

Lake Washington School District  
Teaching and Learning Framework

**Grades 3-5**

Science

Process and Skills | August 2007

## Process and Skills | Third, Fourth, and Fifth Grades

*Inquiry: The student Knows and applies the skills, processes, and nature of scientific inquiry.*

### Thinking and Learning

#### Investigating Systems

- Develop the knowledge and skills necessary to do scientific inquiry

### Questioning

#### Ask questions about objects, organisms, and events in the environment

- Formulate and refine investigative questions about objects, organisms, and events
- Generate a question independently that can be answered through a scientific investigation

### Planning and Conducting Investigations

#### Plan and conduct simple investigations, using appropriate tools, measures, and safety rules

- Make written predictions and give reasons for the predictions

Plan, conduct, and write a simple investigation using logical steps including:

- Variables kept the same
- Changed variable
- Measured variable
- How often and where measurements are recorded
- Repeated trials
- Identify and use simple equipment and tools to gather data
- Collect, categorize, order, organize, and interpret observational data
- Identify and use appropriate units of measurement for an investigation
- Identify possible improvements in an investigative design
- Follow a plan and use equipment correctly and safely

### Explaining

#### Use data to make reasonable explanations

- Use data from repeated investigations to generate a scientific conclusion that answers the investigative question
- Explain how the original prediction was or was not supported by the data

### Modeling

#### Model objects, events, or processes by representing them with concrete objects, metaphors, analogies, or other conceptual or physical constructs

- Create a model (e.g., diagram and/or physical model) to represent familiar objects, events, or processes
- Identify or describe the similarities or differences between a model, event, or object and a scientific phenomenon

## Communicating

Record and report observations, explanations, and conclusions using visual, oral, written, and mathematical expression

- Accurately report observations of simple investigations
- Describe the materials used in the investigation using numbers, shapes, colors, etc.

## Communicating (continued)

Report the process used and summarize the results of the investigations using verbal, visual, written, and mathematical formats

- Describe connections between the results, prediction, and phenomenon

## Collaborating

Work with others to investigate and present

- Develop plans and organize tasks for completion of group projects
- Give and respond to feedback in a constructive manner
- Develop and extend ideas and insights through group discussion
- Practice perseverance in seeking scientific information

## Connecting and Applying

Nature of Science

- Understand the nature of scientific inquiry

## Intellectual Honesty

Understand that all scientific observations should be recorded accurately even when they contradict expectations

- Accurately record what is observed
- Keep records and do not change records later
- Identify an appropriate scientific response to unexpected results
- Acknowledge contributions of others and give credit to information sources

## Limitations of Science and Technology

Distinguish between questions that can be answered with science and technology and those that cannot

- Identify whether a question about a given phenomenon or situation can be answered through scientific inquiry
- Identify and explain reasons why a question can or cannot be answered through scientific inquiry

## Evaluating Inconsistent Results

Explain why similar investigations may not produce similar results

- Identify and explain why two similar investigations produced different results

## Evaluating Methods of Investigation

### Recognize that results of scientific investigations can come from expected and unexpected sources

- Identify and describe one event that could have lead to unexpected data in a given investigation
- Document flaws in a given investigation when the data is inconsistent with the prediction
- Identify or describe ways to improve the plan of an investigation when the data is inconsistent with a second investigation
- Decide whether an investigation is valid and explain why
- Identify or describe ways to increase the validity of an investigation

## Evolution of Scientific Ideas

### Know that ideas in science change as new scientific thinking, theories, and evidence arise

- Describes how thinking has changed because of an investigation (e.g. I used to think...but now I think...because...)
- Given historical information, identify reasons why a scientific idea changed over time

## Design

*The student knows and applies the design process to develop solutions to human problems in societal contexts*

### Designing Solutions

- Apply design processes to develop solutions to human problems or meet challenges using the knowledge and skills of science and technology

### Identifying Problems

- Identify problems from familiar contexts in which a scientific or technological design can or can not be used to design solutions

### Designing and Testing Solutions

- Propose, design, and test a solution to a problem using the following steps:
- Identify criteria
- Propose, sketch, and/or construct a model/prototype
- Plan, perform, and repeat tests
- Analyze the results
- Re-design as necessary based on results

### Evaluating Potential Solutions

- Evaluate how well a design or product solves a problem
- Critique a design using scientifically established criteria
- Determine whether a design needs modifications based on evaluations, results and scientific concepts