

**STUDENT SCORING RUBRIC**  
**PROGRAM VIEW FORMAT**  
**ABILITIES NECESSARY TO DO SCIENTIFIC INQUIRY**

PRIMARY (K-2)	INTERMEDIATE (3-5)	MIDDLE (6-8)	HIGH (9-12)
<p><b>A. Asking Questions</b></p> <p>4 Asks a question that relates to a topic of study without teacher guidance</p> <p>3 Asks a question that relates to a topic of study with some teacher guidance</p> <p>2 Asks questions but requires extensive teacher guidance</p> <p>1 Asks questions unrelated to the topic of study</p>	<p><b>A. Asking Testable Questions that May be Explored through Scientific Investigation</b></p> <p>4 Asks testable questions that may be explored scientifically without teacher guidance</p> <p>3 Asks testable questions with minimal teacher guidance</p> <p>2 Asks testable questions with considerable teacher guidance</p> <p>1 Uses teacher-generated question</p>	<p><b>A. Identifying Questions and Formulating Hypotheses that Can be Examined through Scientific Investigations</b></p> <p>4 Formulates testable questions and hypotheses that are specific, based on scientific concepts, and lead to scientific investigation</p> <p>3 Formulates testable questions and hypotheses that lead to scientific investigation</p> <p>2 Formulates testable questions which lead to a scientific investigation; even though the hypotheses is present it does not directly answer the question</p> <p>1 Testing the question is not possible; hypothesis is missing or unclear</p>	<p><b>A. Formulating Questions and a Hypothesis Statement</b></p> <p>4 Formulates a coherent testable hypothesis that potentially answers the question; completely supported by prior knowledge</p> <p>3 Formulates a coherent testable hypothesis that potentially answers the question; partially supported by prior knowledge</p> <p>2 Formulates a hypothesis that may not answer the question; supported by opinions and misconceptions</p> <p>1 Is not able to formulate a testable hypothesis that answers the question</p>

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<p><b>B. Conducting Investigations</b></p> <p>4 Makes at least three observations directly related to the investigation using both qualitative (descriptions of observations using five senses) and quantitative observations (information gathered from counts of measurements)</p> <p>3 Makes observations directly related to the investigation using either qualitative or quantitative observations</p> <p>2 Makes observations with teacher support</p> <p>1 Makes observations not directly related to the investigation</p>	<p><b>B. Planning and Conducting an Investigation</b></p> <p>4 Plans and conducts a replicable investigation that has logical steps; may make logical amendments to the investigation</p> <p>3 Plans and conducts a replicable investigation with few logic errors; may make changes which are not logical to the investigation</p> <p>2 Plans and conducts an investigation with considerable teacher guidance</p> <p>1 Uses teacher-provided investigation</p>	<p><b>B. Designing and Conducting a Scientific Investigation</b></p> <p>4 Identifies what variable is controlled and what variables are manipulated; design of investigation is sequential and logical to the hypothesis; experimental design requires minimal teacher guidance</p> <p>3 Identifies what variable is controlled and what variables are manipulated; design of investigation is sequential and logical; experimental design requires minimal teacher intervention</p> <p>2 Flaws are evident in identifying variables; design of investigation contains minor flaws; some teacher intervention is necessary</p> <p>1 Little attempt is made to control and manipulate variables; design of investigation contains major flaws in sequence and logic; extensive teacher intervention is necessary</p>	<p><b>B. Designing and Conducting Scientific Investigations</b></p> <p>4 Designs and conducts a scientific investigation related directly to the hypothesis; steps are logical and sequential; variables and constants are identified and managed objectively; repeated trials are sufficient to validate results</p> <p>3 Designs and conducts a scientific investigation related directly to the hypothesis; steps contain minor inaccuracies in logic and/or sequence; minor inaccuracies in identifying and managing variables and constants do not significantly affect overall results; evidence of repeated trials</p> <p>2 Relationship between the hypothesis and the scientific investigation lacks clarity; steps are missing and/or difficult to follow; variables and constants are not properly identified and/or mismanaged and detract from results; trials are insufficient to test hypothesis</p> <p>1 Designs and conducts a scientific investigation unrelated to the hypothesis; steps are not logical, not sequential, and/or are vague; variables and constants are missing; no repeated trials</p>

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<p><b>C. Using Tools to Extend the Senses</b></p> <p>4 Selects and correctly uses appropriate tools independently</p> <p>3 Selects and uses tools appropriately with minimal assistance</p> <p>2 Selects appropriate tools with some assistance but may make mistakes in their use</p> <p>1 Unable to correctly select and use tools</p>	<p><b>C. Using Simple Equipment and Tools to Gather Data and Extend the Senses</b></p> <p>4 <u>Consistently</u> chooses appropriate tools/equipment and <u>consistently</u> uses them correctly and accurately</p> <p>3 <u>Usually</u> chooses appropriate tools/equipment and <u>usually</u> uses them correctly and accurately</p> <p>2 <u>Sometimes</u> chooses appropriate tools/equipment and <u>sometimes</u> uses them correctly and accurately</p> <p>1 <u>Seldom</u> chooses appropriate tools/equipment and <u>seldom</u> uses them correctly and accurately</p>	<p><b>C. Using Appropriate Tools and Techniques to Collect and Record Data</b></p> <p>4 Collects and records data which is complete, accurate, and objective; uses appropriate equipment and techniques; requires minimal teacher guidance</p> <p>3 Collects and records complete and objective data; uses appropriate equipment and techniques; requires minimal teacher intervention</p> <p>2 Collects and records objective data; incorrectly uses equipment and techniques; requires some teacher intervention</p> <p>1 Collects and records invalid data; uses inappropriate equipment and techniques; data collected contains inaccuracies in measurement which alter the results; required extensive teacher intervention or guidance</p>	<p><b>C. Using Appropriate Tools and Techniques to Collect and Record Data</b></p> <p>4 Selects and safely uses lab equipment; effectively chooses/uses appropriate technology and mathematical concepts; data is collected and recorded in a systematic, accurate, and objective manner</p> <p>3 Selects and safely uses lab equipment; generally chooses/uses appropriate technology and mathematical concepts; minor inaccuracies and some subjectivity in data collection; some inconsistencies present in recording data</p> <p>2 Incorrectly uses equipment and techniques; some unsafe practices are evident; ineffective use of technology and mathematical concepts; errors present in collected data</p> <p>1 Selects inappropriate equipment and techniques; does not employ safety when using lab equipment, ineffective use of technology and mathematical concepts; significant errors or gaps in collected data</p>

