

3 Million Teachers Can't Be Wrong—  
Just Try It!

***Hands-On Engineering Design***



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## TeachEngineering.org

- Free!
- Over 3M unique users/yr
- NSF-funded
- 56 other university partners contributed curriculum (RET and GK-12 grantees)
- 1560 K-12 lessons + activities
  - engineering design-focused
  - externally reviewed
  - most are NGSS-aligned
- Led by CU Boulder engineering college

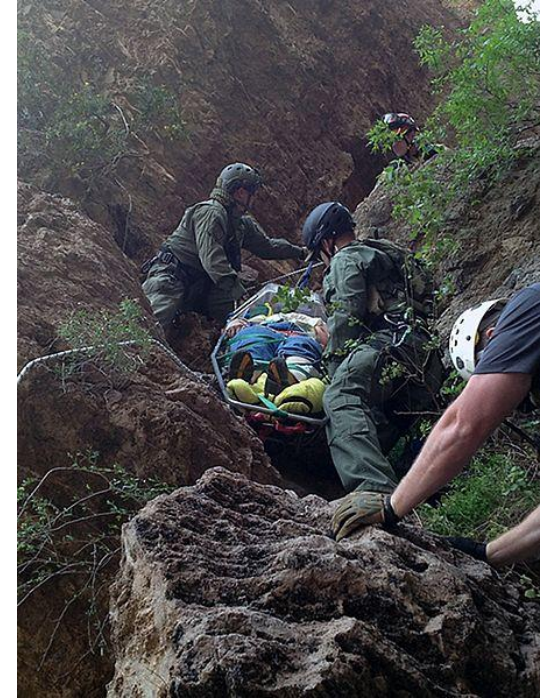
# ***Let's Try It!***

## ***Setting the Stage...***

### Injuries in the Backcountry

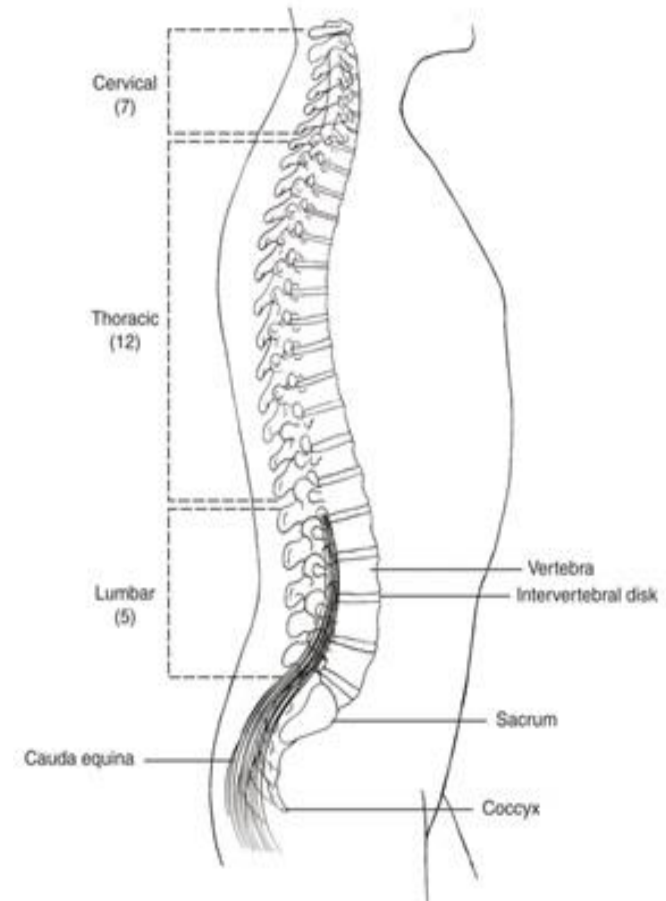
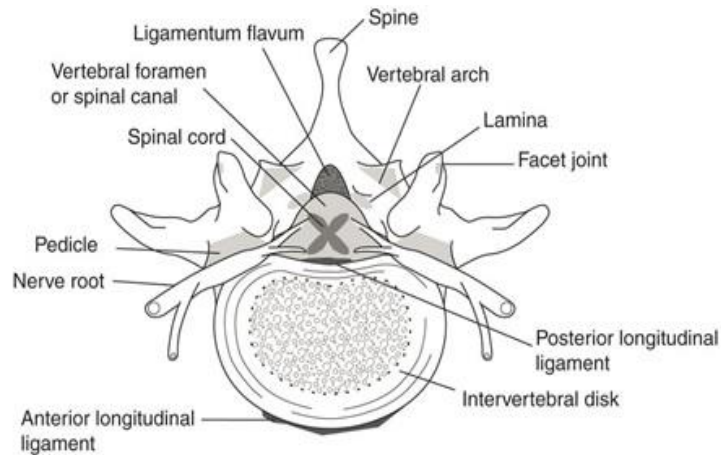
Imagine you and a group of people are hiking in the backcountry when a person gets very hurt and needs to go to the hospital, but you are far from any roads. What would you do?

