***Uncovering Student Ideas* Probe Collections- High School\***

**LIFE SCIENCE**

**LS1.A Structure and Function**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Is It Living? | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Concept of living |
| Is It Made of Cells? | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Cells |
| Human Body Basics | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Cells, levels of organization |
| Functions of Living Things | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Life processes |
| Whale and Shrew | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Cells, cell size |
| Cells and Size | [*Uncovering Student Ideas in Science- Vol. 3*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume3) | Cells, cell size |
| Respiration | [*Uncovering Student Ideas in Science- Vol. 3*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume3) | Cellular respiration |
| Digestive System | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Digestive system, cells, food |
| Cucumber Seeds | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Concept of living |
| Atoms and Cells | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Cells, atoms |
| Light and Dark | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Photosynthesis, respiration |
| Human Excretory System | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Excretory system, waste products |
| The Virus Debate | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Concept of living |
| Which One Will Dry Out Last? | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Cells, volume, surface area, diffusion |
| Chlorophyll | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Plant cells, chlorophyll |
| DNA, Genes, and Chromosomes | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | DNA, genes, chromosomes |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS1.B Growth and Development of Organisms**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Sam’s Puppy | [*Uncovering Student Ideas in Science- Vol. 3*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume3) | Growth, cell division |
| Eggs | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Sexual reproduction, egg |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS1.C Organization for Matter and Energy Flow in Organisms**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Is It Food for Plants? | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Biological concept of food, sugar, photosynthesis |
| Sequoia Tree | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Transformation of matter, growth, photosynthesis, carbon |
| Is It Food? | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Biological concept of food |
| Chicken Eggs | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Food, transformation of matter, respiration |
| Digestive System | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Food, digestion, cells, energy |
| Food for Corn | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Biological concept of food, photosynthesis, sugar |
| Light and Dark | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Photosynthesis, respiration |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS2.A Interdependent Relationships in Ecosystems**

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| --- | --- | --- |
| **Name of Probe** | **Source** | **Concepts addressed** |
| Habitat Change | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Interdependency, survival when resources are limited |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS2.B Cycles of Matter and Energy Transfer in Ecosystems**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Sequoia Tree | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Carbon cycling, photosynthesis |
| Earth’s Mass | [*Uncovering Student Ideas in Science- Vol. 3*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume3) | conservation of matter, cycling of matter |
| Ecosystem Cycles | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Matter cycling, energy flow |
| Food Chain Energy | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Flow of energy |
| Light and Dark | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Photosynthesis, respiration |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS2.C Ecosystem Dynamics, Functioning, and Resilience**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Habitat Change | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Effects of change on a population |
| Changing Environment | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | adaptation, ecosystem change |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS2.D Social Interactions and Group Behavior**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS3.A Inheritance of Traits**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Baby Mice | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Inheritance of traits |
| Eye Color | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | Genes, traits |
| DNA, Genes, and Chromosomes | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | DNA, genes, chromosomes |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS3.B Variation of Traits**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Baby Mice | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Variation, inheritance of traits |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS4.A Evidence of Common Ancestry and Diversity**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**LS4.B Natural Selection**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Habitat Change | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | survival of individuals born with certain traits |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023. | | |

**LS4.C Adaptation**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Adaptation | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | adaptation |
| Changing Environment | [*Uncovering Student Ideas in Life Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-lifescience-volume1) | adaptation, ecosystem change |
| Additional probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023. | | |

**EARTH AND SPACE SCIENCE**

**ESS1.A The Universe and Its Stars**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| How Far Away Is the Sun? | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Sun’s distance from Earth |
| Sunspots | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Sun surface features |
| What Are Stars Made of? | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Stars, composition of stars |
| What Happens to Stars When They Die? | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Life cycle of stars |
| Do Stars Change? | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Stellar evolution |
| Are We Made of Star Stuff? | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Stars, formation of the elements |
| Seeing into the Past | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Stars, speed of light |
| Expanding Universe | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Big Bang Theory |
| Is the Big Bang “Just a Theory”? | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Big Bang Theory |

**ESS1.B Earth and the Solar System**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| The Two R’s | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | rotation, revolution |
| How Do Planets Orbit the Sun? | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Planetary orbits |
| Where Do You Find Gravity? | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Gravity as a universal force |
| Gravity in Other Planetary Systems | [*Uncovering Student Ideas in Astronomy*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-astronomy) | Gravity |

**ESS1.C The History of Planet Earth**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| How Old Is Earth? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Age of the Earth |

**ESS2.A Earth Materials and Systems**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Mountain Age | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Weathering, uplift, landforms |
| What’s Beneath Us? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Earth’s crust |
| What Is the Inside of Earth Like? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Earth’s layers |

