

## MS-PS1-3 Matter and its Interactions

Students who demonstrate understanding can:

**MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.** [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] [Assessment Boundary: Assessment is limited to qualitative information.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

### Science and Engineering Practices

#### Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or now supported by evidence.

### Disciplinary Core Ideas

#### PS1.A: Structure and Properties of Matter

- Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.

#### PS1.B: Chemical Reactions

- Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.

### Crosscutting Concepts

#### Structure and Function

- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

#### Connections to Engineering, Technology, and Applications of Science

#### Interdependence of Science, Engineering, and Technology

- Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.

#### Influence of Science, Engineering and Technology on Society and the Natural World

- The uses of technologies and any limitation on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time.

### Observable features of the student performance by the end of the course:

1	Obtaining information
a	Students obtain information from published, grade-level appropriate material from at least two sources (e.g., text, media, visual displays, data) about: <ol style="list-style-type: none"> <li>Synthetic materials and the natural resources from which they are derived.</li> <li>Chemical processes used to create synthetic materials from natural resources (e.g., burning of limestone for the production of concrete).</li> <li>The societal need for the synthetic material (e.g., the need for concrete as a building material).</li> </ol>
2	Evaluating information
a	Students determine and describe whether the gathered information is relevant for determining: <ol style="list-style-type: none"> <li>That synthetic materials, via chemical reactions, come from natural resources.</li> <li>The effects of the production and use of synthetic resources on society.</li> </ol>
b	Students determine the credibility, accuracy, and possible bias of each source of information, including the ideas included and methods described.
c	Students synthesize information that is presented in various modes (e.g., graphs, diagrams, photographs, text, mathematical, verbal) to describe:

	i. How synthetic materials are formed, including the natural resources and chemical processes used.
	ii. The properties of the synthetic material(s) that make it different from the natural resource(s) from which it was derived.
	iii. How those physical and chemical properties contribute to the function of the synthetic material.
	iv. How the synthetic material satisfies a societal need or desire through the properties of its structure and function.
	v. The effects of making and using synthetic materials on natural resources and society.