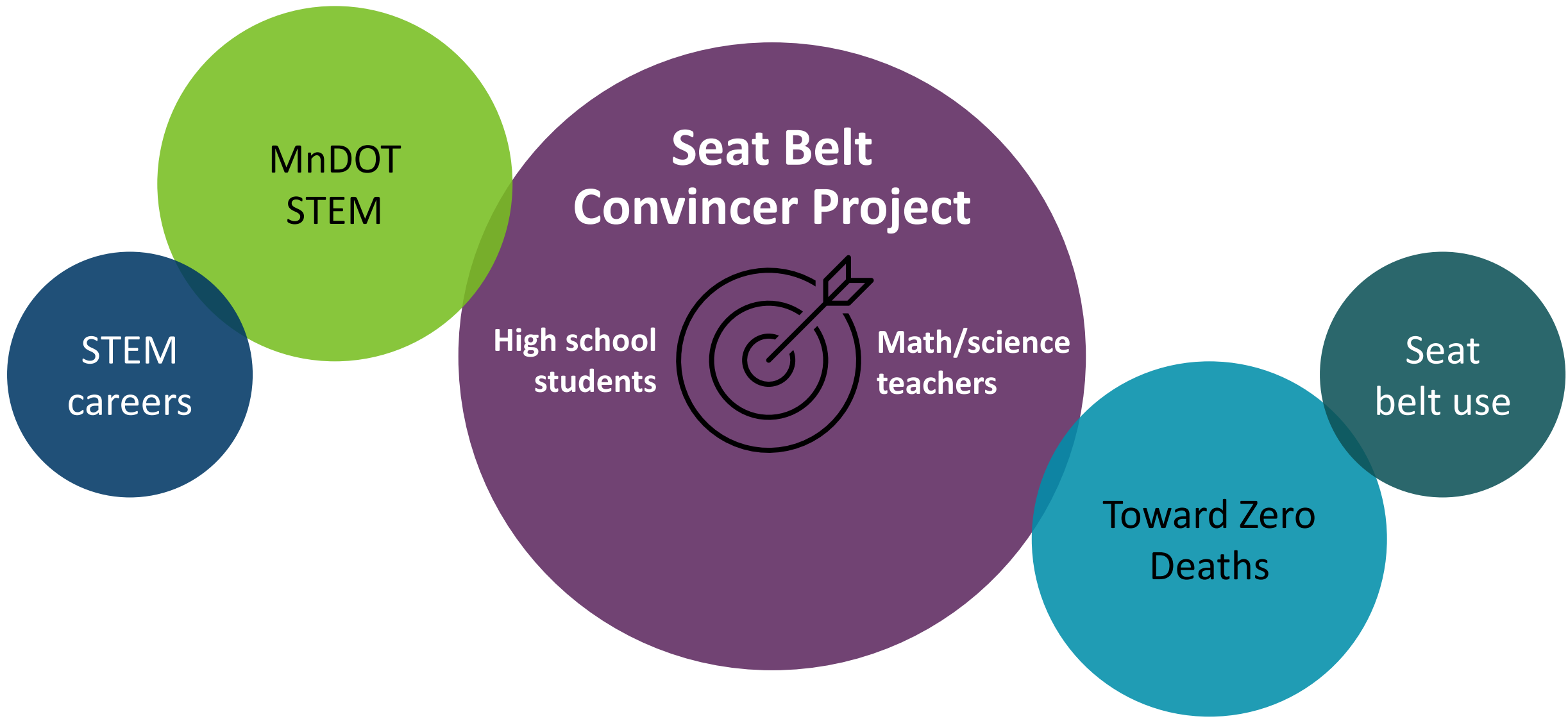


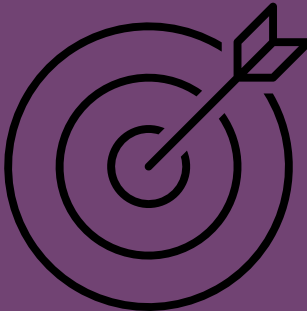
# Seat Belt Convincer Project:

*Teaching safety through physics*

Cindy Morgan, MnDOT Public Engagement Coordinator



# Seat Belt Convincer Project



High school students

Math/science teachers

MnDOT  
STEM

STEM  
careers

Toward Zero  
Deaths

Seat  
belt use



<https://fb.watch/k7VrmhZGSO/>

## Seat Belt Convincer

Introduce  
force,  
Newton's  
Laws

Experience  
force of  
crash

Calculate  
force,  
expand the  
calculations

Safety  
learning

Link to  
careers



## The program

# Force

Physics background

# Newton's 2<sup>nd</sup> Law of Motion

When a force acts on an object,  
it will cause the object to accelerate

Physics background

**force = mass x acceleration**



$$\mathbf{F} = \mathbf{m} \times \mathbf{a}$$

Physics background

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The program



# Newton's 1<sup>st</sup> Law of Motion

An object in motion tends to stay in motion  
unless an external force acts upon it

