3rd Grade Science — Performance Level Descriptors

**Data Presentations and Experiments for the Elementary School Grade Band**

**Concepts/questions encompassed in a simple data presentation or experiment:**
- Students apply science knowledge, skills, and practices to analyze, interpret, and communicate information.
- Students apply science knowledge, skills, and practices to evaluate the validity of simple data presentations and experiments.

**Nature of simple data presentations and experiments:**
- Likely to be familiar to, or readily understood by, elementary school students regardless of their exposure to rigorous, active science instruction.
- Likely to be familiar to, or readily understood by, elementary school students regardless of their exposure to rigorous, active science instruction.

**Evaluation of Models, Inferences, and Experimental Results**
- Students apply science knowledge, skills, and practices to evaluate the validity of simple data presentations and experiments.
- Students apply science knowledge, skills, and practices to evaluate the validity of simple data presentations and experiments.

**Concepts/quantities encompassed in a simple data presentation or experiment:**
- Likely to be familiar to, or readily understood by, elementary school students regardless of their exposure to rigorous, active science instruction.
- Likely to be familiar to, or readily understood by, elementary school students regardless of their exposure to rigorous, active science instruction.

**Moderately Complex Data Presentations and Experiments for the Elementary School Grade Band**

**Concepts/questions encompassed in a moderately complex data presentation or experiment:**
- Students apply science knowledge, skills, and practices to analyze, interpret, and communicate information.
- Students apply science knowledge, skills, and practices to evaluate the validity of complex data presentations and experiments.

**Nature of moderately complex data presentations and experiments:**
- Likely to be familiar to, or readily understandable by, elementary school students who have had exposure to rigorous, active science instruction.
- Likely to be familiar to, or readily understandable by, elementary school students who have had exposure to rigorous, active science instruction.

**Evaluation of Models, Inferences, and Experimental Results**
- Students apply science knowledge, skills, and practices to evaluate the validity of complex data presentations and experiments.
- Students apply science knowledge, skills, and practices to evaluate the validity of complex data presentations and experiments.

**Concepts/quantities encompassed in a complex data presentation or experiment:**
- Likely to be familiar to, or readily understandable by, elementary school students who have had exposure to rigorous, active science instruction.
- Likely to be familiar to, or readily understandable by, elementary school students who have had exposure to rigorous, active science instruction.

**Complex Data Presentations and Experiments for the Elementary School Grade Band**

**Concepts/questions encompassed in a complex data presentation or experiment:**
- Students apply science knowledge, skills, and practices to analyze, interpret, and communicate information.
- Students apply science knowledge, skills, and practices to evaluate the validity of complex data presentations and experiments.

**Nature of complex data presentations and experiments:**
- Likely to be challenging for elementary school students regardless of their exposure to rigorous, active science instruction.
- Likely to be challenging for elementary school students regardless of their exposure to rigorous, active science instruction.

**Evaluation of Models, Inferences, and Experimental Results**
- Students apply science knowledge, skills, and practices to evaluate the validity of complex data presentations and experiments.
- Students apply science knowledge, skills, and practices to evaluate the validity of complex data presentations and experiments.
Simple Data Presentations and Experiments

Students apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulate conclusions and predictions based on that information.

Evaluation of Models, Inferences, and Experimental Results

Students apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulate conclusions and predictions based on that information.

Moderately Complex Data Presentations and Experiments

Students apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulate conclusions and predictions based on that information.

Complex Data Presentations and Experiments

Students apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulate conclusions and predictions based on that information.
5th Grade Science — Performance Level Descriptors

**Interpretation of Data**

**Needs Support**
- Students at the Needs Support level should:
  - select one piece of data from a moderately complex data presentation.
  - find information in text that describes a moderately complex data presentation.
  - identify features of a moderately complex table, graph, or diagram (e.g., axes, table, units of measure).
  - understand common scientific terminology, symbols, and units of measure used in a moderately complex scientific context.
  - translate complex information into a table, graph, or diagram.
  - determine the value of a variable as the value of another variable changes in a moderately complex data presentation.
  - compare data from a moderately complex data presentation (e.g., find the highest/lowest value; order data from a table).
  - combine data from a simple data presentation (e.g., sum data from a table).
  - perform an extrapolation using data in a simple table or graph.