Challenge: Getting an injured hiker, **Avery**, to safety when an ambulance is not an option (by using a rescue litter)



# Why a rescue litter?

Protects the head, neck and back  
Prevents further injury or paralysis





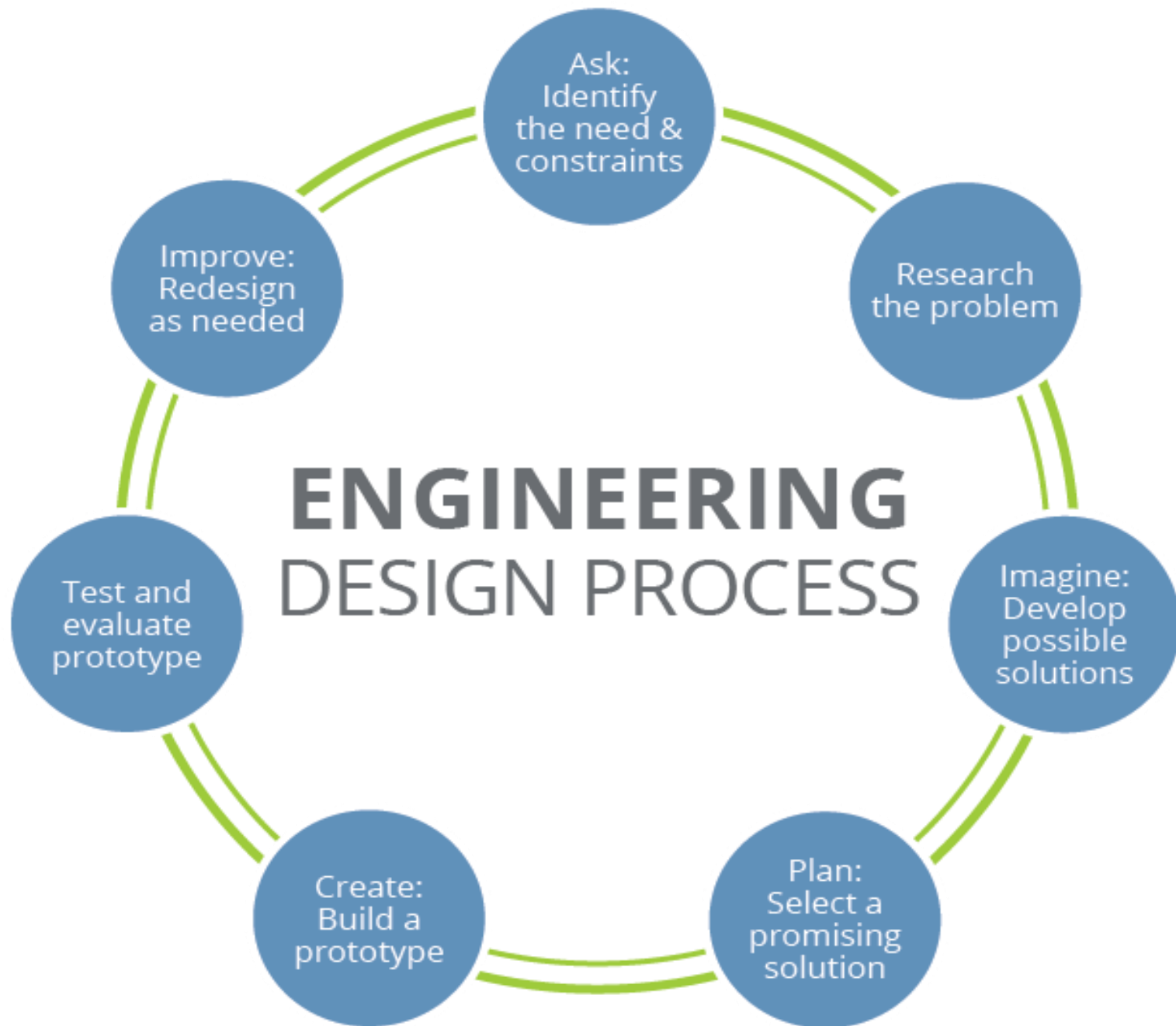
# Rescue litter design

*Engineering is design within constraints...*

*Constraints to consider when designing a rescue litter?*

- Lightweight
- Easy to assemble
- Sturdy
- Easy to carry





# Today's challenge:

Work in teams of two to design a litter to safely transport an “injured hiker,” **Avery**. Together, **design and prototype** a rescue litter using limited materials.

Your litter requirements:

- Designed and built of provided materials
- Ability to assemble for easy transport
- Compact: parts must fit in a ziploc bag (your “backpack”)
  - The ziplock bag cannot be part of the litter
- Able to carry Avery (represented by a potato)