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<p><b>D. Develop Reasonable Explanations to Explain Observations</b></p> <p>Not developmentally appropriate</p>	<p><b>D. Using Data to Develop a Reasonable Explanation to Answer the Question Being Investigated</b></p> <p>4 Consistently records and organizes data in a logical manner and develops a reasonable explanation based on collected data and/or facts from reliable scientific sources</p> <p>3 Usually records and organizes data in a logical manner and develops a reasonable explanation based on collected data and/or facts from reliable scientific sources</p> <p>2 Records of and organization of data is incomplete/inaccurate and explanation may be logical but reflects incomplete/inaccurate data or scientific information</p> <p>1 Records of and organization of data is missing and explanation, if present, is illogical</p>	<p><b>D. Using Evidence to Develop Explanations and Describe Relationships between Evidence and Explanation</b></p> <p>4 Data is analyzed objectively; students draw logical inferences based on observed patterns and relationships; inferences lead to questions for future investigations</p> <p>3 Students draw inferences based on relationships, perceived patterns, or previously held ideas</p> <p>2 Students draw faulty inferences based on patterns or previously held ideas</p> <p>1 Students are unable to draw inferences (interpretation of an observation)</p>	<p><b>D. Formulating and Revising Scientific Explanations and Models Using Logic and Evidence</b></p> <p>4 Explanations/models reflect evidence from investigation and are based on accurate science; uses results to verify or refute the hypothesis; formulates possible revisions and alternative explanations</p> <p>3 Explanations/models partially reflect evidence from investigation and are based on accurate science; uses results to verify or refute the hypothesis; formulates possible revisions</p> <p>2 Explanations/models are based on flawed analysis of data and misconceptions of science; formulates limited revisions</p> <p>1 Explanations/models are not based on analysis of data or accurate science; data which refutes the hypothesis is discounted; connections are not present between results and hypothesis; no evidence of possible revision and alternative explanations</p>

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<p><b>E. Sharing Findings with Classmates, Teacher, Family, or Community Members</b></p> <p>4 Describes and compares things in terms of characteristics (e.g., number, shape, texture, size, weight, color), relative order (e.g., before/middle/after, top/bottom), and motion (e.g., fast/slow, straight/curved); draws pictures that correctly portray most features of the thing being described</p> <p>3 Describes and compares things in terms of characteristics, relative order, or motion; draws pictures that correctly portray some features of the thing being described</p> <p>2 Describes things in terms of characteristics; draws pictures that illustrate some features of the thing being described</p> <p>1 Describes things in terms of characteristics</p>	<p><b>E. Communicating Procedures, Results, and Explanations of an Investigation</b></p> <p>4 Writes precise instructions that others can follow in carrying out procedures; makes detailed sketches to aid an explaining procedures or ideas; uses qualitative and quantitative data to describe and compare objects and events</p> <p>3 Writes instructions that others can follow in carrying out procedures; makes sketches to aid in explaining procedures or ideas; uses qualitative data to describe and compare objects and events</p> <p>2 Writes incomplete instructions; draws inaccurate sketches; ignores data when describing objects and events</p> <p>1 Writes inaccurate instructions; does not use sketches; communicates incomplete and inaccurate descriptions of objects and events</p>	<p><b>E. Communicating Procedures, Results, and Explanations of a Scientific Investigation</b></p> <p>4 Scientific information is communicated clearly and precisely but may also include inventive/expressive dimensions; presentation is effectively focused and organized (e.g., using tables, models, texts, figures); a variety of media enhance communication</p> <p>3 Scientific information is communicated clearly; presentation is focused and organized; medium facilitates communication</p> <p>2 Scientific information has some clarity; presentation has some focus and organization; medium permits communication</p> <p>1 Scientific information is unclear; presentation lacks focus and organization; medium hinders communication</p>	<p><b>E. Communicating and Defending a Scientific Argument</b></p> <p>4 Methods and procedures are clearly and accurately represented to allow replication of the investigation and enhance opportunities for further investigation; arguments and responses to critical comments are logical and effectively demonstrate understanding of relationships between the investigation and accurate science</p> <p>3 Methods and procedures are generally accurate to allow replication of the investigation and support the opportunity for further investigation; arguments and responses to critical comments contain some flaws in logic but generally demonstrate the connections between the investigation and accurate science</p> <p>2 Methods and procedures are unclear or represented inaccurately; arguments and responses to critical comments as well as the connections between the investigation and accurate scientific knowledge are flawed</p> <p>1 Methods and procedures are unclear and inaccurately represented; arguments and responses to critical comments as well as the connections between the investigation and accurate scientific knowledge are missing</p>
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