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from: engineeringadventures@mos.org  
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 subject: Impact Hazards Ahead



8:45 AM

Hi engineers!

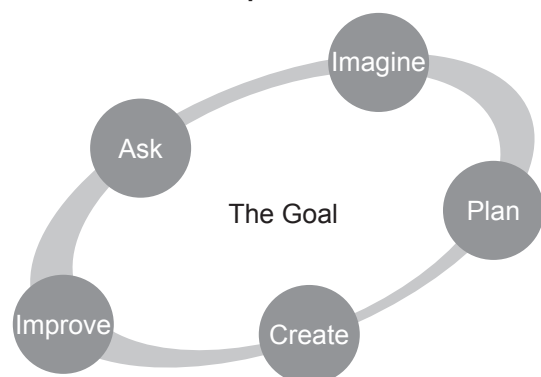
You did a great job *asking* questions about the materials we sent. With your help, Jacob and I learned about which materials work well to protect against super cold temperatures!

Maru told us it's also really important for astronauts to keep their hands safe from another type of space hazard—impact, or damage, from heavy moving objects. When astronauts work with machines with lots of moving parts, their space gloves need to protect different parts of their hands from getting crushed. Spacesuits are also at risk of being damaged by heavy moving space debris. Space debris can be natural, like pieces of floating rock, or human made, like pieces of old satellites and fragments of spacecraft.

We were surprised to find out that a material can be really good at protecting against one type of hazard but terrible at protecting against another. We sent you the same materials you explored last time. Can you figure out which of these materials are good at protecting astronauts against impact hazards? Are there any materials that can protect against both impact hazards and cold temperatures?

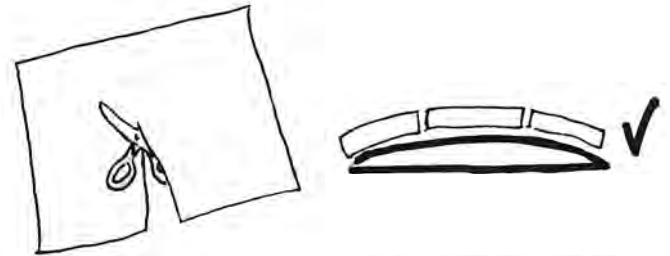
Let us know what you find out!

India



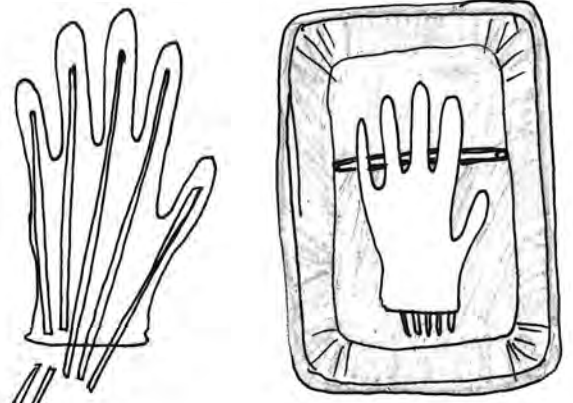


1. Cut your material and tape it in **1 layer** to **1 side of your glove**.

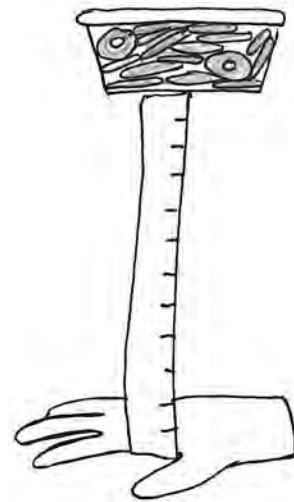


2. Put 1 piece of pasta in each finger of your glove. Snap off excess pasta that may be sticking out from the wrist.

3. Place your glove in the aluminum tray. Make sure that the “fingers” are resting on the wooden skewer.



4. Lift the weight 1 foot above the center of your glove. Make sure the entire weight is above the ruler.



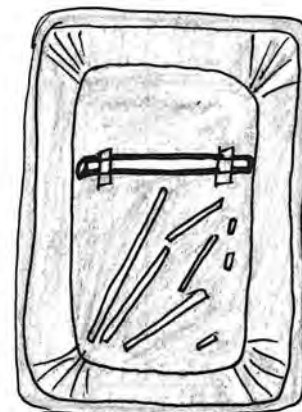
5. Drop the weight.

6. Carefully empty the pasta out of the glove and count the number of pieces.

7. Record your results.

8. Repeat 2 more times for a total of 3 tests.

9. Record the highest number in the “Final” column. How well did your glove protect against impact?

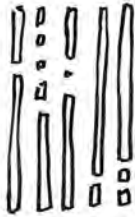

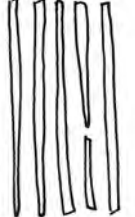




### Directions:

Record the number of pieces of pasta after each test. Choose the highest number recorded and write it in the column marked “Final.” Using the chart below, find out how well your glove protected against impact.

Is your material good at protecting against impact?

<p><b>Not Good</b></p> <p>11+ pieces</p> 	<p><b>Good</b></p> <p>8–10 pieces</p> 	<p><b>Great</b></p> <p>5–7 pieces</p> 
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Test Results					
Material	Test 1	Test 2	Test 3	Final	How well does it protect against impact?

### Reflect

Which materials were best at protecting against impact?

Why do you think these materials worked well?

