

AIMS Item Specifications
HS Grade Science

STRAND	1: Inquiry Process
CONCEPT	1: Observations, Questions, and Hypotheses
PO	1. Evaluate scientific information for relevance to a given problem. (See R09-S3C1, R10-S3C1, R11-S3C1, and R12-S3C1)
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> • Evaluate scientific information for relevance to a given question.. • determining relevance or irrelevance of any piece of information to a given hypothesis or toward the development of a hypothesis. • evaluating scientific information in the form of a data set from an experiment. The data can be in a table, a chart or a graph.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Given the information below, which of the following is a reasonable hypothesis?	
Given an experimental setup, determine which hypothesis was being investigated.	

STRAND	1: Inquiry Process
CONCEPT	1: Observations, Questions, and Hypotheses
PO	2. Develop questions from observations that transition into testable hypotheses.
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> • evaluating data to generate a relevant question • Distinguish between testable and non-testable questions
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	1: Inquiry Process
CONCEPT	1: Observations, Questions, and Hypotheses
PO	3. Formulate a testable hypothesis.
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> • knowing the difference between a testable question and a hypothesis. • identifying an appropriate hypothesis from a testable question,: • A hypothesis by definition is testable.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

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STRAND	1: Inquiry Process
CONCEPT	1: Observations, Questions, and Hypotheses
PO	4. Predict the outcome of an investigation based on prior evidence, probability, and/or modeling (not guessing or inferring).
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> • developing a reasonable prediction based on the extrapolation of past patterns into future conditions. • predicting the logical outcome of an experimental set up.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	1: Inquiry Process
CONCEPT	2: Scientific Testing (Investigating and Modeling)
PO	1. Demonstrate safe and ethical procedures (e.g., use and care of technology, materials, organisms) and behavior in all science inquiry.
PO CLARIFICATION	At this grade level, this PO is assessed as evaluating the ethical aspects of experiments, correlational data, and scientific studies involving humans or other animals. Need to also include safety (materials, equipment, procedures, etc.) In addition to socially ethical aspects, should also include scientifically ethical aspects, such as reporting all data, care of laboratory animals, proper disposal of chemicals/lab waste, etc.)
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.

A science class is studying tadpoles. Which of these is the best way to house the tadpoles in a classroom?

- A** art of ziplock bag
- B** art of a shallow cup
- C** art of a deep container with a vented cover
- D** art of a deep container with a closed cover

Note: Not just for controlled Experiments. Inference correlation

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STRAND	1: Inquiry Process
CONCEPT	2: Scientific Testing (Investigating and Modeling)
PO	2. Identify the resources needed to conduct an investigation.
PO CLARIFICATION	At this grade level, this PO is assessed as identifying resources, including research information; prior studies; and scientific apparatus, such as weather instruments, microscopes, triple beam balances, funnels, magnets, hot plates, beakers, graduated cylinders, and other common lab instruments.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	1: Inquiry Process
CONCEPT	2: Scientific Testing (Investigating and Modeling)
PO	3. Design an appropriate protocol (written plan of action) for testing a hypothesis: <ul style="list-style-type: none"> • Identify dependent and independent variables in a controlled investigation. • Determine an appropriate method for data collection (e.g., using balances, thermometers, microscopes, spectrophotometer, using qualitative changes). • Determine an appropriate method for recording data (e.g., notes, sketches, photographs, videos, journals (logs), charts, computers/calculators).
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> • evaluating whether a given experimental protocol is appropriate (protocol not limited to conducting controlled experiments; correlational and circumstantial evidence also acceptable). • identifying appropriate instruments to perform certain tasks. • determining the correct method of performing certain tasks.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Describe an experiment. Which of these is the dependent variable in this experiment?	

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STRAND	1: Inquiry Process
CONCEPT	2: Scientific Testing (Investigating and Modeling)
PO	4. Conduct a scientific investigation that is based on a research design.
PO CLARIFICATION	No P.O. clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	1: Inquiry Process
CONCEPT	2: Scientific Testing (Investigating and Modeling)
PO	5. Record observations, notes, sketches, questions, and ideas using tools such as journals, charts, graphs, and computers.
PO CLARIFICATION	No P.O. clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	1: Inquiry Process
CONCEPT	3: Analysis, Conclusions, and Refinements
PO	1. Interpret data that show a variety of possible relationships between variables, including: <ul style="list-style-type: none"> • positive relationship • negative relationship • no relationship
PO CLARIFICATION	At this grade level, this PO is assessed as analyzing data table or a graphical model such as a scatter plot, bar graph, line graph or a contingency table to identify the relationship of variables. The relationships between the variables may be strong or weak.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
<p>The graph below shows how the number of deer in a particular state park varied as the number of wolves in the park increased.</p> <p>[graph]</p>	

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STRAND	1: Inquiry Process
CONCEPT	3: Analysis, Conclusions, and Refinements
PO	2. Evaluate whether investigational data support or do not support the proposed hypothesis.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Describe 4 different scenarios. Which of the following would support Joe's hypothesis?	

