# Engineering in Sports

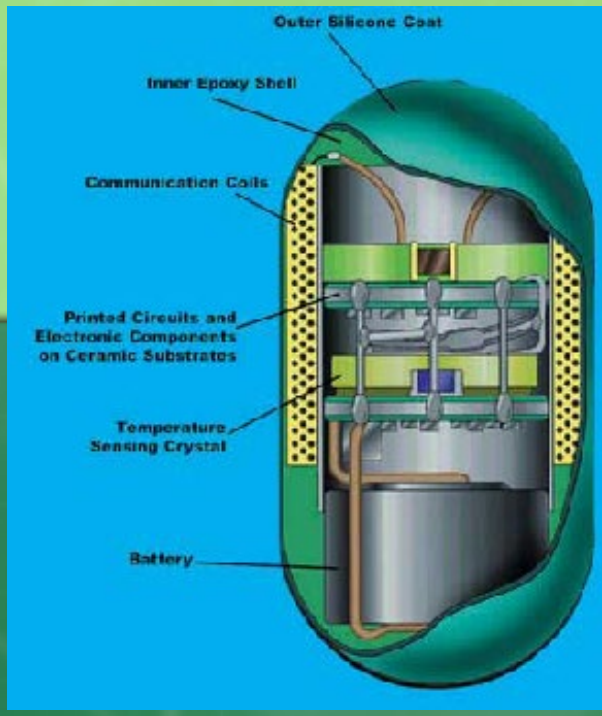
Teacher Name

# Not your everyday jeans…


- 2010 Winter Olympics snowboarding uniforms for US, China & Finland
- Look like plaid flannel and worn denim, but are:
- …next-generation fabrics made of waterproof membranes with breath-able microporous holes


Inventors: GORE-TEX and Burton Boards

# Ingestible computers for athletes (really!)




- "Thermometer Pill" transmits athletes' core body temperature and heart rate data
- Alerts to heat exhaustion
- Quartz crystal sensor & micro-battery wrapped in silicon


Inventors: Engineers at NASA and Johns Hopkins University

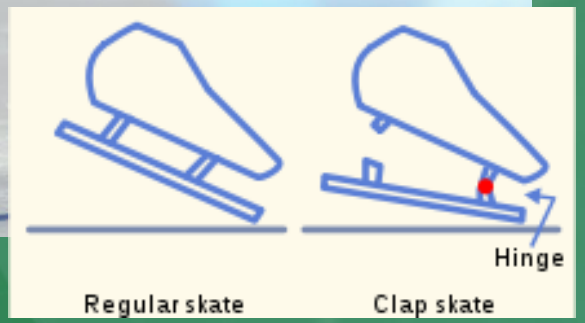
# Skiing armor


- Protects from high-speed wipeouts and 600mph gates
- Soft, thin and flexible material moves with body, but instantly hardens upon impact
- Spreads shock over surface area
- Uses sheer thickening fluid reactive material

Inventors: Engineers at British firm d30 and Spyder

# Skater's edge

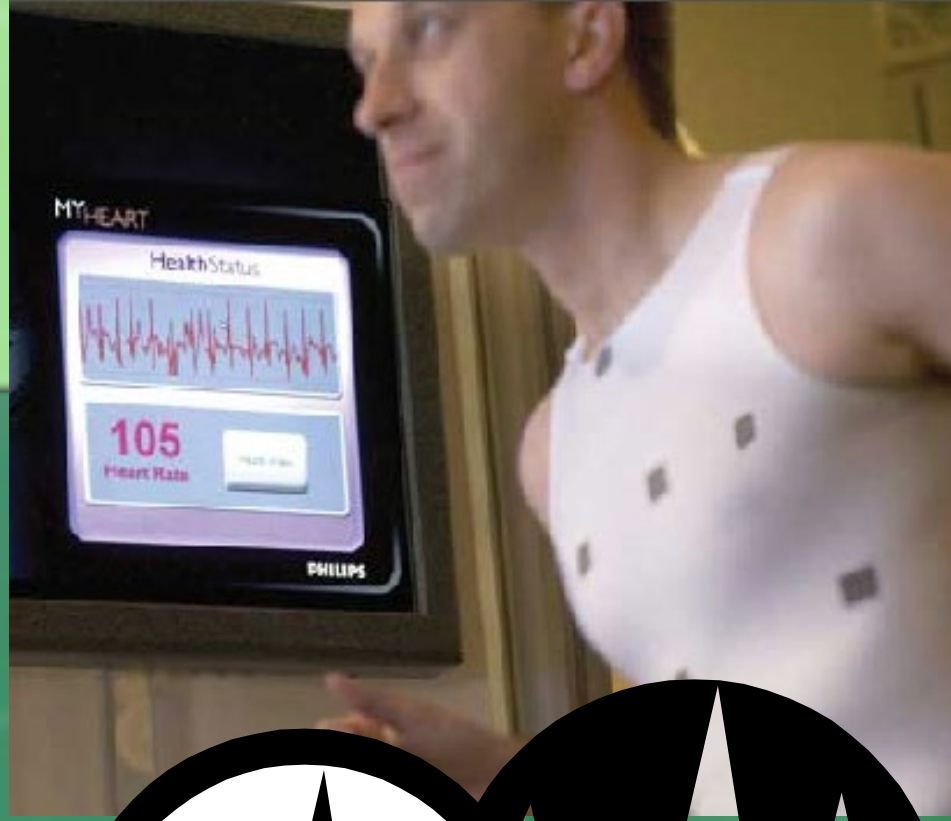
- "Clap skates" Back of blade hinged so stays on ice longer, evens out weight, legs generate more force




