



"Designing Knee Braces" Assessment

My initials:		
FIRST	MIDDLE	LAST
(A)	(A)	(A)
(B)	(B)	(B)
(C)	(C)	(C)
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(X)	(X)	(X)
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I am a:

Girl

Boy

I was born in:

MONTH BORN
<input type="radio"/> January
<input type="radio"/> February
<input type="radio"/> March
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Today the date is:

MONTH	DAY	YEAR
<input type="radio"/> January		<input type="radio"/> 2010
<input type="radio"/> February		<input type="radio"/> 2011
<input type="radio"/> March	(0) (0)	<input type="radio"/> 2012
<input type="radio"/> April	(1) (1)	<input type="radio"/> 2013
<input type="radio"/> May	(2) (2)	<input type="radio"/> 2014
<input type="radio"/> June	(3) (3)	<input type="radio"/> 2015
<input type="radio"/> July	(4)	<input type="radio"/> 2016
<input type="radio"/> August	(5)	<input type="radio"/> 2017
<input type="radio"/> September	(6)	<input type="radio"/> 2018
<input type="radio"/> October	(7)	<input type="radio"/> 2019
<input type="radio"/> November	(8)	<input type="radio"/> 2020
<input type="radio"/> December	(9)	

Marking Instructions	
<ul style="list-style-type: none"> • Use a No. 2 pencil or a blue or black ink pen only. • Do not use pens with ink that soaks through the paper. • Make solid marks that fill the response completely. • Make no stray marks on this form. 	<p>CORRECT: ●</p> <p>INCORRECT:</p> <p>☑ ☒ ☐ ☑</p>

For each question below, fill in the bubble for the **BEST** answer.

1. What do all biomedical engineers need to know about?

- (A) Fixing computers
- (B) Ambulance engines
- (C) How the human body works
- (D) What to do when someone gets sick

2. What part of your body do you use when you take a step forward?

- (A) Bones and joints
- (B) Joints and muscles
- (C) Bones and muscles
- (D) Bones, joints, and muscles

3. What do models help engineers to do?

- (A) Learn about how things work.
- (B) Figure out what might happen.
- (C) Try out different designs to see how they work.
- (D) All of the above.

PLEASE DO NOT WRITE IN THIS AREA



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4. Which body parts do you need to bend your elbow?

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A Joints

C Bones

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B Muscles

All of the above

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5. A biomedical engineer is MOST LIKELY to work on:

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A An ambulance.

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An artificial arm.

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C A pair of eye glasses.

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D A biomedical engineer would not work on any of these.

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6. Choose the BEST answer.

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Why are humans able to bend their legs?

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A Because their skin is soft

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B Because their legs are strong

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C Because their bones are flexible

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Because they have joints in their knees

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7. A company is designing a new kind of shoe for people who have trouble walking. What would a biomedical engineer do to help?

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A Design machines to make lots of the new kind of shoe.

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B Drive trucks to bring the shoes to stores and doctors' offices.

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Study how people's feet work when they have trouble walking.

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D A biomedical engineer would not help with this problem.

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8. Where in their bodies do people have muscles?

A In only their arms and legs

B In their arms, legs, and heads

C In their arms, legs, and fingers

Throughout their bodies

9. You are designing a new shoe for soccer players.



Which of the following is NOT important to do before you design your shoe?

A Watch a soccer game to observe how soccer players run.

B Learn how people's feet are shaped so you can design a shoe that fits.

C Interview soccer players to find out what they like and don't like about soccer shoes.

All of these things are important to do.

10. Which of these statements is FALSE?

A A shoulder is a joint.

Joints and bones are the same thing.

C Elbows can move in some ways but not others.

D People need both joints and muscles to move.

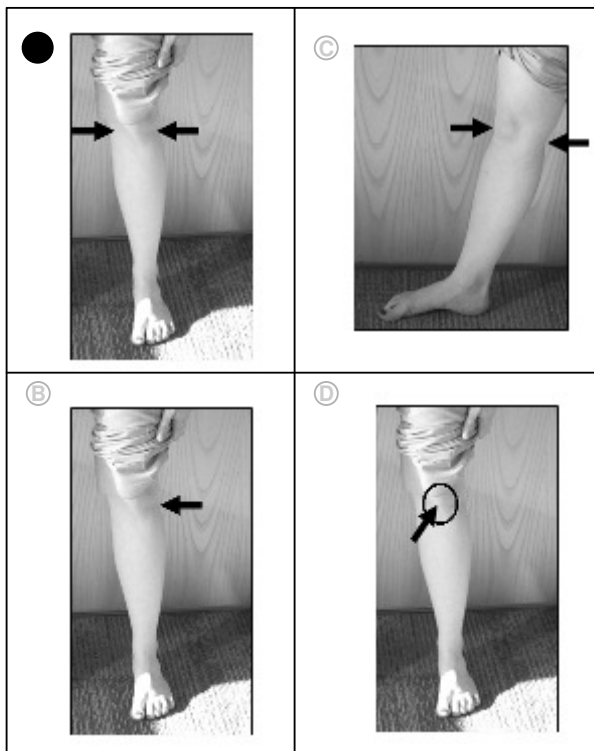
11. Someone is designing a new kind of brace to protect broken fingers. Which model would be MOST useful for her to use?

- A model that bends like a real finger
- A model that looks exactly like a finger
- A model that feels soft like a real finger
- A model would not be useful here

12. A biomedical engineer is MOST likely to do which of the following?

- Design a doctor's office.
- Study plants and animals.
- Fix machines in a hospital.
- Collect data about the human body.

13. Someone needs to improve a knee brace design so that a knee does NOT move from side-to-side when the brace is on it. Which picture shows where he should add more support?



14. How might a biomedical engineer help people who hurt their legs?




- Design ambulances to take them to the hospital.
- Design something to help their legs heal faster.
- Design robots that can help them get work done while they are healing.
- A biomedical engineer would not help with this process.

15. What part or parts of your body do you use to turn your wrist in a circle?

- Bones and joint
- Muscles and joint
- Bones and muscles
- Bones, joint, and muscles



16. Which of these things is a model?

<p><input type="radio"/> A doll's arm</p> 	<p><input type="radio"/> Map of hiking trails</p> 
<p><input type="radio"/> A plastic skeleton</p> 	<p><input checked="" type="radio"/> All of these are models</p>

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17. The picture below shows the human skeleton.



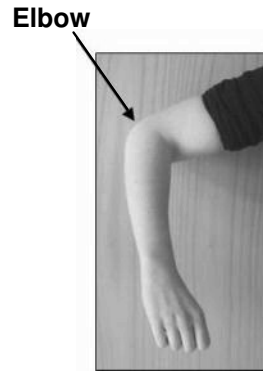
What does the skeleton do?

- A Helps the body move
- B Supports the human body
- C Protects the organs in the human body
- All of the above

18. At work, what is a biomedical engineer MOST LIKELY to do?

- A Drive an ambulance.
- B Give people medicine.
- C Fix machines in a hospital.
- Figure out new ways to do surgery.

19. Some people are figuring out how to design a brace for elbows.



Using a model could help them:

- A Figure out how elbows work.
- B Test different ideas for how to make braces.
- C Figure out what shape they should make the braces.
- All of the above.

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