STRAND	1: Inquiry Process
CONCEPT	3: Analysis, Conclusions, and Refinements
PO	3. Critique reports of scientific studies (e.g., published papers, student reports).
PO CLARIFICATION	This is currently classroom assessment only. This PO is assessed as critiquing reports of scientific studies from published papers/journal articles, newspaper articles, and/or student reports. <ul style="list-style-type: none"> • Critique experimental design – sample size, number of replications, appropriateness of materials and procedures • Critique whether data was appropriately displayed and/or analyzed • Critique conclusions and whether the data support the conclusions.
SAMPLE MC ITEM	This is currently classroom assessment only.

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STRAND	1: Inquiry Process
CONCEPT	3: Analysis, Conclusions, and Refinements
PO	4. Evaluate the design of an investigation to identify possible sources of procedural error, including: <ul style="list-style-type: none"> • sample size • trials • controls • analyses
PO CLARIFICATION	At this grade level, this PO is assessed as evaluating descriptions of experimental design or procedures.
SAMPLE MC ITEM	Joe is studying factors that affect seed growth. He wants to test whether soaking seeds in water affects the sprouting process. Which should Joe measure to get the MOST useful results? A. Growth of 100 soaked seeds at a given temperature B. Growth of 100 regular seeds at different temperatures C. Growth of 50 soaked and 50 regular seeds at a given temperature D. Growth of 50 soaked and 50 regular seeds at different temperatures
<p>Was there a control? What was the control? Was the control appropriate? How many trials / was the number of trials sufficient? What was the sample size and was it appropriate? Is it practical to increase the sample size?</p>	

STRAND	1: Inquiry Process
CONCEPT	3: Analysis, Conclusions, and Refinements
PO	5. Design models (conceptual or physical) of the following to represent "real world" scenarios: <ul style="list-style-type: none"> • carbon cycle • water cycle • phase change • collisions
PO CLARIFICATION	No P.O. clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

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STRAND	1: Inquiry Process
CONCEPT	3: Analysis, Conclusions, and Refinements
PO	6. Use descriptive statistics to analyze data, including: <ul style="list-style-type: none"> • mean • frequency • range (See MHS-S2C1-10)
PO CLARIFICATION	Use of calculators not allowed.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	1: Inquiry Process
CONCEPT	3: Analysis, Conclusions, and Refinements
PO	7. Propose further investigations based on the findings of a conducted investigation.
PO CLARIFICATION	<ul style="list-style-type: none"> • No clarification needed.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	1: Inquiry Process
CONCEPT	4: Communication
PO	1. For a specific investigation, choose an appropriate method for communicating the results. (See W09-S3C2-01 and W10-S3C3-01)
PO CLARIFICATION	At this grade level, this PO is assessed as determining the most appropriate table, graph, or chart to show quantitative data and determining the most appropriate way to communicate qualitative data.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Look at the data below. [Data Table] Which of these types of graphs should be used to represent the above data?	

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STRAND	1: Inquiry Process
CONCEPT	4: Communication
PO	2. Produce graphs that communicate data. (See MHS-S2C1-02)
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> • providing an appropriate title and/or legend for a graph. • labeling the axes of graphs, including proper units as needed. • Proper placement of independent and dependent variables.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	1: Inquiry Process
CONCEPT	4: Communication
PO	3. Communicate results clearly and logically.
PO CLARIFICATION	No P.O. clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	1: Inquiry Process
CONCEPT	4: Communication
PO	4. Support conclusions with logical scientific arguments.
PO CLARIFICATION	No P.O. clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

