


Short Performance Assessment: 5-PS1-1

Grade Level: **Fifth Grade**

Adapted from [SNAP](#)¹

Title	Onion Proof Goggles KEY		
Designed by	AIS Vienna - Brian, Barb, Megan, and Paul	Course(s)	Grade 5
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Performance Expectation	<p>5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen.</p> <p>Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.</p> <p>Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.</p>
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Science and Engineering Practice	<p>Developing and Using Models</p> <ul style="list-style-type: none">• Use models to describe phenomena.
Disciplinary Core Ideas	<p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none">• Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.
Crosscutting Concept	<p>Scale, Proportion, and Quantity</p> <ul style="list-style-type: none">• Natural objects exist from the very small to the immensely large.

Student Performance	<ol style="list-style-type: none">1. Components of the model2. Connections3. Relationships
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¹ The Short Performance Assessment (SPA) and the Assessment Rubric adapted from the Stanford NGSS Assessment Project <http://snapgse.stanford.edu/>



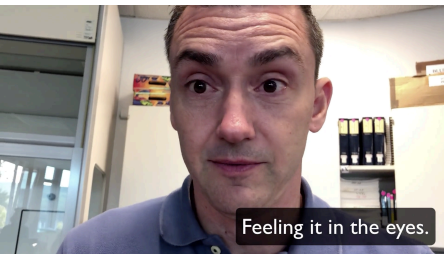





Name_____

Onion-Slicing Goggles

Mr. G (a fifth grade teacher) has been bothered by slicing onions while cooking for years. A fellow teacher told him that an online store is selling a pair of Onion Slicing Goggles for \$19.99 each. Before purchasing the goggles he and Ms. P (a third grade teacher) plan and conduct an investigation to test the concept.

1. Watch a [video of their investigation](#).

 <p>Perfect</p> <p>Ms. P: Goggles in place. Camera operator: Goggles in place. Get a real tight seal. Perfect.</p>	 <p>Are you feeling it?</p> <p>Camera operator: Are you feeling it? Mr. G: It's happening. You can come in close. Camera operator: It's happening to you already. Mr. G: Yeah.</p>	 <p>Feeling it in the eyes.</p> <p>Ms. P: (whisper) It's not happening to me. Camera operator: Are you feeling it in the eyes? Mr. G: Feeling it in the eyes. Ms. P: Is it observable?</p>
 <p>Unaffected.</p> <p>Camera operator: Yeah maybe. How are you feeling? Ms. P: Fine. I'm good. Unaffected. I'm working on my mad knife skills.</p>	 <p>Hmmm.... Nope.</p> <p>Mr. G: I'm feeling it in the eyes. Yes definitely. They're starting to burn a little bit. Starting to water. Camera operator: Turn this way and take your goggles off. Does it hurt? Ms. P: Hmmm.... Nope.</p>	 <p>So yeah.</p> <p>Camera operator: What about you? Mr. G: They're a little red. Teary. Nose is running. So yeah.</p>

2. Based on Mr. G's investigation, do the onion slicing goggles work?

CLAIM: **Yes** No Uncertain (Circle response)

EVIDENCE: What specific observations from the video would provide evidence for this claim?

- Mr. G doesn't wear the goggles and Ms. P does.
- Ms. P feels good and unaffected after slicing the onion..
- Mr. G. has a runny nose, red eyes and tears after slicing the onions.



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Mr. G reads several reviews online and finds that the goggles are receiving very high ratings. Most of the reviewers are very pleased with their purchase.

