Short Performance Assessment: **MS-PS1-3**

Grade Level: **Middle School**

Adapted from SNAP[1]

Title	**Natural vs. Synthetic Materials**		
Designed by Edited by	**John Mark Filcik - Colegio Nueva Granada** **Elizabeth Perez & Paul Andersen**	Course(s)	**Grade 7 Integrated NGSS**

Performance Expectation	**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.

Science and Engineering Practice	**Obtaining, Evaluating, and Communicating Information** • 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 Concept	**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.

Student Performance	1. Obtaining information 2. Evaluating information

[1] The Short Performance Assessment (SPA) and the Assessment Rubric adapted from the Stanford NGSS Assessment Project http://snapgse.stanford.edu/

Natural vs. Synthetic Materials Summative
Instructions + Rubric

MS-PS1-3

Directions: For this summative task, you will be reading, gathering, and synthesizing information evidence to answer the following questions about the synthetic product of your choice:

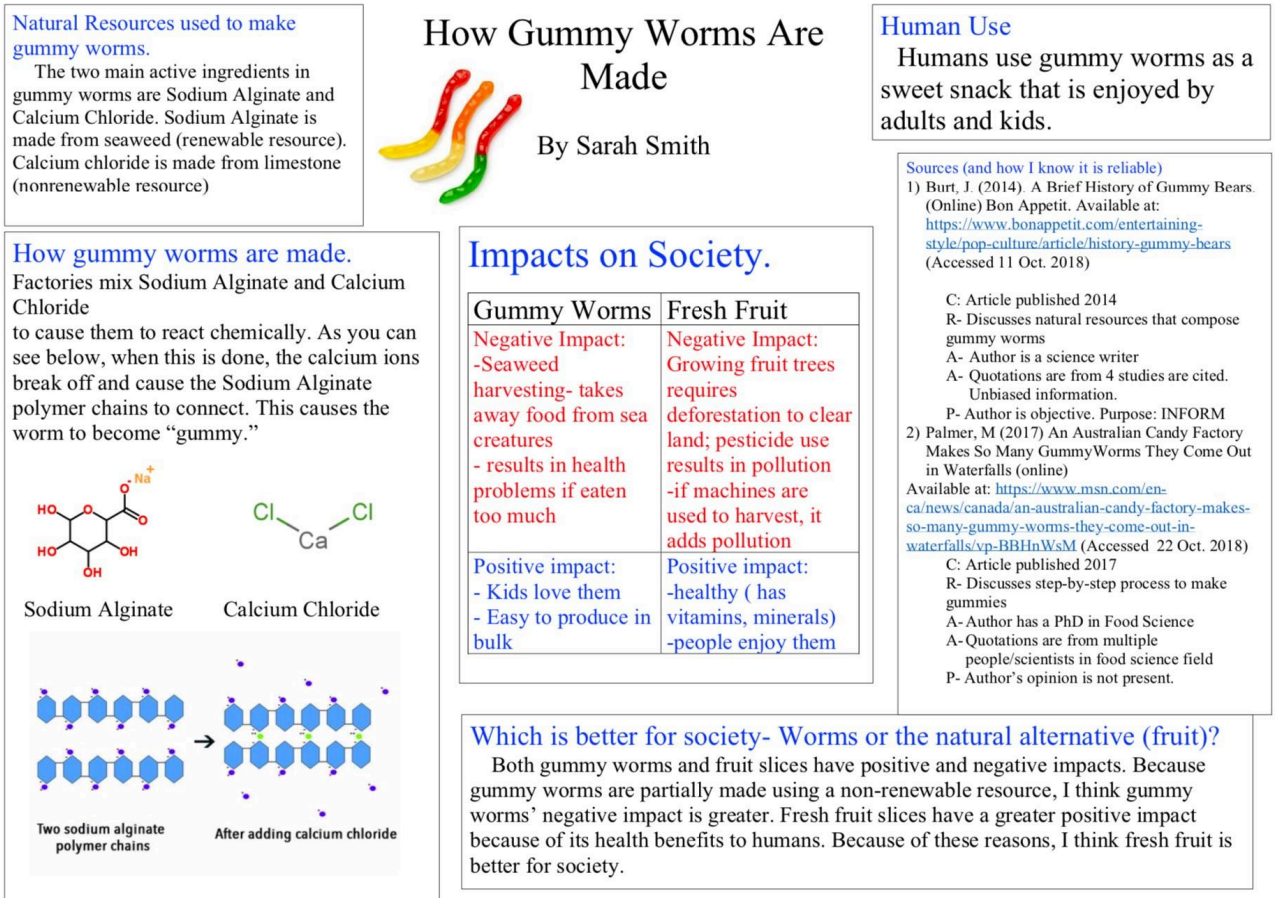
1) **What is the synthetic material?**
2) **What is the importance to humans?** *(Why do humans use/make it?)*
3) **What natural resources are used to make the synthetic material?**
4) **What are the atomic structures of the reactants and the synthetic product?**
5) **How is the synthetic material made?** *(What chemical process(es) are used to create the product?)*
6) **What are the negative and positive impacts/effects of <u>making</u> and <u>using the synthetic material,</u> compared to making and/or using a more natural material with a similar function?**