**Close**
- Students at the Close level should:
  - determine which results of a simple experiment support or contradict a hypothesis, prediction, or conclusion.
  - determine the scientific question that is the basis for a simple experiment.
  - understand a simple experimental design.
  - determine which moderately complex experiments utilized a given tool, method, or aspect of design.
  - understand the methods, tools, and functions of tools used in a moderately complex experiment.
  - determine the scientific question that is the basis for a moderately complex experiment (e.g., the hypothesis).
  - evaluate the design or methods of a simple experiment (e.g., possible flaws or inconsistencies; precision and accuracy issues).
  - predict the results of an additional trial in a simple or moderately complex experiment.
  - determine how the value of a variable changes as the value of another variable changes in a simple experiment.

**Ready**
- Students at the Ready level should:
  - understand the methods, tools, and functions of tools used in a complex experiment.
  - understand a complex experimental design.
  - evaluate the design or methods of a moderately complex experiment (e.g., possible flaws or inconsistencies; precision and accuracy issues).
  - predict the results of an additional trial or measurement in a complex experiment.
  - determine how the value of a variable changes as the value of another variable changes in a moderately complex experiment.

**Exceeding**
- Students at the Exceeding level should:
  - evaluate the design or methods of a complex experiment (e.g., explain flaws or inconsistencies; precision and accuracy issues).
  - determine what conditions in a complex experiment would produce specified results.
  - determine what additional trial or experiment could be performed to enhance or evaluate the results of a moderately complex experiment.

**Scientific Investigation**

**Needs Support**
- Students at the Needs Support level should:
  - apply science knowledge, skills, and practices to evaluate the tools, procedures, and design of scientific experiments and to compare, extend, and modify these experiments.

**Close**
- Students at the Close level should:
  - determine which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex data presentation or piece of information in text.
  - determine which results of a moderately complex data experiment support or contradict a hypothesis, prediction, or conclusion.
  - determine which hypothesis, prediction, or conclusion is, or is not, consistent with two or more moderately complex data presentations and/or pieces of information in text.

**Ready**
- Students at the Ready level should:
  - determine which hypothesis, prediction, or conclusion is, or is not, consistent with a complex data presentation or piece of information in text.
  - determine which results of a complex data experiment or complex data presentation support or contradict a hypothesis, prediction, or conclusion.
  - determine which hypothesis, prediction, or conclusion is, or is not, consistent with two or more complex data presentations and/or pieces of information in text.

**Exceeding**
- Students at the Exceeding level should:
  - determine which additional trial or experiment could be performed to enhance or evaluate the results of a moderately complex experiment.

**Evaluation of Models, Inferences, and Experimental Results**

**Needs Support**
- Students at the Needs Support level should:
  - apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulas, conclusions, and predictions based on that information.

**Close**
- Students at the Close level should:
  - apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulas, conclusions, and predictions based on that information.

**Ready**
- Students at the Ready level should:
  - apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulas, conclusions, and predictions based on that information.

**Exceeding**
- Students at the Exceeding level should:
  - apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulas, conclusions, and predictions based on that information.

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Middle school students regardless of their exposure to rigorous science instruction, such as mass, volume, or speed, even if only understood qualitatively; newly introduced concepts are likely to be familiar to, or readily understood by, based on that information.

Students apply science knowledge, skills, and practices to evaluate the models, inferences, and diagrams of varying complexity.

**Interpretation of Data**
- A student performing at the Needs Support level:
  - selects two or more pieces of data from a single data presentation,
  - identifies similarities and differences between experiments,
  - determines experiments utilizing a given tool, method, or aspect of design.

- A student performing at the Close level:
  - determines which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex data presentation,
  - determines which moderately complex experiments utilized a given tool, method, or aspect of design.

- A student performing at the Ready level:
  - identifies similarities and differences between experiments,
  - determines which moderately complex data presentations support or contradict a hypothesis, prediction, or conclusion.

- A student performing at the Exceeding level:
  - determines which moderately complex data presentations support or contradict a hypothesis, prediction, or conclusion.

**Scientific Investigation**
- A student performing at the Needs Support level:
  - determines which experiments utilized a given tool, method, or aspect of design.

- A student performing at the Close level:
  - determines which moderately complex theoretical model support or imply certain information.

- A student performing at the Ready level:
  - determines which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex data presentation, or pieces of information in text.

- A student performing at the Exceeding level:
  - identifies similarities and differences between moderate complex data presentations, or pieces of information in text.