Rating Snapshot

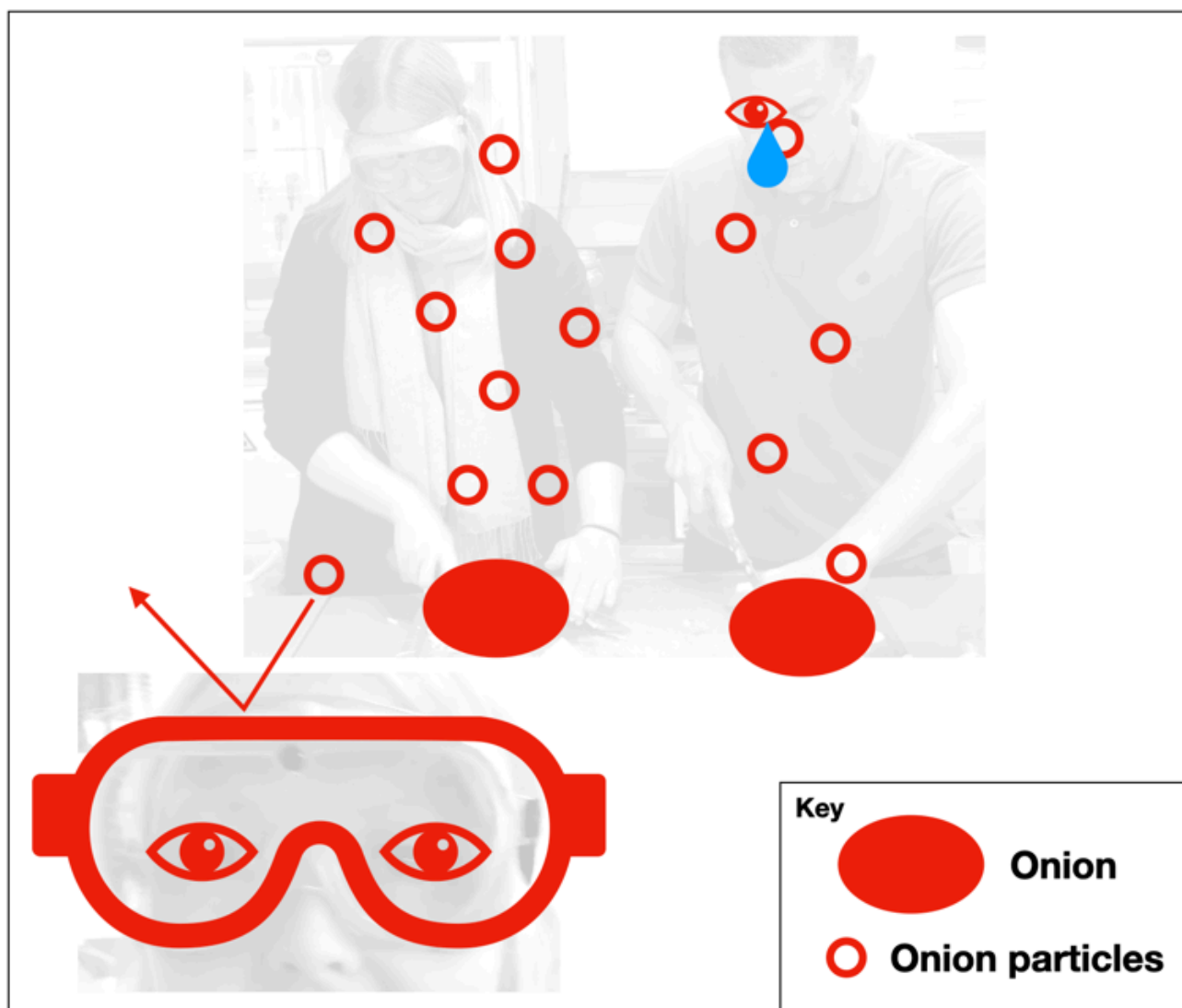
Select a row below to filter reviews.



3. Assuming the reviews are correct and the goggles work develop a particle **scale** model that answers the following question:

How do the onion slicing goggles work?

(Note: Your model should include important bulk matter as well as particles that are too small to be seen.)



4. Use your model (in question 3) to describe how matter, composed of tiny particles too small to be seen, can account for the effect of the onion slicing goggles.

Onion particles (a gas) move away from a sliced onion. Onion particles make their way to an unprotected eye creating tears and discomfort. Onion-proof goggles block the onion particles from reaching the eye and keep the onion slicer free of discomfort.

5. Your answers to Questions 3 and 4 were limited by the information presented in this video. What additional research or investigations might help you to better understand this phenomenon?

What material are the \$19 goggles constructed of and what are the actual particles that come off of the sliced onions.