- Avery's head, neck and back must be stable!



Testing – redesigning – retesting (design loop)

1. Weigh your litter
2. Carry your assembled litter together on the “trail” (path around the room)
3. Place Avery on the litter
4. Carry litter, with Avery on board, back down the trail
5. Time your rescue

# Design Constraints

- Team size: 2 people
- Brainstorm design ideas first!
- Time limit: 10 minutes/design
- Weight of litter
- Cost of litter (less than \$20)
- Litter must have handles for carrying
- Litter must be robust for loaded transport
- Your pre-assembled litter must fit into ziploc bag (your “backpack”)



**Brainstorm** ideas as a team and decide on the best design idea

**Success defined: the team that safely and successfully transports their “injured hiker” the fastest, in the lightest litter, wins!**

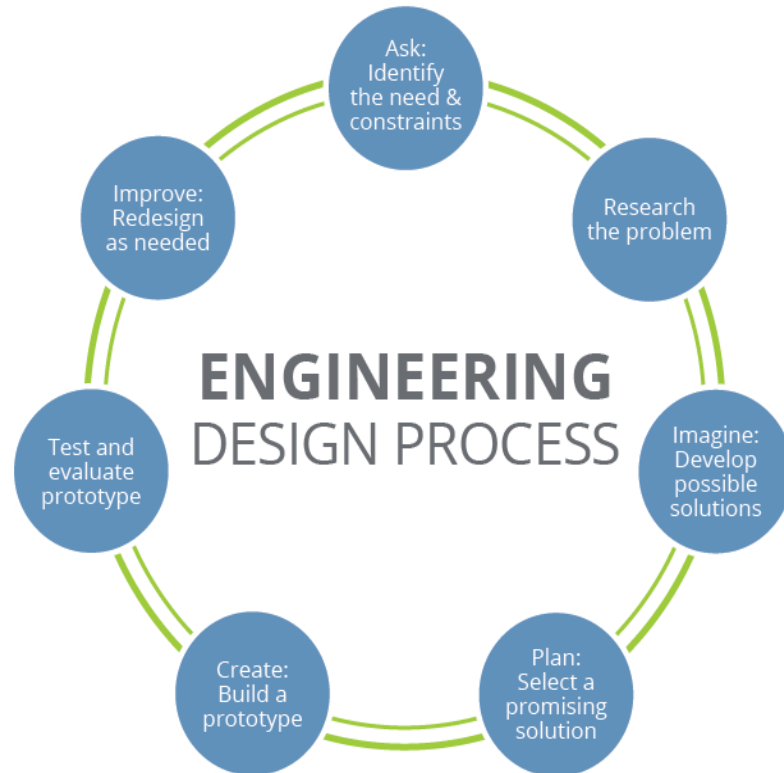


# Materials

Scissors are provided free of charge, but cannot be part of the litter design.