**Evaluation of Models, Inferences, and Experimental Results**
- A student performing at the Needs Support level:
  - determines which simple theoretical models support or contradict a hypothesis, prediction, or conclusion.

- A student performing at the Close level:
  - identifies similarities and differences between moderate complex experiments.

- A student performing at the Ready level:
  - identifies similarities and differences between moderate complex theoretical models.

- A student performing at the Exceeding level:
  - identifies similarities and differences between moderate complex theoretical models.

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*Some elementary school level material is assessed in Grade 6. This allows students with diverse access to science instruction to demonstrate some skills, even when not ready for most middle school level science content.*
### Scientific Investigation

Students apply science knowledge, skills, and practices to understand the processes, procedures, and design of scientific experiments and to compare, extend, and modify these experiments.

#### Needs Support

- Identifies similarities and differences between simple experiments.
- Determines which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex theoretical model.
- Translates moderately complex information into a table, graph, or diagram.
- Determines which complex theoretical models present or imply certain information.
- Determines which additional trial or experiment could be performed to enhance or evaluate the results of a simple experiment.

#### Close

- Identifies similarities and differences between moderately complex experiments.
- Determines which complex theoretical models present or imply certain information.
- Combines data from a complex data presentation.
- Determines which results of a moderately complex experiment support or contradict a hypothesis, prediction, or conclusion.

#### Ready

- Identifies similarities and differences between complex experiments.
- Determines which complex theoretical models present or imply certain information.
- Translates moderately complex information into a table, graph, or diagram.
- Determines which findings are provided.

#### Exceeding

- Identifies similarities and differences between complex experiments.
- Determines which complex theoretical models present or imply certain information.
- Translates moderately complex information into a table, graph, or diagram.
- Determines which findings are provided.

### Evaluation of Models, Inferences, and Experimental Results

Students apply science knowledge, skills, and practices to evaluate the validity of scientific information and formulate conclusions and predictions based on that information.

#### Needs Support

- Determines which hypothesis, prediction, or conclusion is, or is not, consistent with two or more simple data presentations and/or pieces of information in text.
- Determines which hypothesis, prediction, or conclusion is, or is not, consistent with two or more moderate complex data presentations or pieces of information in text.
- Identifies the strengths and weaknesses of a moderately complex theoretical model.
- Determines which simple theoretical models support or are weakened by new information.
- Determines which simple theoretical models support or are weakened by new information.

#### Close

- Determines which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex theoretical model.
- Determines which simple theoretical models support or are weakened by new information.
- Determines which simple theoretical models support or are weakened by new information.
- Determines which simple theoretical models support or are weakened by new information.

#### Ready

- Determines which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex theoretical model.
- Determines which simple theoretical models support or are weakened by new information.
- Determines which simple theoretical models support or are weakened by new information.
- Determines which simple theoretical models support or are weakened by new information.

#### Exceeding

- Determines which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex theoretical model.
- Determines which simple theoretical models support or are weakened by new information.
- Determines which simple theoretical models support or are weakened by new information.
- Determines which simple theoretical models support or are weakened by new information.

### Simple Data Presentations, Experiments, and Theoretical Models

- Identifies similarities and differences between simple experiments.
- Determines which hypothesis, prediction, or conclusion is, or is not, consistent with a moderately complex theoretical model.
- Translates moderately complex information into a table, graph, or diagram.
- Determines which complex theoretical models present or imply certain information.
- Determines which additional trial or experiment could be performed to enhance or evaluate the results of a simple experiment.

### Moderately Complex Data Presentations, Experiments, and Theoretical Models

- Identifies similarities and differences between complex experiments.
- Determines which complex theoretical models present or imply certain information.
- Translates moderately complex information into a table, graph, or diagram.
- Determines which findings are provided.
- Identifies the strengths and weaknesses of a moderately complex theoretical model.
- Determines which simple theoretical models support or are weakened by new information.

### Complex Data Presentations, Experiments, and Theoretical Models

- Identifies similarities and differences between complex experiments.
- Determines which complex theoretical models present or imply certain information.
- Translates moderately complex information into a table, graph, or diagram.
- Determines which findings are provided.
- Identifies the strengths and weaknesses of a moderately complex theoretical model.
- Determines which simple theoretical models support or are weakened by new information.
### 8th Grade Science — Performance Level Descriptors

**Interpretation of Data** Students apply scientific knowledge, skills, and practices to locate, translate, infer, and extend from, and evaluate data and information in scientific graphs, tables, and diagrams of varying complexity.