**ESS2.B Plate Tectonics and Large Scale System Interactions**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Mountain Top Fossil | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Plate movement, uplift, fossils, sea floor |
| Describing Earth’s Plates | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Tectonic plates |
| Where Do You Find Earth’s Plates? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Plate tectonics, continental crust, ocean basin crust |
| What Do You Know About Earthquakes and Volcanoes? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Earthquakes, volcanoes, plate tectonics |

**ESS2.C The Roles of Water in Earth’s Surface Processes**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Is It Erosion? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Weathering, erosion, deposition |
| Why Is the Ocean Salty? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Weathering and erosion, salinity |

**ESS2.D Weather and Climate**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Camping Trip | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | solar radiation, Earth’s albedo |
| Are They Talking About Weather or Climate? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Weather, climate |
| Global Warming | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Global warming, climate change |

**ESS2.E Biogeology**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Probes will be added to this DCI when *Uncovering Student Ideas in Life Science- Vol. 2* is released in 2023*.* | | |

**ESS3.A Natural Resources**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Groundwater | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | groundwater |
| What Is a Watershed? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | watershed |

**ESS3.B Natural Hazards**

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| --- | --- | --- |
| **Name of Probe** | **Source** | **Concepts addressed** |
| What Do You Know About Volcanoes and Earthquakes? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Volcanoes, earthquakes |

**ESS3.C Human Impacts on Earth Systems**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Is Natural Better? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | agriculture, natural resources, pollution |
| Acid Rain | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Acid rain, air pollution, human impact |
| What Is a Product’s Life Cycle | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Life cycle analysis |

**ESS3.D Global Climate Change**

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| --- | --- | --- |
| **Name of Probe** | **Source** | **Concepts addressed** |
| Global Warming | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Global warming, climate change |
| Greenhouse Effect | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Greenhouse gases, climate change |
| Does the Ocean Influence Our Weather or Climate? | [*Uncovering Student Ideas in Earth and Environmental Science*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-earth-and-environmental-science) | Ocean conveyer belt |

**PHYSICAL SCIENCE**

**PS1.A Structure and Properties of Matter**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Is It Matter? | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | concept of matter |
| Is It Made of Molecules? | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | molecules |
| Comparing Cubes | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Atoms, properties of matter |
| Turning the Dial | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Boiling point |
| Boiling Time and Temperature | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Boiling point |
| Freezing Point | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Freezing/melting point |
| Chemical Bonds | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Chemical bonds |
| Pennies | [*Uncovering Student Ideas in Science- Vol. 3*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume3) | Properties of atoms vs. properties of substances |
| Iron Bar | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Kinetic molecular theory, thermal expansion |
| Salt Crystals | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Arrangement of atoms, extended structures |
| What Do You Know About Atoms and Molecules? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Atoms, molecules |
| Atoms and Apples | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Relative size of atoms |
| What if You Could Remove All the Atoms? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Particle model of matter |
| Do They Have the Same Properties? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Macroscopic and microscopic properties |
| Are They the Same Substance? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Characteristic properties |
| Graphite and Diamonds | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Allotropes, isotropes |
| What Is a Substance? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Pure substances, elements, compounds |
| Neutral Atoms | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Atoms, protons, neutrons, electrons |

**PS1.B Chemical Reactions**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Rusty Nails | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Chemical reaction, oxidation |
| Seedlings in a Jar | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Chemical reaction in a living system |
| Burning Paper | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Chemical reaction, combustion, conservation of matter |
| Nails in a Jar | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Chemical reaction, oxidation, conservation of matter |
| Will It Form a New Substance? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | chemical reactions |
| What Is the Result of a Chemical Change? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | chemical reactions |
| What Happens to Atoms During a Chemical Reaction? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Chemical reactions, atoms |
| Does It Have New Properties? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | combining substances, properties, chemical change, physical change |
| Is It a Chemical Change? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Chemical change |

**PS1.C Nuclear Processes**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Are They Safe to Eat? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Radiation, radioactivity |
| Radish Seeds | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Radiation, radioactivity, effect on cells |

**PS2.A Forces and Motion**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Dropping Balls | [*Uncovering Student Ideas in Science- Vol. 3*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume3) | Newton’s 2nd Law, acceleration |
| Why Things Fall | [*Uncovering Student Ideas About Force and Motion*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-force-and-motion) | Newton’s 2nd Law |
| Pulling on a Spool | [*Uncovering Student Ideas About Force and Motion*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-force-and-motion) | Newton’s 2nd Law |
| Lifting Buckets | [*Uncovering Student Ideas About Force and Motion*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-force-and-motion) | Newton’s 2nd Law |
| Free Falling Objects | [*Uncovering Student Ideas About Force and Motion*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-force-and-motion) | Newton’s 2nd Law, freefall, acceleration |
| Roller Coaster Ride | [*Uncovering Student Ideas About Force and Motion*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-force-and-motion) | Acceleration |