- Aerodynamic "swift suit" reduces air drag – Nike assures 1% faster times (close races!)
- Wind tunnel testing of suits and positions (arms behind backs, drafting, corner tilting)

Inventors: Engineers at Nike (suits) and many others

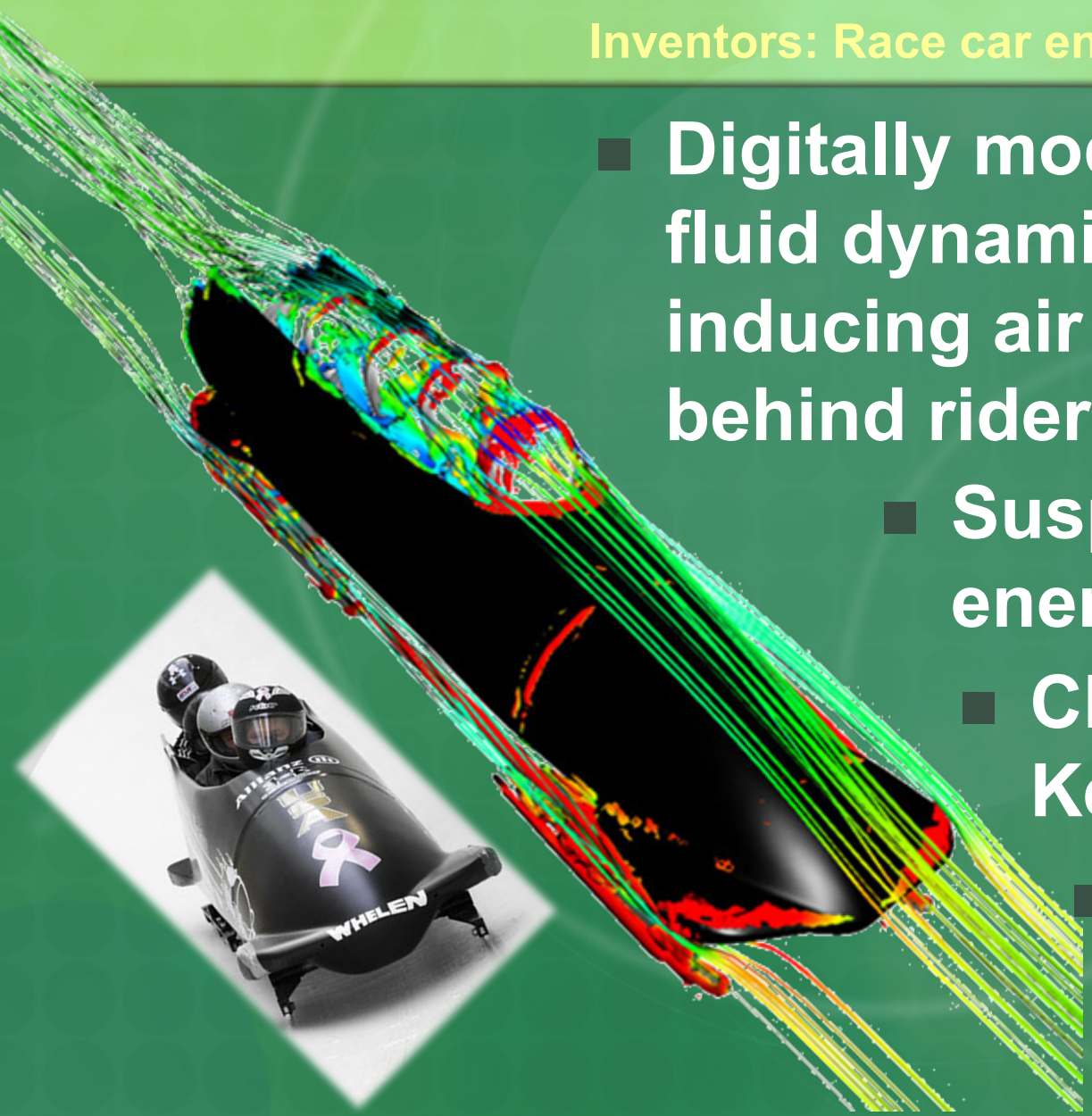
# "Smart" clothing




- Fabric with embedded microscopic sensors and wireless networks
- Remotely monitors athlete's heart rate, body temperature, hydration and more
- Extends to patient and soldier applications: Records and transmits real-time biometrics — from blood pressure to bullet wounds

# Most aerodynamic sled ever

Inventors: Race car engineers at Exa Corporation






