

Student Guide

Achieving Classroom Excellence Act (ACE)
End of Course Project
Algebra I
Category B
Tall and Wide

Project Overview

Design and conduct an investigation in order to determine and explain the relationship between a person's height and their arm span. This project will require collecting data from at least 10 people.



Guidelines

The student meets with the Project Coordinator to review progress at the indicated check points in this guide. The student must verify that he/she completed all of ACE End of Course Project without assistance. The student is to submit a completed project with all necessary components and forms to the Project Coordinator who will forward it to the evaluation team.

Directions

- With your Project Coordinator, determine a timeline for completing the project.
Project due date: _____
- Enter target dates for completing each of the CHECKPOINTS in the space provided.
- Check in with your Project Coordinator at the CHECKPOINTS listed in the project.
- Complete the project steps.
- Submit the project, for scoring by the due date.

Requirements for Submission of the ACE End of Course Project

For submission, a completed ACE End of Course Project must include:

- Completed Student Planner and Agreement
- A description of the results or the product requested in each step of the project (15 total, see rubric for guidance)
- Student Learning Reflection
- Completed Project Submission Form as required for authenticity of the work

Guidelines

The student must verify that he/she completed all of the ACE End of Course Project without assistance.

Tall and Wide

Project Task

Design and conduct an investigation in order to determine and explain the relationship between a person's height and their arm span. This project will require collecting data from at least 10 people.

Task Specifications

You will select 10 or more individuals and accurately measure their heights. You will also measure the length of each person's arm span. You will need to design methods for collecting accurate and consistent data. Once the data is collected, you will need to analyze the data in order to answer the questions in the Project Steps.

Project Representation

Representation of work may come in a variety of forms, including multi-media presentations, constructed objects, artistic expression, written documents, and verbal expression. Creativity is encouraged!

Project Steps

1. Determine if you will use the metric system or the standard system of measurement. Defend your selection.
2. Describe the design of the experiment and provide a rationale for the methods you will use to ensure that your measurements of height and arm span are accurate.
3. Select a sample of at least 10 individuals. Describe and defend your sample selection.

CHECKPOINT DATE _____ Student Initials ____ Coordinator Initials ____

4. Collect and record data. Submit a table of your data, showing all individuals' heights and arm spans, separating males and females.

	Name	Height	Arm Span Length
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

CHECK POINT DATE _____ Student Initials____ Coordinator Initials ____

5. Create two scatterplots, where each scatterplot represents the data collected. Height data points can be represented with one color and connected correctly. Arm span length can be represented with a different color and connected accordingly.
 - Identify the independent and dependent variables.
 - Use appropriate scales.
 - Include descriptive titles and/or labels.
6. Explain any relationships you notice in the data.

CHECKPOINT DATE _____ Student Initials Coordinator Initials

7. Determine the linear model/equation for each scatterplot of data. Explain how you arrived at those two equations, justifying the steps for each.
8. Using the equations in step 7, solve by using substitution or elimination.
9. Explain the meaning of one equation in terms of the context of the situation. Include the meaning of each variable, slope, and y-intercept.
10. Graph one equation on a coordinate plane.

CHECKPOINT DATE _____ Student Initials Coordinator Initials ____

11. Answer the following questions using correct unit labels:
 - A Based on your linear equations, what is the general rate of change of height of the participants included in the experiment?
 - B Based on your linear equations, if an individual was 5' 6", what would you predict his/her arm span to be?

12. What is a reasonable domain and range of each of your functions?

13. Circle below any factors that might affect your findings?

Explain whether or not you believe any of these factors affected your results.

Hair color	Yes	No	Explanation: _____
Shoe size	Yes	No	Explanation: _____
Hair size (volume)	Yes	No	Explanation: _____
Shoes on	Yes	No	Explanation: _____

14. If someone repeated your experiment, would you expect them to get similar or different results? Justify your answer.

CHECKPOINT DATE _____ Student Initials ____ Coordinator Initials ____

Student Learning Reflection

15. Using a method of your choice in the presence of your Project Coordinator, explain how this project has contributed to your learning and ability to apply Algebra I skills to the real world.

You may choose to write your reflection as if you were writing in a journal, or you may prefer to present your reflection verbally, through a multi-media presentation, or through some other format.

Use the questions below to guide your reflection. You may also reflect on additional topics not listed in the questions.

- What did you learn about data collection methods?
- If you were to repeat this project, what would you have done differently? Why?
- What additional resources would have been helpful in completing this project?