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STRAND	2: History and Nature of Science
CONCEPT	1: History of Science as a Human Endeavor
PO	1. Describe how human curiosity and needs have influenced science, impacting the quality of life worldwide.
PO CLARIFICATION	No P.O. clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	2: History and Nature of Science
CONCEPT	1: History of Science as a Human Endeavor
PO	2. Describe how diverse people and/or cultures, past and present, have made important contributions to scientific innovations.
PO CLARIFICATION	No P.O. clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	2: History and Nature of Science
CONCEPT	1: History of Science as a Human Endeavor
PO	3. Analyze how specific changes in science have affected society.
PO CLARIFICATION	At this grade level, this PO is assessed as explaining the impact of scientific discoveries and inventions on society.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science), including context from discoveries such as the discovery of penicillin, X-rays, microscopes, vaccinations, natural selection, aseptic procedures, refrigeration, the discovery of the structure of DNA, pasteurization, etc. <u>Please note: This is not an all-inclusive list.</u>

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STRAND	2: History and Nature of Science
CONCEPT	1: History of Science as a Human Endeavor
PO	4. Analyze how specific cultural and/or societal issues promote or hinder scientific advancements.
PO CLARIFICATION	No clarification is needed.
SAMPLE MC ITEM	<p>Items for this PO should relate to Concepts from Strand 4 (Life Science), including stem cell research, study of evolution, treatments used for HIV/AIDS patients, cloning, genetic engineering of crops, use of hormones to promote growth such as recombinant growth hormone, use of pesticides and fertilizers, biochemical weapons, etc. <u>Please note: This is not an all-inclusive list.</u></p> <p>There are several ways to approach this PO other than the suggested sample(s) presented here.</p>
<p>Which of these describes a concern people might have of using genetically engineered crops? CR- Genetically engineered crops may contain new toxins which are harmful to humans. Good luck!</p>	

STRAND	2: History and Nature of Science
CONCEPT	2: Nature of Scientific Knowledge
PO	<p>1. Specify the requirements of a valid, scientific explanation (theory), including that it be:</p> <ul style="list-style-type: none"> • logical • subject to peer review • public • respectful of rules of evidence
PO CLARIFICATION	<ul style="list-style-type: none"> • At this grade level, this PO is assessed as identifying the requirements necessary for an explanation to be considered a scientific theory as opposed to a popular or private “theory” (explanation). This PO is addressing the misuse of the popular definition of <i>theory</i> in a scientific context.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

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STRAND	2: History and Nature of Science
CONCEPT	2: Nature of Scientific Knowledge
PO	2. Explain the process by which accepted ideas are challenged or extended by scientific innovation.
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> • explaining what happens when accepted ideas are challenged. • evaluating how the public views new information. • evaluating the social aspects of ideas. • given two hypotheses that each explain a particular process, deciding which hypothesis is supported.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science), including context such as gradualism versus punctuated equilibrium, alternative medicine, medicinal leeches and maggots in medicine, antibiotics and vaccinations, genetic engineering, chemicals in agriculture, etc. <u>Please note: This is not an all-inclusive list.</u>

STRAND	2: History and Nature of Science
CONCEPT	2: Nature of Scientific Knowledge
PO	3. Distinguish between pure and applied science.
PO CLARIFICATION	This PO is assessed as students understanding the difference between applied and pure science. They also need to know that research without immediate or obvious application is still valuable research because it may eventually lead to applications or may eventually provide background or supporting evidence for future research (either basic or applied research).
SAMPLE MC ITEM	This is currently classroom assessment only.

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STRAND	2: History and Nature of Science
CONCEPT	2: Nature of Scientific Knowledge
PO	4. Describe how scientists continue to investigate and critically analyze aspects of theories.
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> targeting the difference in the way scientists think, versus the way in which general public evaluate theories and discoveries. evaluating different components of a theory, realizing that the components of a theory can be debated or revised without discarding the entire theory.
CONTENT LIMITS	Use content from Strand 4 of the HS Science Standard, including context such as gradualism versus punctuated equilibrium, evolution, genetic engineering and fingerprinting, germ theory, Mendel’s theory of genetics and the work of Barbara McClintock, and spontaneous generation.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science), including context such as gradualism versus punctuated equilibrium, evolution, genetic engineering and fingerprinting, germ theory, Mendel’s theory of genetics and the work of Barbara McClintock, spontaneous generation, etc. <u>Please note: This is not an all-inclusive list.</u>

STRAND	3: Science in Personal and Social Perspectives
CONCEPT	1: Changes in Environments
PO	1. Evaluate how the processes of natural ecosystems affect, and are affected by, humans.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Which of these describes how the release of CO ₂ from burning fossil fuels will affect the atmosphere?	

