


# Short Performance Assessment: HS-PS2-6

Grade Level: **High School**

Adapted from [SNAP](#)<sup>1</sup>

Title	How Chemistry Saves the World		
Designed by	Tyna Meeks & Sonal Patel-Dame (NC Master Teachers)	Course(s)	Regents Chemistry
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Performance Expectation	<p><b>HS-PS2-6:</b> Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.</p> <p><b>Clarification Statement:</b> Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.</p> <p><b>Assessment Boundary:</b> Assessment is limited to provided molecular structures of specific designed materials.</p>
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Science and Engineering Practice	<p><b>Obtaining, Evaluating, and Communicating Information</b></p> <ul style="list-style-type: none"><li>Communicate scientific and technical information (e.g., about the process of development and the design and performance of a proposed process or system) in multiple formats (including oral, graphical, textual and mathematical).</li></ul>
Disciplinary Core Ideas	<p><b>PS2.B: Types of Interactions</b></p> <ul style="list-style-type: none"><li>Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects.</li></ul>
Crosscutting Concept	<p><b>Structure and Function</b></p> <ul style="list-style-type: none"><li>Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.</li></ul>

Student Performance	<ol style="list-style-type: none"><li>Communication style and format</li><li>Connecting the DCIs and the CCCs</li></ol>
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## Note to teacher:

This is a multi-day assessment in which student teams will choose an item and conduct independent online research to answer the provided prompts. They may use molecular model kits to assist in their presentation.

Students are encouraged to peer-review posters (e.g. post-its of feedback).

Students may also choose their own products (ex: “As Seen on TV”) to add to the variety of presentations.

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



Name \_\_\_\_\_

### Phenomenon:

Chemistry solves real-world problems, whether those problems are societal or personal. Manufacturers make products based on the chemical properties of substances and their molecular interactions with other substances. Select one of the following products to describe the structure, properties, and design of the chosen material.

**Create a poster**, to be presented to your peers, which includes answers to the provided questions.

Small Sample of Manufactured Products that Could be Used to Solve Societal or Personal Problems.				
 <p>This product absorbs liquid and solid wastes and prevents it from leaking and sitting against the skin</p> <p><a href="https://www.google.com/url?sa=i&amp;source=images&amp;cd=&amp;ved=2ahUKEwju35DtdzJAHULyIkKHdibBVAQ/Rx6BAGBEAU&amp;url=https://3A1%2F%2Ffumblingtowardstime.com/2F2015%2F01%2F29%2Fpotty-talk%2F&amp;psig=AOvVawlaVXUORMMqoTwxAsYwJLU&amp;ust=1564677950008132">https://www.google.com/url?sa=i&amp;source=images&amp;cd=&amp;ved=2ahUKEwju35DtdzJAHULyIkKHdibBVAQ/Rx6BAGBEAU&amp;url=https://3A1%2F%2Ffumblingtowardstime.com/2F2015%2F01%2F29%2Fpotty-talk%2F&amp;psig=AOvVawlaVXUORMMqoTwxAsYwJLU&amp;ust=1564677950008132</a></p>	 <p>When placed in flood-prone areas, it absorbs water and prevents water damage</p> <p><a href="https://www.youtube.com/watch?v=Vnib2gghvdE">https://www.youtube.com/watch?v=Vnib2gghvdE</a></p>	 <p>Allows for the collection of cat urine for veterinary testing</p> <p><a href="https://www.google.com/url?sa=i&amp;source=images&amp;cd=&amp;ved=2ahUKEwJF37C0zdJAHULyIkKHdibBVAQ/Rx6BAGBEAU&amp;url=https://3A1%2F%2Fwww.entirelypets.com/2Fkit4cat-cat-urine-sample-collection-sand-2-lbs.html&amp;psig=AOvVaw3VBgaZSiMx_z2HO001pITo&amp;ust=1564677950008132">https://www.google.com/url?sa=i&amp;source=images&amp;cd=&amp;ved=2ahUKEwJF37C0zdJAHULyIkKHdibBVAQ/Rx6BAGBEAU&amp;url=https://3A1%2F%2Fwww.entirelypets.com/2Fkit4cat-cat-urine-sample-collection-sand-2-lbs.html&amp;psig=AOvVaw3VBgaZSiMx_z2HO001pITo&amp;ust=1564677950008132</a></p>	 <p>Absorbs oil on skin, removing it from the surface</p> <p><a href="https://www.amazon.com/Clean-Clear-Absorbing-Sheets-Count/dp/B003V5TQSI">https://www.amazon.com/Clean-Clear-Absorbing-Sheets-Count/dp/B003V5TQSI</a></p>	 <p>Filters water, making it safe for human consumption</p> <p><a href="https://www.walmart.com/ip/LifeStraw-Personal-Water-Filter/222093367?wmlspartner=wlp&amp;selectedSellerId=0&amp;adid=22222222227016058700&amp;wi0=&amp;w1t=g&amp;w12=c&amp;w13=5429871791&amp;w14=pla-91497990071&amp;wi5=9004859&amp;wi6=8w17=&amp;wi8=&amp;wi9=pla&amp;w10=8175035&amp;w11=online&amp;w12=22209336&amp;veh=sem&amp;gclid=CjwKCAjw-TqBRB7EiwAZlc5UzrARb-bQM5TWPBtqHeTyeJGtE78Ox6mXPXOHUN5KqUIN2an-OP2hocPMQAvD_BwE">https://www.walmart.com/ip/LifeStraw-Personal-Water-Filter/222093367?wmlspartner=wlp&amp;selectedSellerId=0&amp;adid=22222222227016058700&amp;wi0=&amp;w1t=g&amp;w12=c&amp;w13=5429871791&amp;w14=pla-91497990071&amp;wi5=9004859&amp;wi6=8w17=&amp;wi8=&amp;wi9=pla&amp;w10=8175035&amp;w11=online&amp;w12=22209336&amp;veh=sem&amp;gclid=CjwKCAjw-TqBRB7EiwAZlc5UzrARb-bQM5TWPBtqHeTyeJGtE78Ox6mXPXOHUN5KqUIN2an-OP2hocPMQAvD_BwE</a></p>

