

**East Haven High School**  
**2018-2019 Scientific Research Report**  
**Theme: What If?**



## **Scientific Research**

### **Project Idea:**

What if you could wear a device that protects you and provides peace of mind when you are out alone. People who go walking, jogging, or exercising alone need to feel safe. Muggings, violent attacks, sexual assaults, and even homicides continue are on the rise globally. Traditional personal defense products such as knives, hand guns, pepper sprays, and tasers require an individual to engage the attacker in close contact. This increases the odds of personal injury or death. Knives, and guns can be taken from you and used against you. Our product stands out from current market competition. For example, liquid pepper sprays require the victim to retrieve it, release the safety, and discharge it-hopefully in time. Our product the DCPS-1 will employ a dry propelled substance (proprietary spice blend) unlike traditional pepper sprays which are in liquid form.

### **Research and Development:**

When choosing our project for Expo, our team felt that there was an unusually high number of incidences of attacks on joggers, and those who exercise or walk alone. As our research continued we were alarmed to learn that there have even been cases of homicide. How can this be if there are self defense products available to the public? After doing research, we realized that the market had a number of self defense products such as pepper spray, small knives, tasers, or even handguns. We wanted to design a product that could be worn comfortably, not raise attention, and provide enough personal defense to allow a user to escape harm and get help. We felt that the products available were intimidating, and potentially dangerous if used inappropriately or in the hands of a child. Our research team found a poll of 1000 people done by Wearsafe Labs shows that 34% feel afraid running, biking, walking, or hiking alone outdoors.  $\frac{1}{3}$

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say they were fearful sometimes or all the time, 34% say in the winter they use a wearable safety item, 22% say their fear has greatly increased when they hear about violent crimes, 40% of people said when they are outdoors with others they feel safer.

[https://www.womensrunning.com/2016/11/health-wellness/statistics-runner-safety-stay-safer\\_67506](https://www.womensrunning.com/2016/11/health-wellness/statistics-runner-safety-stay-safer_67506)

**Mathematical Thinking:**

\$2.00 neoprene material and straps

\$0.60 co2 cartridge

\$12.00 co2 trigger----could reduce cost if we engineer our own Goal cost: \$3.00

Spice blend cartridge and powder: \$0.20 (est)

Our cost per unit: \$7.00

Our team created and deployed a survey to 91 students in our school. Analysis revealed that 58.3% of polled students felt that typical defense weapons are very effective. 33% of people would feel a lot safer if they were carrying a defense weapon.

**Graph 1 of 2**

**1 = unsafe**

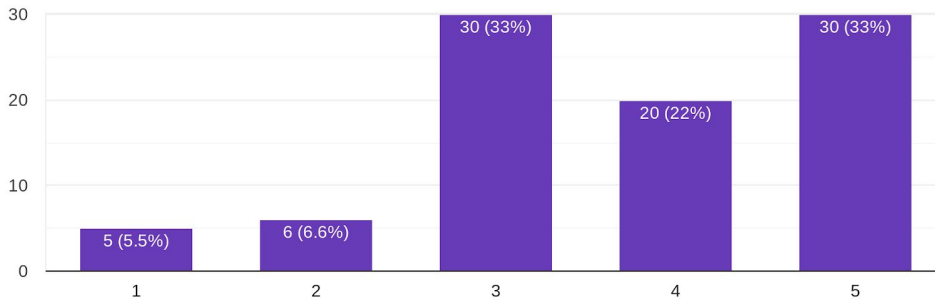
**5= very safe**

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Would you feel safer walking alone if you were carrying a defense weapon?

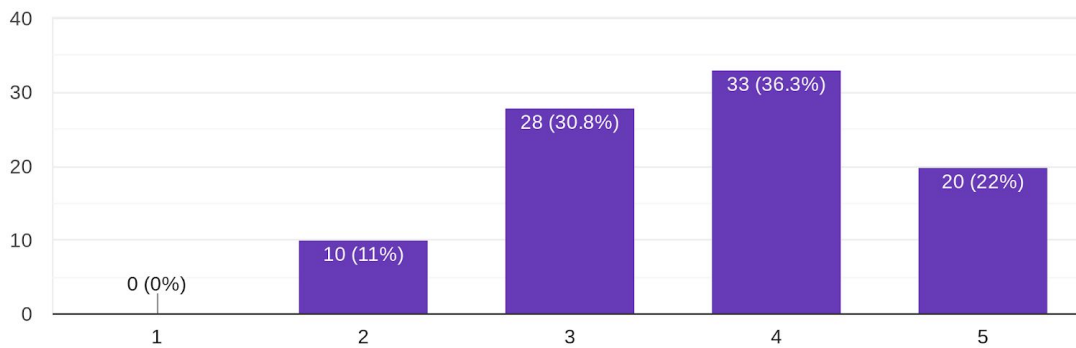
91 responses



**Graph 2 of 2**

How effective do you think weapons of defense are?

91 responses



**1 = ineffective**

**5 = very effective**

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## **Research Citations**

Kindelan, Katie. “Jogger's Stabbing Highlights 'Unfortunate' and Scary Reality for Female Runners.” *ABC News*, ABC News Network, 20 Sept. 2018, [abcnews.go.com/GMA/News/killing-jogger-highlights-dangerous-reality-women-responding/story?id=57959071](http://abcnews.go.com/GMA/News/killing-jogger-highlights-dangerous-reality-women-responding/story?id=57959071).

“Alarming Statistics About Runner Safety And How To Stay Safer.” *Women's Running*, 7 Nov. 2016,

[www.womensrunning.com/2016/11/health-wellness/statistics-runner-safety-stay-safer\\_67506](http://www.womensrunning.com/2016/11/health-wellness/statistics-runner-safety-stay-safer_67506).

Medrano, Kastalia. “Study: Majority of Women Joggers Get Harassed While Running.” *Time*, Time, 27 Oct. 2016, [time.com/4548022/women-jogging-harassment-study/](http://time.com/4548022/women-jogging-harassment-study/).