Name_____ Period _____ Date _____

Explosion Shield

STEM Sims

Lesson 1: Testing the Best Material

When bomb disposal experts attempt to disarm a bomb, they need to be equipped with strong, durable shields to help protect them in case the bomb detonates. It's important that the shields are made of as strong a material as possible. A direct comparison between materials will be the best way to evaluate the different shields, so put on protective gear and test out the materials!

Doing the Science

1. Start the Explosion Shield Simulation by clicking on the "Sim" tab.
2. Click on the "Design" button.
3. In the "Material Type" section, click on the right arrow until "Carbon Fiber" appears.
4. In the "Shape" section, click on the right arrow three times until the moderate bevel rectangular shape appears.
5. Click on the "Test" button.
6. In the testing room, there is a dummy standing behind the shield you designed. Click on the red trigger that the dummy is holding to set off the bomb.
7. Click on the "Analysis" button.
8. Hover over each yellow and black icon to read the "Damage Stats". Record the damages into Table 1 below.
9. Repeat steps 2-8 with the different material types given in Table 1.

Table 1.

Material Type	Head	Stomach	Right Arm	Left Arm	Right Leg	Left Leg
Carbon Fiber						
Kevlar						
Nanofiber						
Plexiglass						
Polycarbonate						
Polyvinyl Chloride						
Steel						
Titanium						

Do You Understand?

1. Which material is the best to use to construct a shield? Which is the poorest? Why?