Once you have completed your research, you will make a scientific poster about your findings. Your poster must include:

- all necessary requirements,
- citations for at least two sources,
- evidence that your chosen sources are reliable,
- and a neat and professional appearance.

<u>Consult the rubric and exemplars to help guide you during this assessment.</u>

Exemplar (Full Page PDF link)



Natural Resources used to make gummy worms.

The two main active ingredients in gummy worms are Sodium Alginate and Calcium Chloride. Sodium Alginate is made from seaweed (renewable resource). Calcium chloride is made from limestone (nonrenewable resource)

How Gummy Worms Are Made

By Sarah Smith

Human Use

Humans use gummy worms as a sweet snack that is enjoyed by adults and kids.

Sources (and how I know it is reliable)

1) Burt, J. (2014). A Brief History of Gummy Bears. (Online) Bon Appetit. Available at: https://www.bonappetit.com/entertaining-style/pop-culture/article/history-gummy-bears (Accessed 11 Oct. 2018)

C: Article published 2014
R- Discusses natural resources that compose gummy worms
A- Author is a science writer
A- Quotations are from 4 studies are cited. Unbiased information.
P- Author is objective. Purpose: INFORM

2) Palmer, M (2017) An Australian Candy Factory Makes So Many GummyWorms They Come Out in Waterfalls (online) Available at: https://www.msn.com/en-ca/news/canada/an-australian-candy-factory-makes-so-many-gummy-worms-they-come-out-in-waterfalls/vp-BBHnWsM (Accessed 22 Oct. 2018)

C: Article published 2017
R- Discusses step-by-step process to make gummies
A- Author has a PhD in Food Science
A- Quotations are from multiple people/scientists in food science field
P- Author's opinion is not present.

How gummy worms are made.

Factories mix Sodium Alginate and Calcium Chloride to cause them to react chemically. As you can see below, when this is done, the calcium ions break off and cause the Sodium Alginate polymer chains to connect. This causes the worm to become "gummy."

Sodium Alginate

Calcium Chloride

Two sodium alginate polymer chains

After adding calcium chloride

Impacts on Society.

Gummy Worms	Fresh Fruit
Negative Impact: -Seaweed harvesting- takes away food from sea creatures - results in health problems if eaten too much	Negative Impact: Growing fruit trees requires deforestation to clear land; pesticide use results in pollution -if machines are used to harvest, it adds pollution
Positive impact: - Kids love them - Easy to produce in bulk	Positive impact: -healthy (has vitamins, minerals) -people enjoy them

Which is better for society- Worms or the natural alternative (fruit)?

Both gummy worms and fruit slices have positive and negative impacts. Because gummy worms are partially made using a non-renewable resource, I think gummy worms' negative impact is greater. Fresh fruit slices have a greater positive impact because of its health benefits to humans. Because of these reasons, I think fresh fruit is better for society.

Rubric:

	Approaching	Meeting	Beyond Meeting
Obtaining Information **Evaluating Information**	Read, gather, and synthesize information from some Partially and/or inconsistently cite sources of information Communicate scientific information in writing and/or through oral presentations using some scientific language Partially support claims/findings by inconsistently using qualitative and quantitative information, media, and visual displays	Read, gather, and synthesize information from a variety of reliable sources M Cite sources of information N Clearly communicate scientific information in writing and/or through oral presentations using scientific language O Support claims and findings by using qualitative/quantitative information, media, and visual displays P	Read gather, and synthesize information from a variety of advanced scientific text Communicate clearly and concisely in writing Use scientific language accurately whenever possible in communications Create complex multimedia to support communications Evaluate scientific and technical texts by assessing credibility and possible bias