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STRAND	3: Science in Personal and Social Perspectives
CONCEPT	1: Changes in Environments
PO	2. Describe the environmental effects of the following natural and/or human-caused hazards: <ul style="list-style-type: none"> • flooding • drought • earthquakes • fires • pollution • extreme weather
PO CLARIFICATION	Extreme weather should include tornado and hurricane.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Which of these describes how forest fires lead to landslides?	

STRAND	3: Science in Personal and Social Perspectives
CONCEPT	1: Changes in Environments
PO	3. Assess how human activities (e.g., clear cutting, water management, tree thinning) can affect the potential for hazards.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

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STRAND	3: Science in Personal and Social Perspectives
CONCEPT	1: Changes in Environments
PO	4. Evaluate the following factors that affect the quality of the environment: <ul style="list-style-type: none"> • urban development – smog/noise, pollution • smoke • volcanic dust
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	3: Science in Personal and Social Perspectives
CONCEPT	1: Changes in Environments
PO	5. Evaluate the effectiveness of conservation practices and preservation techniques on environmental quality and biodiversity.
PO CLARIFICATION	At this grade level, this PO is assessed as focusing on conservation of renewable and non-renewable natural resources, and methods of preserving the integrity of habitats.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Which of these would be most disruptive to a population of Tree Swallow birds that nests in cavities found on maple trees?	

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STRAND	3: Science in Personal and Social Perspectives
CONCEPT	2: Science and Technology in Society
PO	1. Analyze the costs, benefits, and risks of various ways of dealing with the following needs or problems: <ul style="list-style-type: none"> • various forms of alternative energy • storage of nuclear waste • abandoned mines • greenhouse gases • hazardous wastes
PO CLARIFICATION	No clarification needed.
CONTENT LIMITS	Use content from Strand 4 of the HS Science Standard, including the following forms of alternative energy: wind, water, solar energy, biofuels, and methane.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science), including the following forms of alternative energy: wind, water, solar energy, biofuels, methane, etc. <u>Please note: This is not an all-inclusive list.</u>

STRAND	3: Science in Personal and Social Perspectives
CONCEPT	2: Science and Technology in Society
PO	2. Recognize the importance of basing arguments on a thorough understanding of the core concepts and principles of science and technology.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	3: Science in Personal and Social Perspectives
CONCEPT	2: Science and Technology in Society
PO	3. Support a position on a science or technology issue.
PO CLARIFICATION	At this grade level, this PO is assessed as given a scenario (descriptive or data), evaluating which pieces of evidence support or contradict an issue.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science), including biogenetics in plants, cloning, medical testing, agricultural practices, etc. <u>Please note: This is not an all-inclusive list.</u>

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STRAND	3: Science in Personal and Social Perspectives
CONCEPT	2: Science and Technology in Society
PO	4. Analyze the use of renewable and nonrenewable resources in Arizona: <ul style="list-style-type: none"> • water • land • soil • minerals • air
PO CLARIFICATION	At this grade level, this PO is assessed as: analyzing the impact of obtaining, using, and disposing of these resources on the environment and society.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	3: Science in Personal and Social Perspectives
CONCEPT	2: Science and Technology in Society
PO	5. Evaluate methods used to manage natural resources (e.g., reintroduction of wildlife, fire ecology).
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	3: Science in Personal and Social Perspectives
CONCEPT	3: Human Population Characteristics
PO	1. Analyze social factors that limit the growth of a human population, including: <ul style="list-style-type: none"> • affluence • education • access to health care • cultural influences
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

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STRAND	3: Science in Personal and Social Perspectives
CONCEPT	3: Human Population Characteristics
PO	2. Describe biotic (living) and abiotic (nonliving) factors that affect human populations.
PO CLARIFICATION	Assess as part of 3.3.3.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	3: Science in Personal and Social Perspectives
CONCEPT	3: Human Population Characteristics
PO	3. Predict the effect of a change in a specific factor on a human population.
PO CLARIFICATION	<ul style="list-style-type: none"> • At this grade level, this PO is assessed as describing the effect of biotic and abiotic factors on human populations (e.g. birthrate and mortality, population density, disease, natural disasters). . • Include assessment of 3.3.2 here with 3.3.3
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4: Life Science
CONCEPT	1: The Cell
PO	1. Describe the role of energy in cellular growth, development, and repair.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

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STRAND	4: Life Science
CONCEPT	1: The Cell
PO	2. Compare the form and function of prokaryotic and eukaryotic cells and their cellular components.
PO CLARIFICATION	At this grade level, this PO is assessed as comparing and contrasting the basic differences among plant cells, animal cells, and bacterial cells.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4: Life Science
CONCEPT	1: The Cell
PO	3. Explain the importance of water to cells.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	This is currently classroom assessment only.