### Task:

Create a **poster**, to be **presented** to your peers, which includes scientific and technical details discovered while answering questions 1-5. The rubric at the end of the document will be used to grade your poster and presentation to the class. Ensure sources are scientifically-accurate and properly cited in APA format.

**Answer the following questions.** Conduct research on the following prompts and be sure to cite reputable sources using APA format.

1. Select a product from above and identify the problem this product solves. How is this important to solve societal or personal problems?
2. Identify the molecular **structure** of the substance that is important to the **functionality** of the chosen material.
3. Create a molecular model of your substance (use a **Lewis Dot Diagram** and/or **ball and stick** with **lone pairs**, if applicable).

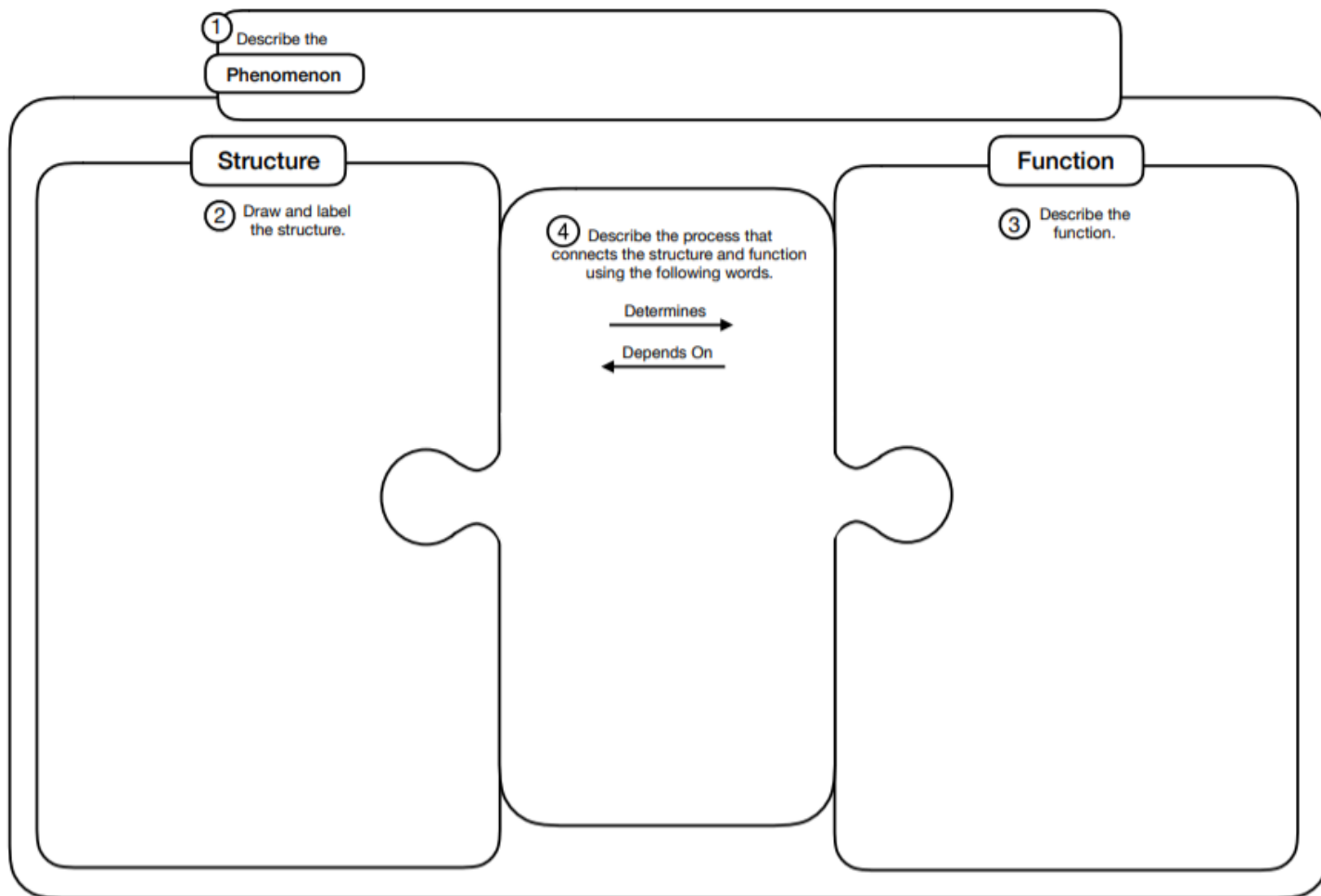


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- On your model, show the **electrostatic** and **intermolecular forces** (contact forces) between surfaces that demonstrates how the substance interacts with the environment to solve the problem
- Use the provided graphic organizer (next page...*from the awesome Paul Andersen...he hopes this is helpful*) to connect observable features of the structure and function of the designed material.
- After the presentations, explain why the molecular-level structure is important in the functioning of a designed material.

## Structure and Function



thewonderofscience.com

Adapted from: Amy & Jeremy Peacock

### Rubric for Oral and Poster Presentation:

Teachers, use [Features Analysis Tool](#) from Wonder of Science



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Points	1	2	3	4	Total
<b>Subject Knowledge</b>	Student does not have grasp of information. Many statements are incorrect and unsupported.	Student is uncomfortable with information, leaves out important details and/or presents inaccurate information.	Student is at ease with topic and presents accurate information.	Student demonstrates full grasp of the topic, presenting complete and accurate information.	
