

## Documenting the Field Investigation Science Practice

### Identify the Phenomenon to Be Investigated

The phenomenon (something puzzling that students are trying to explain) and purpose of the investigation is described. The essential question and investigation question are identified.

**Essential Question** is the big picture question that cannot be answered with one investigation.

**Investigation Question** is the researchable question that can be answered with qualitative or quantitative observations or measurements.

### Make a Prediction (Initial Claim)

Predictions are not typically made for descriptive studies. For comparative studies, students predict what will happen to the responding (measured) variable when one of the changes occurs. For correlative studies predict the relationship. Secondary students should also give a reason for their prediction.

### Decide on Materials

The materials needed to perform the investigation are listed.

### Plan the Field Investigation

The investigation plan includes:

- Logical steps to do the investigation; steps written clearly so someone else could follow procedure.
- What variables are under study? What is changed (manipulated/independent)? What is measured (responding/dependent)?
- How, when and/or where will observations/measurements be taken? How will samples or measurements be repeated?
- How is sampling/measurement method consistent (controlled variables) or systematic? Secondary students should describe how sampling is random and representative of the site.

### Carry out the Investigation (Collect the Data)

Data/observations/measurements are recorded systematically on a data collection sheet. Location, date, time of day and a description of study site (including weather) are recorded.



## Analyze and Interpret Data

### Organize Data

Results are organized into categories in tables, charts, graphs, maps, and/or other written forms making appropriate calculations (e.g. total growth, distances, total number observed).

Populations are estimated; means, modes, medians, t-values and r-values are calculated; graphs, tables, or maps are generated.

### Identify Relationships

Patterns and trends in the data are observed and described.

### Interpret Data

Relationships are identified in the data and how these patterns identified in the data provide evidence for a conclusion or claim is described.

## Construct an Argument/Explanation

An argument/explanation is constructed that answers the original question being investigated based on the evidence collected and analyzed. This argument/explanation includes:

- **A claim**  
A one sentence answer to the question.
- **Evidence**  
Supports the claim above with sufficient and appropriate evidence collected in the investigation.
- **Supportive reasoning (justification)**  
Connects the evidence to the claim using justification and scientific principles.

## Extend the Investigation

Investigations are extended to allow for students and the class to make sense of the investigation in a broader context than just the specific field investigation that was conducted. The following are ideas:

- Compare data to other similar systems models.
- Identify factors in the field that may have affected the outcomes of the investigation.
- Describe how the procedures might have been more systematic.
- Compare scientific arguments by citing relevant evidence and posing and responding to questions that elicit pertinent elaboration and detail. Provide and receive critiques on arguments.
- Provide new questions about the system or model.
- Recommend future actions and explain why.
- Add to the model of the current system under study.