STRAND	4: Life Science
CONCEPT	1: The Cell
PO	4. Analyze mechanisms of transport of materials (e.g., water, ions, macromolecules) into and out of cells: <ul style="list-style-type: none"> • passive transport • active transport
PO CLARIFICATION	At this grade level, this PO is assessed as testing the difference between passive and active transport ..
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
A raisin put into a cup of water. Which of these correctly describes the movement of water molecules?	

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STRAND	4: Life Science
CONCEPT	1: The Cell
PO	5. Describe the purposes and processes of cellular reproduction.
PO CLARIFICATION	At this grade level, this PO is assessed as describing: <ul style="list-style-type: none"> • the advantages and disadvantages of sexual (meiosis and fertilization) versus asexual (budding, mitosis) reproduction. • the purpose and outcome of mitosis • the purpose and outcome of meiosis.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Which of these describes the product of meiosis?	

STRAND	4: Life Science
CONCEPT	2: Molecular Basis of Heredity
PO	1. Analyze the relationships among nucleic acids (DNA, RNA), genes, and chromosomes.
PO CLARIFICATION	At this grade level, this PO is assessed as analyzing the relationship between <ul style="list-style-type: none"> • chromosomes, genes, and DNA • DNA and RNA
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4: Life Science
CONCEPT	2: Molecular Basis of Heredity
PO	2. Describe the molecular basis of heredity, in viruses and living things, including DNA replication and protein synthesis.
PO CLARIFICATION	At this grade level, this PO is assessed as describing: <ul style="list-style-type: none"> • DNA RNA protein. • Nucleic acids form and function (i.e. Adenine, Thymine, Cytosine, Guanine, Uracil) • viruses work as intracellular parasites.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
Given this sequence of DNA, what would be the complementary sequence?	

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STRAND	4: Life Science
CONCEPT	2: Molecular Basis of Heredity
PO	3. Explain how genotypic variation occurs and results in phenotypic diversity.
PO CLARIFICATION	At this grade level, this PO is assessed as explaining: <ul style="list-style-type: none"> • Mendelian genetics - Punnett squares, monohybrid cross, genotypes and phenotypes, dominant, recessive, homozygous and heterozygous. • how mutation gives rise to variation. • Assess 4.2.4 here with 4.2.3
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4. Life Science
CONCEPT	2. Molecular Basis of Heredity
PO	4. Describe how meiosis and fertilization maintain genetic variation.
PO CLARIFICATION	Assessed as part of 4.2.3.
SAMPLE MC ITEM	

STRAND	4: Life Science
CONCEPT	3: Interdependence of Organisms
PO	1. Identify the relationships among organisms within populations, communities, ecosystems, and biomes.
PO CLARIFICATION	At this grade level, this PO is assessed as identifying relationships regarding: <ul style="list-style-type: none"> • predator and prey (carnivores, herbivore, omnivore) • niches • biomass • ecosystems and diversity. • succession and competitive exclusion. <p>Also assessed as identifying abiotic factors affecting ecosystems – geographical features, temperature, water, etc. Assess 4.3.2 here with 4.3.1</p>
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

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STRAND	4: Life Science
CONCEPT	3: Interdependence of Organisms
PO	2. Describe how organisms are influenced by a particular combination of biotic (living) and abiotic (nonliving) factors in an environment.
PO CLARIFICATION	Assessed as part of 4.3.1.
SAMPLE MC ITEM	

STRAND	4: Life Science
CONCEPT	3: Interdependence of Organisms
PO	3. Assess how the size and the rate of growth of a population are determined by birth rate, death rate, immigration, emigration, and carrying capacity of the environment.
PO CLARIFICATION	At this grade level, this PO is assessed as focusing on the populations of all living organisms. The effect on one population on another occupying the same habitat can also be tested (e.g., predator/prey, producer/consumer, and host/parasite interactions).
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
The graph below shows the number of lynx and snowshoe hare in a particular state park. Which of these describes what would happen when the number of snowshoe hares suddenly increases?	