CHECKPOINT DATE _____ Student Initials _____ Coordinator Initials _____

SAMPLE

Project Scoring Rubric

PROJECT STEP	STANDARD COMPONENT	SCORING CRITERIA
1. Determine if you will use the metric system or the standard system of measurement. Defend your selection.	Process Standards	0 – No justification or inappropriate reason. 1 – Gives a valid reason to support his/her choice.
2. Describe the design of the experiment and provide a rationale for the methods you will use to ensure that your measurements of height, vertical reach, and horizontal leap are accurate.	Process Standards	0 – No explanation or inappropriate explanation. 1 – Explains the design of the experiment including the need for accuracy. 2 – Explains the design of the experiment including the need for consistency and accuracy.
3. Select a sample of at least 10 individuals. Describe and defend your sample selection.	Process Standards	0 – Did not choose at least 10 people or did not include an explanation. 1 – Chose at least 10 people and gave an explanation of how the sample was selected. 2 – Chose at least 10 people using a systematic sampling method and defended the methodology.
4. Collect and record data. Submit a table of your data, showing all individuals' heights and arm spans.	Standard 3	0 – No table submitted. 1 – A table is submitted with incomplete data or without titles and labels. 2 – A complete table is submitted with appropriate titles and labels.
5. Create two scatterplots, where each scatterplot includes all individuals' heights and their arm span lengths. <ul style="list-style-type: none"> Identify the independent and dependent variables. Use appropriate scales. Include descriptive titles and/or labels. 	Standard 2	0 – Did not label independent and dependent variables on one or both scatterplots. 1 – Labeled independent and dependent variables correctly on both scatterplots.
	Standard 3	0 – Did not create two scatterplots. 2 – Created two scatterplots but not all data points are accurate, scales are inappropriate, and/or descriptive titles are missing. 4 – Created two scatterplots with accurate data points, appropriate scales, and descriptive titles.

6. Explain any relationships you notice in the data.	Process Standards & Standard 3	0 – Does not explain relationships in the data or provides an explanation of relationship that does not exist. 1 – Provides an explanation of relationships in the data.
7. Determine the linear model/equation for each scatterplot of data. Explain how you arrived at those two equations, justifying the steps for each.	Standard 1, Standard 2, & Standard 3	0 – Did not determine two accurate linear models/equations. 1 – Determined two accurate linear models/equations but did not provide any explanation. 2 – Determined two accurate linear models/equations and explained how equations were determined. 3 – Determined two accurate linear models/equations, explained how equations were determined, and provided justification for each step. 4 – Determined two accurate linear models/equations, and provided an in-depth explanation and justification for each step.
8. Using the equations in step 7, solve by using substitution or elimination.	Standard 2	0 – Did not solve the system of equations accurately. 1 – Solved the system of equations accurately.
9. Explain the meaning of one equation in terms of the context of the situation. Include the meaning of each variable, slope, and y-intercept.	Standard 1 & Standard 2	0 – Does not explain. 3 – States the meaning of each variable, slope, and y-intercept. 6 – Clearly articulates the meaning of each variable, slope, and y-intercept in context.
10. Graph one equation on one coordinate plane.	Standard 2	0 – Did not graph the equation accurately on one coordinate plane. 1 – Graphs the equation accurately on a coordinate plane. 2 – Graphs the equation accurately on one coordinate plane, including labels, identified equations, clearly distinguished lines, and/or additional analysis.

<p>11. Answer the following questions using correct unit labels:</p> <p>A Based on your linear equations, what is the general rate of change of height of the participant included in the experiment?</p> <p>B Based on your linear equations, if an individual was 5' 6" tall, what would you predict his/her arm span to be?</p>	<p>Standard 1, Standard 2, & Standard 3</p>	<p>0 – Does not answer the questions correctly or answers 1 question correctly without unit labels.</p> <p>1 – Answers 1 question correctly with correct unit label or answers 2 questions correctly without unit labels.</p> <p>2 – Answers 2 questions correctly with correct unit labels or answers 3 questions correctly without unit labels.</p> <p>3 – Answers 3 questions correctly with correct unit labels.</p>
<p>12. What is a reasonable domain and range of each of your functions?</p>	<p>Standard 2</p>	<p>0 – Does not provide a mathematically reasonable domain and/or range.</p> <p>1 – Provides a mathematically reasonable domain and range.</p> <p>2 – Provides a mathematically reasonable domain and range and explains within the context of the situation.</p>
<p>13. Circle any factors relevant to your findings. Explain.</p>	<p>Process Standards & Standard 3</p>	<p>0 – No factors given.</p> <p>1 – Lists additional factors but does not provide a logical explanation of how these may or may not have affected the student's results.</p> <p>2 – Lists additional factors with a logical explanation of how these may or may not have affected the student's results.</p> <p>3 – Lists additional factors with an in-depth explanation of how these may or may not have affected the student's results.</p>

14. If someone repeated your experiment, would you expect them to get similar or different results? Justify your answer.	Process Standards & Standard 3	0 – No justification given. 1 – Logical justification provided. 2 – In-depth justification provided.
15. Explain how this project has contributed to your learning and ability to apply Algebra I skills to the real world.	Process Standard	0 – No explanation or inappropriate explanation. 1- Explanation provided.