<b>Explanations from Evidence</b>	The student either has no conclusions or the conclusions are not related to the evidence provided in the presentation.	Conclusions are very poorly related to the evidence provided in the presentation.	The student uses some data, prior knowledge, research, and experience to draw conclusions but ignores other evidence introduced during the presentation.	The student uses all available data and his/her prior knowledge/research and experience to draw conclusions. If appropriate, student includes discussion of conflicting evidence.	
<b>Tables Graphs Graphics</b>	Presentation includes no graphics or graphics are unrelated to the subject and/or distract from the message.	Student doesn't explain tables/graphs, uses inappropriate graph type(s) or graphics conflict with conclusions.	Graphics illustrate evidence which supports the conclusion, appropriate graph type(s) used. Larger, smaller or simplified graphics would be more clear.	Appropriate graphics clearly present information which supports the conclusion and the student accurately explains the graphics during the presentation.	
<b>Conclusions</b>	Conclusions are not presented.	The conclusions are mostly inconsistent with the evidence.	The conclusion is only partially supported by the evidence.	Based on the data and evidence presented, the conclusions are reasonable.	
<b>Questions</b>	Student cannot answer questions about subject.	Student is able to answer only rudimentary questions, answers questions without explanation.	Student is at ease with answers to most questions, but fails to elaborate.	Student answers all class questions with explanations and elaboration.	
				<b>Total Points:</b>	<b>/20</b>

Rubric found at: [https://uni.edu/ietti/impact/experiences\\_in\\_inquiry\\_secondary/evaluation.html](https://uni.edu/ietti/impact/experiences_in_inquiry_secondary/evaluation.html)



Assessment Rubric* - Question 1				
	Emerging	Developing	Approaching Proficiency	Excelling
Description of performance				
Sample student responses				

Assessment Rubric* - Question 2				
	Emerging	Developing	Approaching Proficiency	Excelling
Description of performance				
Sample student responses				

Insert additional Assessment Rubrics (if needed) here.



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