Northern Route

| Checkpoints | Distance between Checkpoints |
| --- | --- |
| Anchorage to Campbell Airstrip | 20 |
| Campbell Airstrip to Willow | 29 |
| Willow to Yentna Station | 52 |
| Yentna Station to Skwentna | 34 |
| Skwentna to Finger Lake | 45 |
| Finger Lake to Rainy Pass | 30 |
| Rainy Pass to Rohn | 48 |
| Rohn to Nikolai | 75 |
| Nikolai to McGrath | 54 |
| McGrath to Takotna | 18 |
| Takotna to Ophir | 25 |
| Ophir to Cripple | 59 |
| Cripple to Ruby | 112 |
| Ruby to Galena | 52 |
| Galena to Nulato | 52 |
| Nulato to Kaltag | 42 |
| Kaltag to Unalakleet | 90 |
| Unalakleet to Shaktoolik | 42 |
| Shaktoolik to Koyuk | 48 |
| Koyuk to Elim | 48 |
| Elim to Golovin | 28 |
| Golovin to White Mountain | 18 |
| White Mountain to Safety | 55 |
| Safety to Nome | 22 |

Record your final answers here:

| | |
| --- | --- |
| What is the mean distance between checkpoints on the Northern Route? | |
| What is the median distance between checkpoints on the Northern Route? | |
| What is the mode distance between checkpoints on the Northern Route? | |
| What is the range of distances between checkpoints on the Northern Route? | |

# Southern Route



| Checkpoints | Distance between Checkpoints |
|---|:---:|
| | |
| Anchorage to Campbell Airstrip | 20 |
| Campbel Airstrip to Willow | 29 |
| Willow to Yentna Station | 52 |
| Yentna Station to Skwentna | 34 |
| Skwentna to Finger Lake | 45 |
| Finger Lake to Rainy Pass | 30 |
| Rainy Pass to Rohn | 48 |
| Rohn to Nikolai | 75 |
| Nikolai to McGrath | 54 |
| McGrath to Takotna | 18 |
| Takotna to Ophir | 25 |
| Ophir to Iditarod | 90 |
| Iditarod to Shageluk | 65 |
| Shageluk to Anvik | 25 |
| Anvik to Grayling | 18 |
| Grayling to Eagle Island | 60 |
| Eagle Island to Kaltag | 70 |
| Kaltag to Unalakleet | 90 |
| Unalakleet to Shaktoolik | 40 |
| Shaktoolik to Koyuk | 58 |

| Checkpoints | Distance between Checkpoints |
|---|---|
| Koyuk to Elim | 48 |
| Elim to Golovin | 28 |
| Golovin to White Mountain | 18 |
| White Mountain to Safety | 55 |
| Safety to Nome | 22 |

All data from:  http://www.iditarod.com/learn/iditarodtrail.html

Record your final answers here:

| | |
|---|---|
| What is the mean distance between checkpoints on the Southern Route? | |
| What is the median distance between checkpoints on the Southern Route? | |
| What is the mode distance between checkpoints on the Southern Route? | |
| What is the range of distances between checkpoints on the Southern Route? | |

Based on the information you have gathered today, if you were going to enter the Iditarod, would you rather run on the northern route or southern route?  Why?

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