**PS2.B Types of Interactions**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Apple on a Desk | [*Uncovering Student Ideas in Science- Vol. 3*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume3) | Gravity, normal force |
| Experiencing Gravity | [*Uncovering Student Ideas About Force and Motion*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-force-and-motion) | gravity, gravity as a universal force |
| Can It Be Electrically Charged? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Electric charge, conductors, insulators |
| What Happens When You Bring a Charged Balloon Near a Wall? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Electric charge, electric field |
| Conductors or Insulators? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Electrical conductors, insulators |
| Does the Example Provide Evidence? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | electrostatics |
| Where Can You Find Electric Charge? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Electric charge |
| Where Does the Charge Come From? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Electric charge |
| How Do You Think About the Flow of Electric Current Through a Circuit | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | current |
| What Happens When You Wrap a Magnet with Aluminum Foil? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, magnetic field |
| Does a Magnet Work without Air? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, magnetic field |
| How Would a Magnet Work on the Moon? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, magnetic field |
| What Happens When You Hold a Magnet Near a Refrigerator? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, magnetic field |
| What Happens When a Magnet Is Brought Near a Charged Ball? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, electrical interaction |
| What Makes It Stick? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic Interaction |
| How Can You Represent a Magnetic Field? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic field, model |
| How Can You Magnetize a Nail? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction |
| How Can You Make an Electromagnet? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, magnetic field |
| Does the Type of Wire Make a Difference? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, magnetic field |
| How Can You Make a Stronger Electromagnet? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, magnetic field |
| What Happens When You Bring a Compass Near a Current Carrying Wire? | [*Uncovering Student Ideas About Magnetism and Electricity*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-electricity-and-magnetism) | Magnetic interaction, magnetic field |

**PS3.A Definitions of Energy**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Warming Water | [*Uncovering Student Ideas in Science- Vol. 4*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume4) | Thermal energy |
| Describing Energy | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Concept of energy |
| Matter and Energy | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Concept of energy, comparing matter and energy |
| Hot Soup | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Thermal energy, heat, temperature |
| Which Has More Energy? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Temperature, thermal energy |

**PS3.B Conservation of Energy and Energy Transfer**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Mitten Problem | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Transfer of energy, heat, temperature, insulator |
| Objects and Temperature | [*Uncovering Student Ideas in Science- Vol. 1*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume1) | Thermal equilibrium, temperature |
| Ice Cold Lemonade | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Energy transfer from warm to cold, heat |
| Mixing Water | [*Uncovering Student Ideas in Science- Vol. 2*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-volume2) | Energy transfer, thermal equilibrium |
| Hot Soup | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Transfer of energy, conservation of energy, heat, temperature |
| Cold Spoons | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Transfer of energy, conductor, heat |
| How Can I Keep It Cold? | [Uncovering Student Ideas About Matter and Energy](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-physicalscience-matter-and-energy) | Transfer of energy, conductors, insulators |

**PS3.C Relationship Between Energy and Forces**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| No probes available yet for the grades 9-12 DCI. | | |

**PS3.D Energy in Chemical Processes and Everyday Life**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| No probes available yet for the grades 9-12 DCI. | | |

**ENGINEERING**

**ETS1.A Defining and Delimiting Engineering Problems**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| What’s the Problem? | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Defining a problem |
| Who Needs It? | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Who to consider when defining and delimiting a problem |
| Pizza Problem | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Researching a problem |
| Criteria and Constraints | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Criteria, constraints |
| Is It an Engineering Problem? | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Defining an engineering problem |

**ETS1.B Developing Possible Solutions**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| An Engineering Design Process | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Engineering Design Process (EDP) |
| How Do Engineers Solve Problems? | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Engineering Design Process (EDP) |
| Is It Affordable? | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Tradeoffs |
| Engineers’ Models | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Models used by engineers |
| What Is a Product’s Life Cycle | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Life cycle analysis |
| Picking the Best Solution | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Tradeoffs |

**ETS1.C Optimizing the Design Solution**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Testing for Success | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Testing solutions |
| Making It Better | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Optimizing, iteration |

**CONNECTIONS TO ENGINEERING, TECHNOLOGY, AND APPLICATIONS OF SCIENCE**

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| **Name of Probe** | **Source** | **Concepts addressed** |
| Is It a Technology? | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | technology |
| How Are Science and Engineering Similar? | [*Uncovering Student Ideas About Engineering and Technology*](https://www.uncoveringstudentideas.org/books/formative-assessment-probes/uncoveringstudentideas-engineering-and-technology) | Science, engineering |