- Digitally modeled the bobsled's fluid dynamics to minimize drag-inducing air vortexes that form behind riders' heads
- Suspension minimizes energy-draining vibration
- Chassis of fiberglass, Kevlar and carbon fiber
- Adjusts for weather, track conditions, metal fatigue

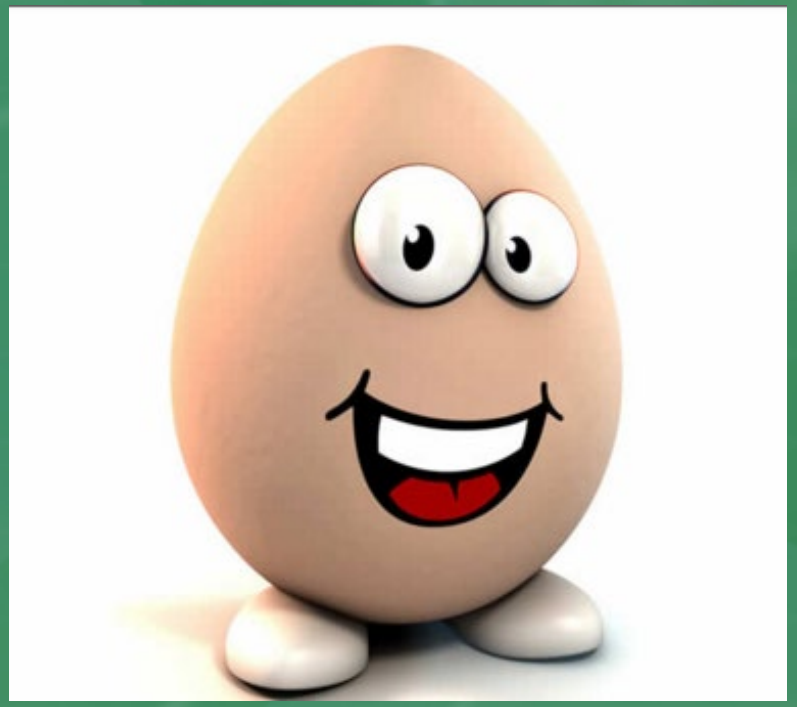
2010 Olympics coach: "1/3 of team's success due to engineering"

# Explore

- Now that we have discussed the importance of having sports equipment for various types of sports, it's time for you as a team to build your own equipment

# Explore

- Player: Mr. Egg
- Sport: Free-falling
- Position: Free-faller
- Drop height: 3-4 feet

