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Understanding the Question

1. Have you answered a question or conducted an investigation similar to this one before? If yes, what was the problem or investigation? How did you answer the question?

2. How might you restate the question?

3. What is the unknown you are investigating?

4. What data might you gather to answer the question: When estimating elapsed time, does feedback help you become a better estimator? Why might this data be appropriate?

5. What data collection tools are available to help answer this question?

Making a Plan

1. How might you gather data?

2. What statistical concepts might you address after collecting data related to estimating elapsed time?

3. How might you use spreadsheet software to organize, represent, and analyze this data?

4. How might you use a graphing calculator to organize, represent, and analyze this data?

5. How might you create a summary document that explains and justifies our answer to the question?

6. After discussing your plan with another participant, use a word processor to open the **Making a Plan** document. Record your plan on this document. As you work, save this file.

Carrying Out the Plan and Answering the Question

1. Open a new spreadsheet document. Use this document to organize, represent, and analyze the data resulting from your plan. Save this document as **Gathering the Data**.

2. Open a new word-processing document. Use this document to hold imported screen shots from the graphing calculator. Save this file as **Gathering the Data with a Graphing Calculator**.

3. Open another new word-processing document. Use this document to summarize and explain your answer to the questions: *Does feedback on estimating elapsed time help you become a better estimator of elapsed time?* and *How does technology assist you in answering this question?* Save this file as **Answering the Question**.

4. How did you organize your data? Record your organized data in the **Answering the Question** document. Include text explanations of why you organized your data as you did. Use this word-processing document to record how you carried out your plan to answer the question: When estimating elapsed time, does feedback help you become a better estimator?

5. What representations of your data did you create? Record your representations in the **Answering the Question** document. Include text explanations of why you represented your data as you did.

6. What tools did you use to represent the data? Include text explanations of why you selected that tools that you used to represent the data.

7. What analyses of your data did you perform? Record your analyses in the **Answering the Question** document. Include text explanations of how you decided to analyze your data, including justification for the appropriateness of your analysis.

8. Record your answer to the following questions, using imported graphics from spreadsheet software and graphing calculators as needed, to justify your solution.
   Does feedback on estimating elapsed time help you become a better estimator of elapsed time? and *How does technology assist you in answering this question?*

Evaluating the Answer and the Plan

1. Is your answer reasonable? Why?

2. Did you alter your plan while carrying it out? Why?

3. What other representations might you have used to communicate your solution to the question?

4. If you did this again, which technology tool(s) would you select to carry out your plan? Why?

5. Summarize your responses to these questions in your **Answering the Question** document.

Extending the Question

1. Based on the data that you have collected, organized, represented, and analyzed, answer the questions:
    a. What do you predict the average time for estimating one minute of elapsed time without feedback will be?
    b. What do you predict the average time for estimating one minute of elapsed time with feedback will be?
    c. How might you test your predictions?

2. How might you connect this question to everyday experiences, investigations in other disciplines, and activities in and outside of school?

3. How might answering this question provide opportunities for communication through informal and formal mathematical language, representations, and models?

4. How might answering this question provide opportunities for you to use logical reasoning to make conjectures and verify conclusions?

5. Summarize your responses to these questions in your **Answering the Question** document.

Rubric for Answering the Question		Proficient	Developing	Emerging
Making a Plan	Content	Fully addresses the statistical concepts and representations to be found in the data.	Partially addresses the statistical concepts and representations to be found in the data.	Barely addresses the statistical concepts and representations found in the data.
	Technology	Includes strategies to address the spreadsheet and the graphing calculator.	Includes strategies to address the spreadsheet or the graphing calculator.	Includes one strategy to address the spreadsheet or the graphing calculator.
Carrying out the Plan - Spreadsheet	Organize Data	The data are organized and labeled.	The data are organized.	The data are not organized.
	Represent Data	The data are represented in multiple ways and labeled appropriately.	The data are represented in one way and labeled appropriately.	The data are not represented appropriately.
	Analyze Data	The data are analyzed.	The data are partially analyzed.	The data are analyzed inappropriately.
Carrying out the Plan – Graphing Calculator	Organize Data	The data are organized and labeled.	The data are organized.	The data are not organized.
	Represent Data	The data are represented in multiple ways and labeled appropriately.	The data are represented in one way and labeled appropriately.	The data are not represented appropriately.
	Analyze Data	The data are analyzed.	The data are partially analyzed.	The data are analyzed inappropriately.
Answering the Question		The answer to the question includes full justification of the answer.	The answer to the question includes partial justification of the answer.	The answer to the question does not address the question.
Evaluating the Answer and the Plan	Reasonableness	The answer to the question includes full justification of the reasonableness of the answer.	The answer to the question includes partial justification of the reasonableness of the answer.	The answer to the question does not address reasonableness.

Rubric for Answering the Question		Proficient	Developing	Emerging
	Reflection	The summary addresses reflections about the mathematics and the technology used to answer the question.	The summary partially addresses reflections about the mathematics and the technology used to answer the question.	The summary lacks reflections about the mathematics and the technology used to answer the question.
Extending the Question	Mathematics	The prediction is reasonable and fully justified based on the data gathered to answer the original question.	The prediction is reasonable and partially justified based on the data gathered to answer the original question.	The prediction is unreasonable.
	Connections	Connections are made to everyday experiences, investigations in other disciplines, and activities in and outside of school.	Connections are made to everyday experiences, investigations in other disciplines, or activities in and outside of school.	Connections are made to everyday experiences.
	Communication	Informal and formal mathematical language is used to describe how the data has been organized, represented, and analyzed.	Informal mathematical language is used to describe how the data has been organized, represented, and analyzed.	Lacks descriptions of how the data has been organized, represented, and analyzed.
	Reasoning	The conjectures and conclusions are logical.	The conjectures and conclusions are partially logical.	Lacks conjectures and conclusions.