Many of you will go on to careers in Health and Science that might STEM has issues with every kind of
The younger generation places importance on identity
Students feel empowered when they see that they
Not talking about it is functionally the same as
The people who learn STEM don't practice connecting
6. 5. 4. 3. 2. 1.
the speed of the blood in a person's
pumped by your heart. During a heart beat,
Motion graphs are for more than carts on
are aware that social issues can undermine
a positive impact on the health of millions of people. But as STEM
sensors. STEM workers in the Health sector are proud that they have
involve using, designing, testing, or writing software for medical
How use of race-norming resulted in
Football tackles and Systemic Racism
1. A 110 kg linebacker running at 2.0 m/s and an 82 kg
quarterback running at 3.0 m/s have a head-on collision in
midair. The linebacker grabs and holds onto the
quarterback. Who ends up moving forward after they hit?
2. How fast are the two going just after they hit?
3. A concussion happens when the brain, which is floating in
cerebrospinal fluid, hits the side of its container, the
skull. Do football helmets prevent concussions? Explain your
reasoning based on Physics we've covered in this class.
4. The average professional NFL player only last about 3.3
years before health reasons cause them to retire. Repeated
concussions are a common cause for retirement. Watch the
4-minute long video How use of race-norming resulted in
denial of former NFL players' concussion claim. What is
"race-based norming"? How was it used in the NFL
settlement for former players who suffered concussions?
5. People often think of racism as being cruel and unfair to
someone based on their race. While that does still happen,
a larger issue is the systemic nature of modern racism:
many policies and practices have racist thinking at their
foundation. The NFL's use of race-norming is an example of
systemic racism. What's another example of a policy or
practice that has the effect of creating racially biased
outcomes? If nothing pops immediately to mind, do a
google search and include any good sites/articles you find in
your answer.
Hair Types and Hair Discrimination
1. Use a laser to measure the width of your hair. There is
an example of how to do this in the lecture video.
Show your work and all measured quantities. If you
need a laser, borrow one from a friend with a cat or from
the school.
2. After you've measured your hair's width, try rotating
the hair to see if the diffraction pattern changes
expands or contracts a little. That is, is your hair circular in cross section or oval? If you can, measure
the thinnest and thickest widths of your hair.
3. Read this short article with helpful diagrams. How do
you expect your hair might be different than other
people in the class?
4. Read this article from USA Today on Race-based Hair
Discrimination. Have people ever given you a hard
time for the way you wear your hair? Have you ever
seen others treated differently because of the way
they wear their hair? Explain.
5. Is hair-bias discrimination racist? Explain.
6. What is an example of a reasonable hair policy for an
employer or institution to have? What is an example of a potentially biased hair policy?
Solenoids and MRIs
Magnetic Resonance Imaging often uses a giant solenoid to
generate huge uniform magnetic fields. The solenoid in a
typical full-body MRI creates a magnetic field strength of
1.5 Tesla.
1. If the solenoid is 1.7 m long and 60 cm in diameter
with a single layer of tightly wound 1.0-mm-diameter
superconducting wire, what current is needed? (Note:
you can find N knowing the width the wire and the
length of the tube with the wrapped wires.)
2. MRIs need to use superconducting wire (R = 0Ω).
Why? What power would be radiated by the MRI
machine if it had even 1 Ω of resistance?
3. What are some health issues that an MRI is used to
diagnose? You might want to google this one.
4. Choose a small rural town in your state. What's the
name of the town? What's its population? Where is
the nearest MRI for someone who lives in this town?
5. Look at your insurance plan. How much would it cost
for you to get an MRI?
6. What are some things happening in industry
to make MRIs both more affordable and more accessible?