



## No Bones About It: Designing Knee Braces

### Lesson 2

---

### Title: Foot Focus

Grade Level: 3, 4, 5

Written by: Claire Moore  
Hanscome Middle School. MA

Prep Time: Under 15 Minutes  
Lesson Time (1): 15-20 Minutes  
Lesson Time (2): 30 Minutes

---

#### Lesson Description:

Students will use their footprint outline to measure and analyze data.

#### Strands:

- Measurement and Data

#### Standards:

- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.
- Geometric measurement: understand concepts of angle and measure angles
- Represent and interpret data
- Convert like measurement units within a given measurement system.

#### Objectives:

Students will be able to:

- Use a ruler to measure using inches and cm (Grades 3-5)
- Convert units from cm to mm (Grade 5)
- Use a protractor to measure and classify angles (Grades 4-5)
- Represent and interpret data by creating line plots (Grades 3-5)

#### Materials:

- For each student:
  - Ruler or tape measure
  - Protractor
  - Footprint outline (from lesson 2)
  - "Foot Data" worksheet

### **Lesson Plan:**

1. Discuss with students what differences we might find when measuring different feet in the classroom. *Ask: How might different measures in our feet affect our shoe preference?* Remind students to keep these data in mind when they write their letters to the Fast Feet Shoe Company.
2. Students work with a partner to measure foot length, toe width, and arch angles of their footprint (created in lesson 2). You may need to demonstrate how students can make an angle with their arch by making two straight intersecting lines that roughly follow along the foot to create the arch.
3. Students record their findings on the “Foot Data” Worksheet. 4<sup>th</sup> and 5<sup>th</sup> grade students will need to convert cm to mm. 5<sup>th</sup> grade students should measure to the nearest quarter of an inch when using U.S. Customary Measurements.
4. Students record group data and share out class data to use to create a line plot. This can be done with one, two, or all measures based on teacher discretion. Data needs to be compiled before completing the line plot section of “Foot Data” worksheet.
5. Students create line plots to compare and contrast these data.
6. Gather students as a whole group to look at class data. Ask them to make inferences about what they see.

### **Reflections:**

- Ask students to look at class data. Ask: **How can these data help us make more informed decisions when we write to Fast Feet Shoe Company?**
- Extend by asking students to think about mean and median data. Ask: **Which is a better representation of our class data?**

### **Assessment:**

- Students should be able to use measuring tools successfully to measure using appropriate units. Teacher should monitor and assess as groups work together.
- Students should be able to place numbers appropriately on line plots to show data visually.



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Foot Data – 3<sup>rd</sup> Grade

*Directions: Use your footprint outline to explore your own foot data. You will then use your data to compare and contrast group and class data.*

<b>Foot Data</b>	<b>How?</b>	<b>Measurement (cm)</b>
Foot Length	Measure from the highest point of your toes to the lowest point on your heel.	
Toe Width	Measure across your foot from your biggest to smallest toes.	
		<b>Type of Angle</b>
Arch Angle	Use a straight edge to make two intersecting lines that roughly follow your curved arch lines. Classify the resulting angle (acute, right, or obtuse).	

Record the foot length data for each member of your group:

---

---

---

Combine your group's data to your class data to create a line plot to show these data.



Record the toe width data for each member of your group:

---

---

---

Combine your group's data to your class data to create a line plot to show these data.





Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Foot Data – 4<sup>th</sup> Grade

*Directions: Use your footprint outline to explore your own foot data. You will then use your data to compare and contrast group and class data.*

<b>Foot Data</b>	<b>How?</b>	<b>Measurement (cm)</b>	<b>Measurement (mm)</b>
Foot Length	Measure from the highest point of your toes to the lowest point on your heel.		
Toe Width	Measure across your foot from your biggest to smallest toes.		
		<b>Type of Angle</b>	<b>Measurement (degrees)</b>
Arch Angle	Use a straight edge to make two intersecting lines that roughly follow your curved arch lines. Measure the resulting angle with your protractor.		

Record the foot length data for each member of your group. Be sure you are all using the same unit:

---

---

---

Combine your group's data to your class data to create a line plot to show these data.



Record the toe width data for each member of your group. Be sure you are all using the same unit:

---

---

---

Combine your group's data to your class data to create a line plot to show these data.





Record the arch angle measure data for each member of your

---

---

---

Combine your group's data to your class data to create a line plot to show these data.





Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Foot Data – 5<sup>th</sup> Grade

*Directions: Use your footprint outline to explore your own foot data. You will then use your data to compare and contrast group and class data.*

Foot Data	How?	Measure (cm)	Measure (mm)	Measure (in)
Foot Length	Measure from the highest point of your toes to the lowest point on your heel.			
Toe Width	Measure across your foot from your biggest to smallest toes.			
		Type of Angle	Measure (degree)	
Arch Angle	Use a straight edge to make two intersecting lines that roughly follow your curved arch lines. Measure the resulting angle with your protractor.			

Record the foot length data for each member of your group. Be sure you are all using the same unit:

---

---

---

Combine your group's data to your class data to create a line plot to show these data.



Record the toe width data for each member of your group. Be sure you are all using the same unit:

---

---

---

Combine your group's data to your class data to create a line plot to show these data.



Record the arch angle measure data for each member of your

---

---

---

Combine your group's data to your class data to create a line plot to show these data.