STRAND	4: Life Science
CONCEPT	4: Biological Evolution
PO	1. Identify the following components of natural selection, which can lead to speciation: <ul style="list-style-type: none"> • potential for a species to increase its numbers • genetic variability and inheritance of offspring due to mutation and recombination of genes • finite supply of resources required for life • selection by the environment of those offspring better able to survive and produce offspring
PO CLARIFICATION	Bulleted items are Darwin's Four Tenets of Natural Selection
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

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STRAND	4: Life Science
CONCEPT	4: Biological Evolution
PO	2. Explain how genotypic and phenotypic variation can result in adaptations that influence an organism's success in an environment.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4: Life Science
CONCEPT	4: Biological Evolution
PO	3. Describe how the continuing operation of natural selection underlies a population's ability to adapt to changes in the environment and leads to biodiversity and the origin of new species.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4: Life Science
CONCEPT	4: Biological Evolution
PO	4. Predict how a change in an environmental factor (e.g., rainfall, habitat loss, non-native species) can affect the number and diversity of species in an ecosystem.
PO CLARIFICATION	At this grade level, this PO is assessed as predicting how changes in habitats can lead to a change in biodiversity and could result in the extinction of certain organisms.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

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HS Grade Science

STRAND	4: Life Science
CONCEPT	4: Biological Evolution
PO	5. Analyze how patterns in the fossil record, nuclear chemistry, geology, molecular biology, and geographical distribution give support to the theory of organic evolution through natural selection over billions of years and the resulting present day biodiversity.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4: Life Science
CONCEPT	4: Biological Evolution
PO	6. Analyze, using a biological classification system (i.e., cladistics, phylogeny, morphology, DNA analysis), the degree of relatedness among various species.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4: Life Science
CONCEPT	5: Matter, Energy, and Organization in Living Systems (Including Human Systems)
PO	1. Compare the processes of photosynthesis and cellular respiration in terms of energy flow, reactants, and products.
PO CLARIFICATION	At this grade level, this PO is assessed as: <ul style="list-style-type: none"> • word equations for photosynthesis and respiration. • complementary nature of photosynthesis and respiration. • chloroplasts contain chlorophyll • aerobic and anaerobic respiration. • differentiating between matter (CO₂, water) and energy (light) in photosynthesis.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

AIMS Item Specifications

HS Grade Science

STRAND	4: Life Science
CONCEPT	5: Matter, Energy, and Organization in Living Systems (Including Human Systems)
PO	2. Describe the role of organic and inorganic chemicals (e.g., carbohydrates, proteins, lipids, nucleic acids, water, ATP) important to living things.
PO CLARIFICATION	No clarification needed.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).

STRAND	4: Life Science
CONCEPT	5: Matter, Energy, and Organization in Living Systems (Including Human Systems)
PO	3. Diagram the following biogeochemical cycles in an ecosystem: <ul style="list-style-type: none"> • water • carbon • nitrogen
PO CLARIFICATION	At this grade level, this PO is assessed as linking the biogeochemical cycles to the organisms in an ecosystem.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
<p>The diagram below shows the carbon cycle. Which of these correctly lists how the carbon molecules pass from the atmosphere to the animals? CR- Carbon dioxide plants animal</p>	

STRAND	4: Life Science
CONCEPT	5: Matter, Energy, and Organization in Living Systems (Including Human Systems)
PO	4. Diagram the energy flow in an ecosystem through a food chain.
PO CLARIFICATION	At this grade level, this PO is assessed as energy flow in an ecosystem, energy pyramids, and 10% rule.
SAMPLE MC ITEM	There are several ways to approach this PO other than the suggested sample(s) presented here.
<p>Which of the following diagrams correctly shows the flow of energy in an ecosystem?</p>	

AIMS Item Specifications
HS Grade Science

STRAND	4: Life Science
CONCEPT	5: Matter, Energy, and Organization in Living Systems (Including Human Systems)
PO	5. Describe the levels of organization of living things from cells, through tissues, organs, organ systems, organisms, populations, and communities to ecosystems.
PO CLARIFICATION	<ul style="list-style-type: none">• No clarification needed.
SAMPLE MC ITEM	No sample item is available for this PO. Items for this PO should relate to Concepts from Strand 4 (Life Science).