



"Designing Knee Braces" Assessment

My initials:		
FIRST	MIDDLE	LAST
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(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
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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
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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.

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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 (D) 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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(B) 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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(D) 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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(C) 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

(D) 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.

(D) All of these things are important to do.

10. Which of these statements is FALSE?

(A) A shoulder is a joint.

(B) 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.

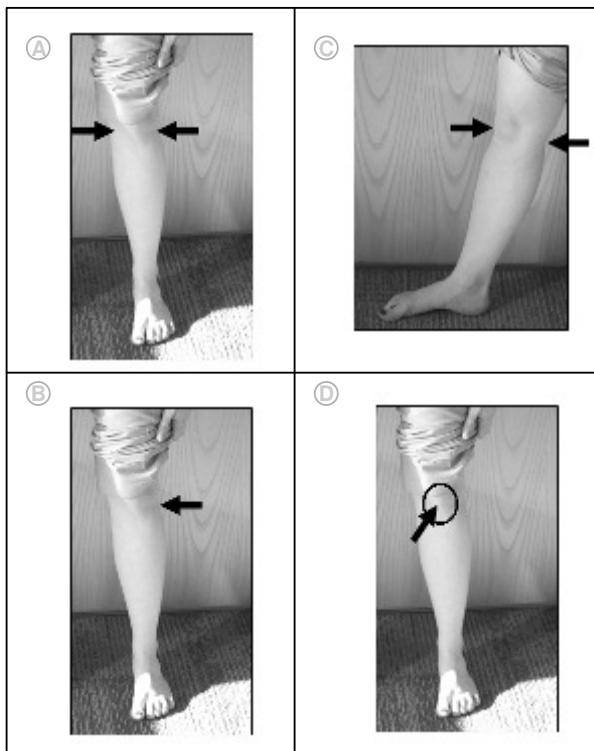
11. Someone is designing a new kind of brace to protect broken fingers. Which model would be MOST useful for her to use?

- Ⓐ 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>Ⓐ A doll's arm</p> 	<p>Ⓒ Map of hiking trails</p> 
<p>Ⓑ A plastic skeleton</p> 	<p>Ⓓ All of these are models</p>

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17. The picture below shows the human skeleton.



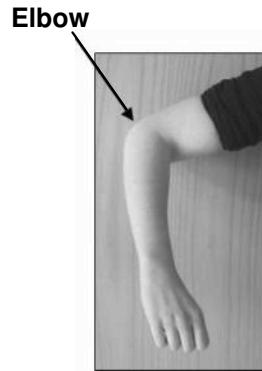
What does the skeleton do?

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

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

- Ⓐ Drive an ambulance.
- Ⓑ Give people medicine.
- Ⓒ 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:

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

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