- **A student performing at the Needs Support Level:**
  - selects one piece of data from a complex data presentation.
  - identifies features of a table, graph, or diagram (e.g., axis labels, units of measure).
  - uses patterns or trends in data to make valid inferences.
  - identifies features of a moderately complex table, graph, or diagram (e.g., axis labels, units of measure).
  - identifies similarities and differences between moderately complex theoretical models presented or implied in text.
  - determines an alternate method for testing the scientific question that is the basis for a moderately complex experiment.

- **A student performing at the Close Level:**
  - selects two or more pieces of data from a complex data presentation.
  - identifies features of a complex table, graph, or diagram (e.g., axis labels, units of measure).
  - understands common scientific terminology, symbols, and units of measure used in a moderately complex data presentation.
  - translates moderately complex information into a table, graph, or diagram.
  - determines the trend or changes in the value of another variable changes in a moderately complex data presentation.
  - combines data from two or more moderately complex data presentations (e.g., find the highest/lowest value, order data from a table).
  - determines which hypothesis, prediction, or conclusion is, or is not, consistent with two or more moderately complex data presentations and/or pieces of information in text.

- **A student performing at the Ready Level:**
  - understands common scientific terminology, symbols, and units of measure used in a complex data presentation.
  - translates complex information into a table, graph, or diagram.
  - determines the trend or changes in the value of another variable changes in a complex data presentation.
  - combines data from two or more complex data presentations (e.g., find the highest/lowest value, order data from a table).
  - compares data from two or more complex data presentations (e.g., compare a value in a table using a scale from another table).
  - translates complex information into a table, graph, or diagram.
  - translates complex information into a table, graph, or diagram.

**Scientific Investigation** Students apply scientific knowledge, skills, and practices to extend from and evaluate data and information involving test plots, experiments having several straightforward steps in which the number of variables measured and controlled is three or fewer; methods and tools are simple bar and double bar charts, line graphs, very simple line graphs, simple flow diagrams (like a basic food web). Examples of simple experiments include simple field studies involving test plots, experiments having several straightforward steps in which the number of variables measured and controlled is three or fewer; methods and tools are simple bar and double bar charts, line graphs, very simple line graphs, simple flow diagrams (like a basic food web). Examples of simple experiments include simple field studies.

- **A student performing at the Needs Support Level:**
  - applies science knowledge and extends from and evaluates data and information involving test plots, experiments having several straightforward steps in which the number of variables measured and controlled is three or fewer; methods and tools are simple bar and double bar charts, line graphs, very simple line graphs, simple flow diagrams (like a basic food web).
  - monitors what conditions in a moderately complex experiment would produce specific results.

- **A student performing at the Close Level:**
  - demonstrates the relationship between two or more of the moderately complex theoretical models presented or implied in text.
  - determines which hypothesis, prediction, or conclusion is, or is not, consistent with two or more moderately complex data presentations and/or pieces of information in text.
  - predicts the effects of modifying the design or methods of a complex experiment.

- **A student performing at the Ready Level:**
  - translates complex information into a table, graph, or diagram.
  - translates complex information into a table, graph, or diagram.
  - translates complex data presentation into a table, graph, or diagram.
  - determines which hypothesis, prediction, or conclusion is, or is not, consistent with a complex data presentation or piece of information in text.
  - explains why a hypothesis, prediction, or conclusion is, or is not, consistent with a complex data presentation or piece of information in text.
  - predicts the effects of modifying the design or methods of a complex experiment.

**Evaluation of Models, Inferences, and Experimental Results** Students apply scientific knowledge, skills, and practices to evaluate the validity of scientific information and formulate conclusions and predictions based on that information.

- **A student performing at the Needs Support Level:**
  - finds information in text that describes a complex experiment.
  - identifies similarities and differences between moderately complex theoretical models presented or implied in text.
  - identifies similarities and differences between simple theoretical models.
  - determines if a hypothesis, prediction, or conclusion is, or is not, consistent with or supported by results of a moderately complex experiment.
  - identifies similarities and differences between simple theoretical models.
  - translates simple information into a table, graph, or diagram.