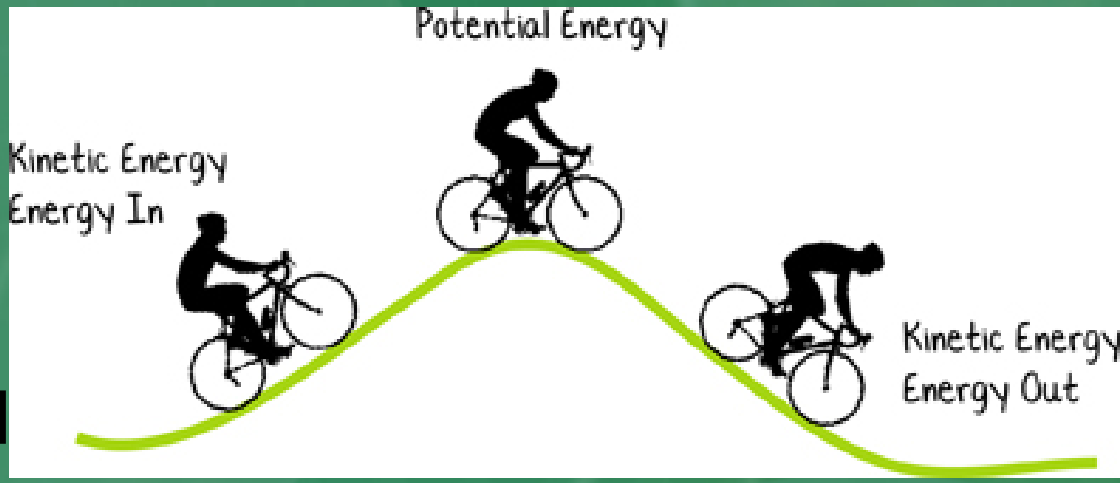


# Egg Safety

- IF your egg breaks prior to the free-falling event let the teacher know immediately

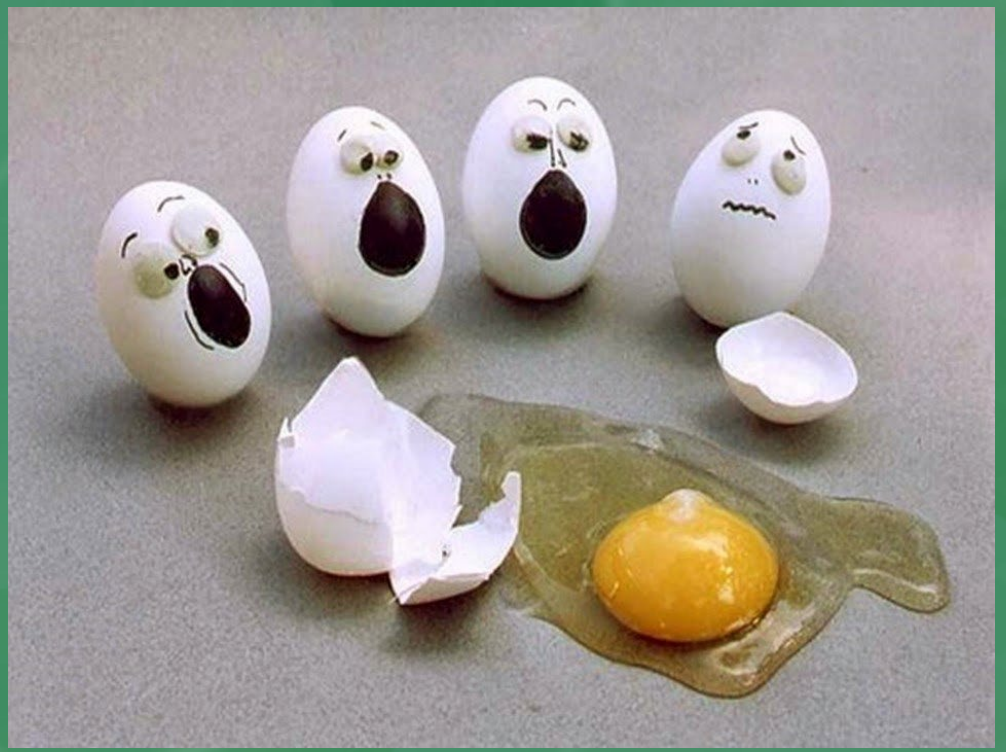
# Explain

- Kinetic energy: energy that occurs while in motion.
- Potential energy: stored energy
- Conservation of energy: energy cannot be created or destroyed.