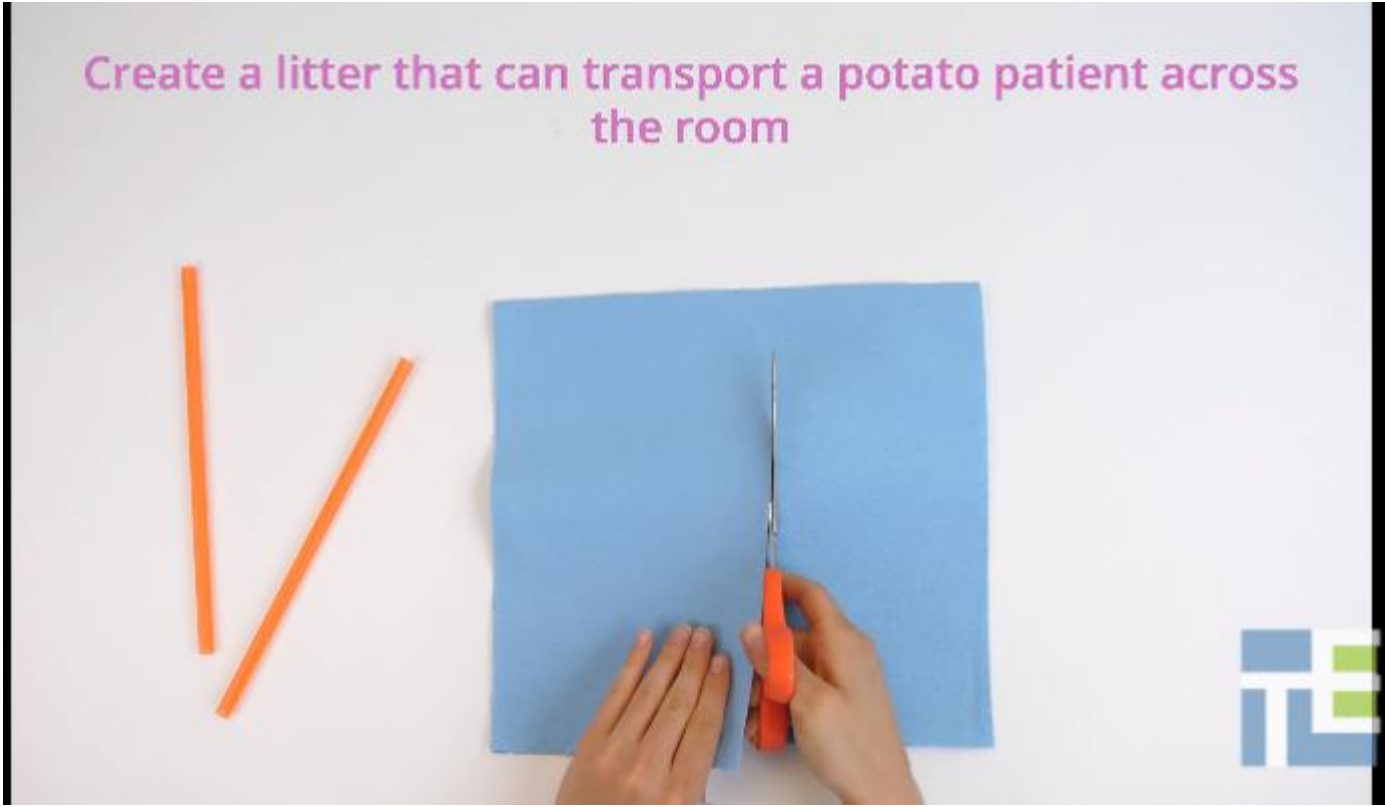
<b>Material</b>	<b>Unit size</b>	<b>Cost per unit</b>
Toothpick	1	\$1.00
Paper towel	1	\$2.00
Popsicle stick	2	\$2.00
Straw	2	\$1.00
Sponge	1	\$3.00
Piece of paper	1	\$1.00
Aluminum foil square	1	\$3.00

# What Did We Learn?





# Find TE on YouTube and Social!



Create a litter that can transport a potato patient across the room



<https://www.youtube.com/watch?v=NX2ijT-85Mo>

Questions? Comments?

*Thank you!*



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