Physics background

$$\text{force} = \frac{\text{change in momentum}}{\text{change in time}}$$



$$F = \frac{m \times \Delta v}{\Delta t}$$

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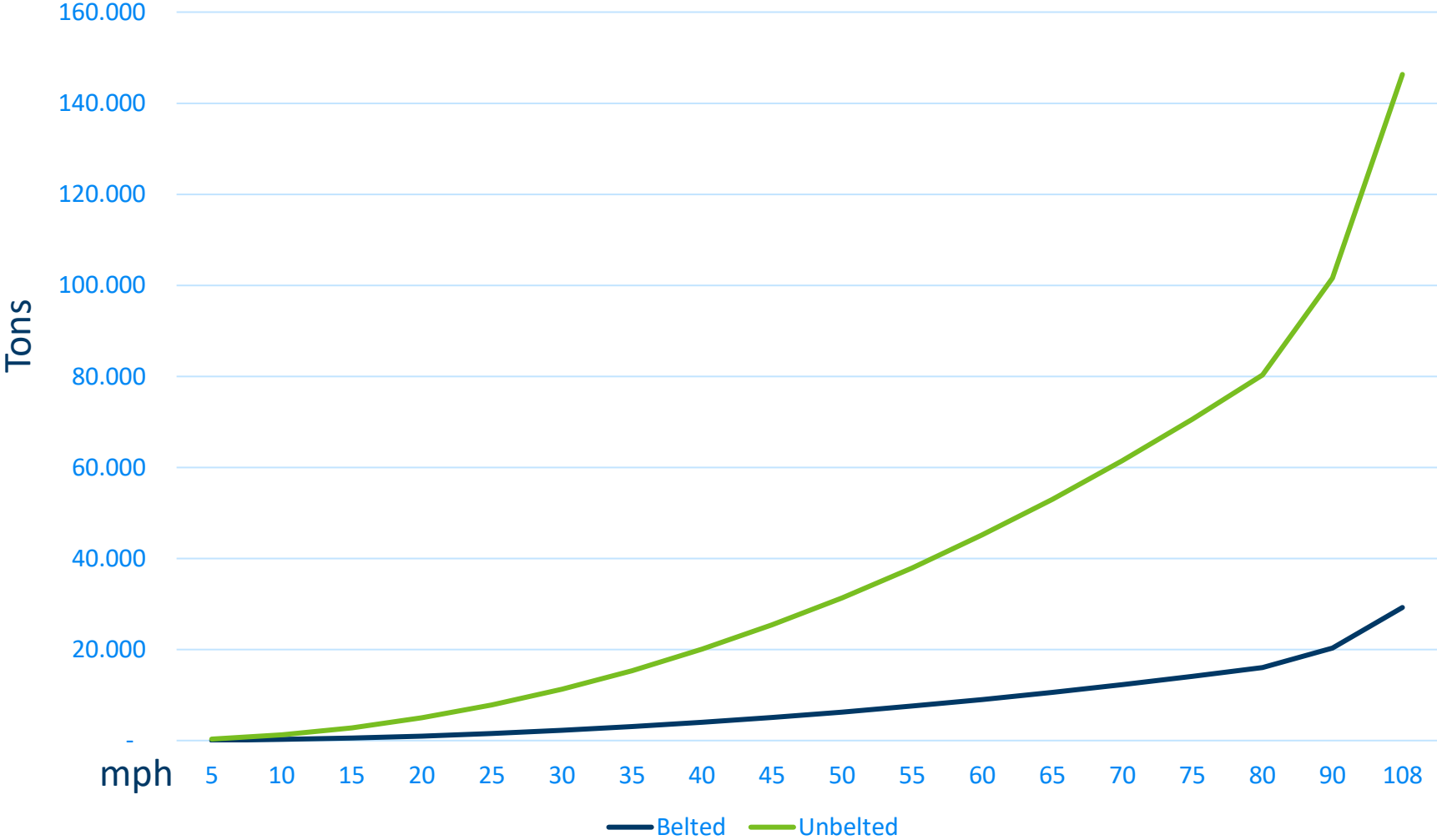
Safety  
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The program

Force felt by individual at time of the crash



The program

The diagram illustrates the equation for force,  $F = \frac{m \times \Delta v}{\Delta t}$ . The force  $F$  is represented by a large red arrow pointing downwards. The mass  $m$  is a blue-outlined character. The change in velocity  $\Delta v$  is represented by a blue-outlined triangle followed by a blue-outlined  $v$ . The change in time  $\Delta t$  is represented by a blue-outlined triangle followed by a blue-outlined  $t$ . A smaller red arrow points downwards above the  $\Delta v$  term, and a green arrow points upwards below the  $\Delta t$  term.

$$F = \frac{m \times \Delta v}{\Delta t}$$

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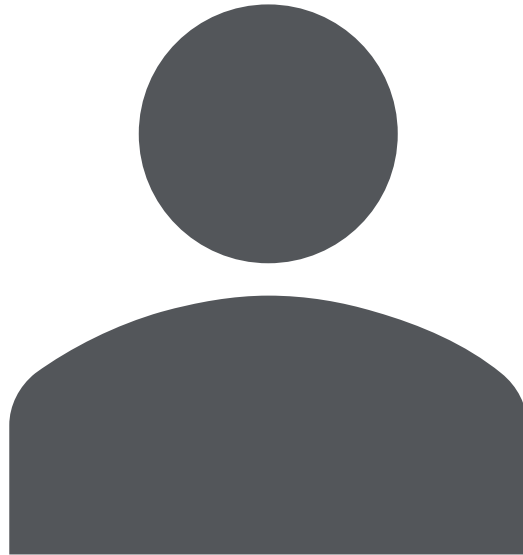


The program

Connect us with regional schools

Commit to an event

Speakers needed, "ride" operators



How can you help?



## Program Details

Joint effort,  
education & safety

Presentation  
explains physics,  
easy to understand  
manner

40 min long, the  
average class  
length

Waivers offered to  
students in  
advance

Opportunity to  
test convincer, get  
data specific to  
individual

# The program

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Questions, comments or feedback?