Lake Washington School District
Teaching and Learning Framework

Grades 3-5

Science

Supplemental Materials | August 2007

Supplemental Materials | Third Grade

Science Investigative Format for a Controlled Experiment

At third grade, students will be well-versed in the development of a question and materials list. Students should continue to practice writing predictions into their investigative write-ups, but focus on the development of the procedure portion of the investigative format. Students will learn procedure writing through teacher modeling and group interaction, while working toward writing procedures and predictions independently by spring. Simple concluding statements should be modeled.

Question

- Develop and write a testable question that can be answered through an investigation.
- Discuss what variable is changed (manipulated variable) *See chart below.
- Discuss what variable is being measured (responding variable) in the investigation.

Prediction

- Discuss how changing a variable affects the outcome of an investigation.
- Write an "if…then" statement e.g. If we shorten the length of the string, then the pitch will be higher.

Materials List (Group and Student Work)

- Use a bulleted list format.
- Write each item and/or tool needed to complete the investigation.

Procedure (Group and Student Work)

- Teacher models to develop independence by spring.
- Write a numbered procedure that includes:
- Steps in logical order.
- One variable that is measured (responding) and how often it is measured.
- How results will be recorded.
- Repeated trials.

When appropriate, teachers may also want to discuss and model the following:

- One variable kept the same (controlled)
- One changed variable (manipulated)

Data (Group and Student Work) (Observation/Data)

- Students are encouraged to verbally and in writing and/or drawing, communicate observations based upon evidence from what the students just investigated.
- Students use appropriate measurement tools to record measurements.
- When appropriate, students record data in a chart or table.

Conclusion

- Teacher models simple concluding statement that answers the investigative question and gives evidence from the data/observations using the word because.
- e.g. The mock rock contains kosher salt because after evaporation there were kosher salt crystals left in the dish.

Science Investigative Format for a Controlled Experiment

At the beginning of fourth grade, students will be well-versed in the development of a question, prediction, and materials list. In third grade, the procedure was introduced and practiced but more elements will now be added (changed variable and controlled variable). Students should independently continue to incorporate the question, prediction, materials list, procedure, data, and simple conclusion into their investigative write-ups. However, independent writing of the expanded procedure will not be expected until spring. The teacher introduces the summary paragraph to develop independence by spring.

Question (Group and Student Work)

- Write a testable question that can be answered through an investigation.
- e.g. How does increasing the number of winds on an electromagnet affect the strength of the electromagnet?
- Include what variable is changed (manipulated variable) *See variable chart below.
- Include what variable is being measured (responding variable) in the investigation.

Prediction

- Discuss how changing a variable affects what is measured in the investigation.
- Write an “if…then” statement.
- e.g. If we increase the number of winds on the electromagnet, then the strength of the electromagnet will increase.

Materials List

- Using a bulleted list format, write each item and/or tool needed to complete the investigation.

Procedure

- Teacher introduces rubric and models procedure during first part of year; at the beginning of the year, students write procedure as a group, working towards individual writing at end of year.
- Write a numbered procedure that includes:
- Steps in logical order.
- One variable kept the same (controlled).
- One changed variable (manipulated).
- One variable that is measured (responding) and how often it is measured.
- How results will be recorded.
- Repeated trials (minimum of three trials).

Data

- Teacher models new data chart during first part of year.
- Student uses appropriate measurement tools to record measurements.
- When appropriate, students record data in a chart or table during investigation.
- A table is used for the changed and measured variables (up to 12 data cells).

Variable Chart

Changed Variable (Units)	Measured Variable (Units)			
	Trial 1	Trial 2	Trial 3	Average
Condition A				
Condition B				
Condition C				

Summary

A summary paragraph, using complete sentences, is written, including the data in a scientific investigation
Write a topic sentence
Details logically follow the topic sentence
Details summarize the data for each trial (minimum of three trials)
Transition words are used in the paragraph

Conclusion (Group and Student Work)

Teacher models simple concluding statement that answers the investigative question and gives evidence from the data/observations using the word because
e.g. As the distance between two magnets increases, the force of attraction decreases because the number of washers needed to break the force decreased as the distance increased.
Include if the prediction is right or wrong

Science Investigative Format for a Controlled Experiment

At fifth grade, students will be well-versed in the development of a question, prediction, materials list, and procedure. The summary paragraph will have been introduced and practiced well. Students should continue to incorporate the question, prediction, materials list, procedure, data, and summary into their investigative write-ups. Introduce the four-point conclusion. By spring, students should work independently in all sections of the Science Investigative Format.

Question

- Write a testable question that can be answered through investigation.
- Include what variable is changed (manipulated variable) See fourth grade Variable Chart.
- Include what variable is being measured (responding variable) in the investigation.

Prediction

- Discuss how changing a variable affects the outcome of an investigation.
- Write an "if…then" statement.
- e.g. If we leave grass seed in the sunlight longer, then the grass will grow taller.

Materials List

- Using a bulleted list format, write each item and/or tool needed to complete the investigation.

Procedure

Write a numbered procedure that includes:

- Steps in logical order.
- One variable kept the same (controlled).
- One changed variable (manipulated).
- One variable that is measured (responding) and how often it is measured.
- How results will be recorded.
- Repeated trials (minimum of three trials).

Data

- Students use appropriate measurement tools to record measurements.
- A table for the changed and measured variables (up to 12 data cells) throughout the time of the investigation. See fourth grade Variable Chart.

Summary

- Write a summary paragraph of the data in a scientific investigation using complete sentences.
- Write a topic sentence.
- Details logically follow the topic sentence.
- Details summarize the data for each trial (minimum of three trials).
- Transition words are used in the paragraph.

Conclusion

Write a concluding paragraph using complete sentences and the four-point format:

- Write a topic sentence that answers the investigative question and clearly states if the prediction is correct OR not correct.
- State supporting start and finish data points for the "lowest" conditions e.g. The grass grew from 0 cm to 3 cm and received 2 hours of light.
- State supporting start and finish data points for the "highest" conditions e.g. The grass grew from 0 cm to 14 cm and received 12 hours of light.
- Explanatory language is used to connect or compare the supporting data to a correct conclusion.
- Example: The grass that receives the most light does grow the tallest, so the prediction was correct. First, the grass grown in 2 hours of light grew from 0 cm to 3 cm. Next, the grass grown in 12 hours of light grew from 0 cm to 14 cm. Therefore, the grass with the most light grew 9 cm more than the grass with 2 hours of light.

Variables Clarification Chart

Example from the WASL: "Which variable was changed (manipulated) in this investigation?"
Note: FOSS uses different verbiage. See below:

5th Grade

- Variable kept the Same (Controlled)
- Variable changed (Manipulated variable)
- Variable measured (Responding variable)

FOSS

- Controlled Variable
- Independent Variable

  OR
- Experimental Variable
- Dependent Variable