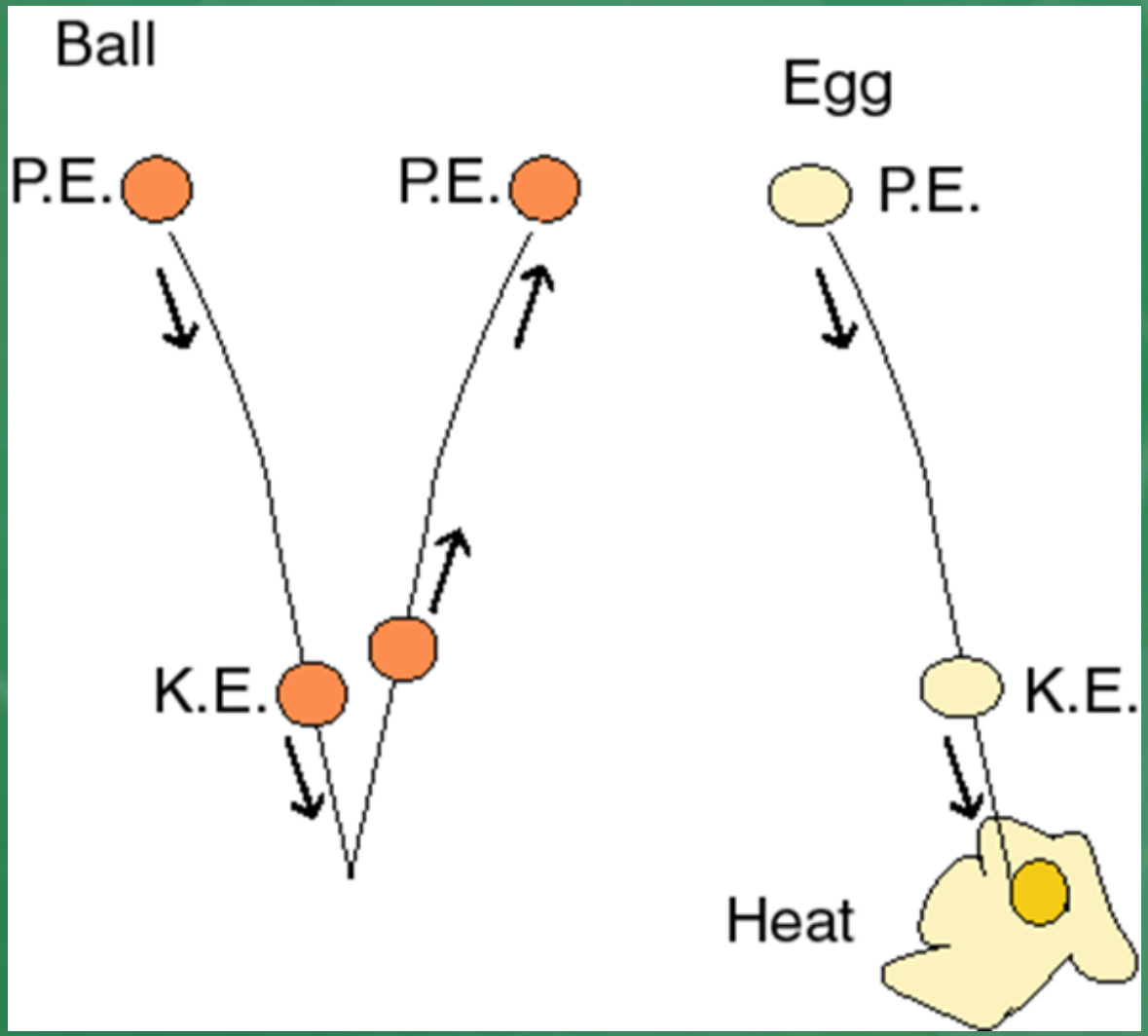


# Explain: Results

- Did your player survive the drop?
- What changes, if any, would you make to improve the design for your egg?
- What additional materials could you have used to improve on your design?



# Explain



# Elaborate

- How important do you think it is for athletes to have safety equipment?
- Are there any differences between the equipment you constructed and the equipment used in sporting events?
- What do engineers have to take into consideration when making safety equipment for athletes?

# Evaluation

- Complete the evaluation on your own
- Turn it in when you are finished

# Source information Feb 2010 (Winter Olympics)

- **Not your everyday denim…**
  http://www.tipsfromthetlist.com/20513.html and http://www.zimbio.com/pictures/S45zd2-s7ns/Snowboard+Day+4/9FUJESPv0iR/Gretchen+Bleiler and http://www.gore-tex.com/remote/Satellite/content/community/press-release/1 and http://insite.artinstitutes.edu/fabric-technology-works-to-enhance-performance-at-winter-olympics-19726.aspx
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