- **A student performing at the Close Level:**
  - understands the methods, tools, and functions of tools used in a moderately complex experiment.
  - understands the moderately complex experimental design.
  - identifies the strengths and weaknesses of simple theoretical models.
  - determines what conditions in a simple experiment would produce results.

- **A student performing at the Ready Level:**
  - identifies similarities and differences between complex experimental designs.
  - translates simple information into a table, graph, or diagram.
  - identifies similarities and differences between moderately complex theoretical models presented or implied in text.
  - combines data from two or more simple data presentations (e.g., find the highest/lowest value, order data from a table).
  - compares data from two or more simple data presentations (e.g., compare a value in a table using a scale from another table).
  - interprets and evaluates scientific models and experimental data.
  - generates and uses mathematical models to create quantitative predictions and explanations.
  - predicts the effects of modifying the design or methods of a moderately complex experiment.
Early High School Science — Performance Level Descriptors

<table>
<thead>
<tr>
<th>Simple Data Presentations, Experiments, and Theoretical Models for the High School Grade Band</th>
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<tbody>
<tr>
<td><strong>Concepts/principles encountered as a simple data presentation, experiment, or theoretical model:</strong> Concepts are likely to be familiar to, or readily understood by, high school students regardless of their level of science instruction. Examples of simple presentations include tables with one or two columns of data. These data may be either empirical, constructed from experiments, or derived from a theoretical model. Students who are familiar with relationships between variables will understand that direct relationships are indicated by a straight line, but they may not be able to interpret those trends if the data are not expressed in a linear form. Students who are not familiar with these concepts should be able to recognize that the relationship is not linear. Students should be able to identify the nature of the data and how it relates to the question being asked. They should also be able to identify the strength of the relationship and the limitations of the data.</td>
</tr>
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<td><strong>Nature of simple data presentations, experiments, and theoretical models:</strong> Likely to be familiar to, or readily understood by, high school students regardless of their level of science instruction. Examples of simple presentations include tables with one or two columns of data. These data may be either empirical, constructed from experiments, or derived from a theoretical model. Students who are familiar with relationships between variables will understand that direct relationships are indicated by a straight line, but they may not be able to interpret those trends if the data are not expressed in a linear form. Students who are not familiar with these concepts should be able to recognize that the relationship is not linear. Students should be able to identify the nature of the data and how it relates to the question being asked. They should also be able to identify the strength of the relationship and the limitations of the data.</td>
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<td><strong>Concepts/principles encountered as a moderately complex data presentation, experiment, or theoretical model:</strong> Concepts/principles extended. Concepts are likely to be familiar to high school students who have had rigorous science instruction. Students may be familiar with relationships between variables, but they may not be able to interpret those trends if the data are not expressed in a linear form. Students should be able to recognize that the relationship is not linear. Students should be able to identify the nature of the data and how it relates to the question being asked. They should also be able to identify the strength of the relationship and the limitations of the data.</td>
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<td><strong>Nature of moderately complex data presentations, experiments, and theoretical models:</strong> Likely to be familiar to, or readily understood by, high school students who have had rigorous science instruction. Students may be familiar with relationships between variables, but they may not be able to interpret those trends if the data are not expressed in a linear form. Students should be able to recognize that the relationship is not linear. Students should be able to identify the nature of the data and how it relates to the question being asked. They should also be able to identify the strength of the relationship and the limitations of the data.</td>
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<td><strong>Concepts/principles encountered as a complex data presentation, experiment, or theoretical model:</strong> Concepts are introduced to students about which they are likely unfamiliar. Concepts are likely to be familiar to high school students who have had rigorous science instruction. Students may be familiar with relationships between variables, but they may not be able to interpret those trends if the data are not expressed in a linear form. Students should be able to recognize that the relationship is not linear. Students should be able to identify the nature of the data and how it relates to the question being asked. They should also be able to identify the strength of the relationship and the limitations of the data.</td>
</tr>
<tr>
<td><strong>Nature of complex data presentations, experiments, and theoretical models:</strong> May be challenging to high school students who are not familiar with the concepts. Concepts are introduced to students about which they are likely unfamiliar. Concepts are likely to be familiar to high school students who have had rigorous science instruction. Students may be familiar with relationships between variables, but they may not be able to interpret those trends if the data are not expressed in a linear form. Students should be able to recognize that the relationship is not linear. Students should be able to identify the nature of the data and how it relates to the question being asked. They should also be able to identify the strength of the relationship and the limitations of the data.</td>
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