Reflexes are rapid, involuntary neural pathways that help to protect the body. The knee-jerk (patellar) reflex is an example of the numerous stretch adjustments your body makes every second to unconsciously maintain your balance and co-ordination. Try to initiate the following five common reflexes.

LIGHT REFLEX

The **light reflex** is a reflex that controls the diameter of the pupil, in response to the intensity of light that falls on the neuron cells of the retina in the back of the eye, thereby assisting in adaptation of vision to various levels of lightness/darkness. A greater intensity of light causes the pupil to constrict, whereas a lower intensity of light causes the pupil to dilate (expansion; thereby allowing more light in). Thus, the pupillary light reflex regulates the intensity of light entering the eye. Light shone into one eye will cause both pupils to constrict.

BLINK REFLEX

The **corneal reflex**, also known as the **blink reflex**, is an involuntary blinking of the eyelids elicited by stimulation of the cornea (such as by touching or by a foreign body), though could result from any **peripheral stimulus**. The reflex occurs at a rapid rate of 0.1 seconds. The purpose of this reflex is **to protect the eyes from foreign bodies** and bright lights (the latter known as the optical reflex). The blink reflex also occurs when sounds greater than 40–60 dB are made.

STRETCH REFLEXES

The primary tool that we will be using to test reflex activity is the **Taylor Reflex Hammer**. Care must be taken to use the proper hammer technique during our lab activities. Improper techniques will not elicit the desired reflexes. The tap stretches a muscle, which stimulates *stretch receptors* located in the muscle. In response to the increased stretch, which normally would only occur when the muscle load has suddenly increased, the muscle contracts. In this demonstration, such a reaction seems strange, but in normal circumstances the stretch reflex allows muscles to reflexively increase the strength of contraction in response to increased load.

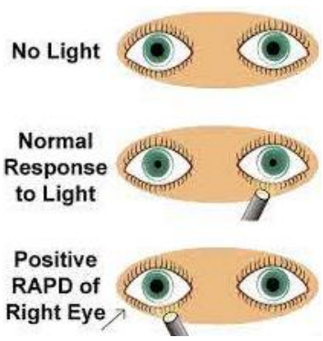
Question

How does a reflex arc help to protect the body from harm?

Safety Precautions

Do *not* use excessive force when testing the knee-jerk reflex. Follow all teacher safety instructions when conducting the blink reflex procedure in Part 2.

Procedure



Part 1: Pupillary Reflex

1. Work with a partner. Dim the lights in the room for a few minutes. Look at the pupils in your partner's eyes.

2. Turn on the lights. Check the size of the pupils.

What happened to the pupil when the lights were turned back on? (1 mark)

_____

Part 2: Blink Reflex

1. Have your partner hold a piece of clear plastic in front of the face.

2. Without warning, quickly throw a cotton ball at your partner's eyes. Your partner should blink, demonstrating the blink reflex.

Did your partner blink? _____ (1 Mark)

Part 3: Knee Jerk (Patellar) Reflex

1. Have your partner sit on a desk with their legs hanging over the edge.

2. Hit the top leg softly, just below the knee, with the side of your hand. The leg should kick out immediately, demonstrating the patellar reflex.

Were you able to get your partners leg to kick out? _____ (1 mark)

Part 4: Achilles Reflex – This one does not work well

1. Hold your parents foot as shown in the picture

2. Strike the Achilles tendon, the foot should flex, this is known as plantar flexion. This reflex assesses the nervous tissue between (and including) the first two sacral segments**.**

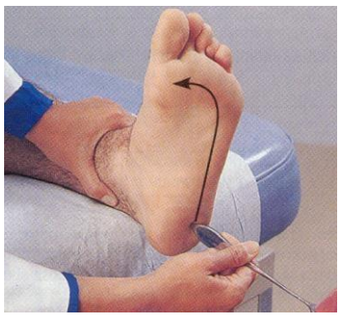
Were you able to get the foot to undergo plantar flexion? _____ (1 mark)

Part 5: Babinski Sign - This one does not work well

Damage to the **corticospinal tract (or incomplete myelination of the nervous system, as is the case with infants)** produces **Babinski's sign**, an abnormal response in which the **toes flare** and the great toe moves in an upward direction.

1. Place the end of the Taylor Reflex Hammer (point) on the bottom of the foot.

2. Slowly and lightly press and move it upwards as show in the picture.



Did your partner's toes curl or flare? _____ (1 mark)

Record the reactions for each of the reflex tests for both partners. Indicate if the response was normal or not. (5 Marks)

Reflex	Partner 1	Partner 2
Pupillary Reflex		
Blink Reflex		
Patellar		
Achilles		
Plantar (Babinski)		

What is a normal reaction for the Patellar reflex? (1 mark)

_____

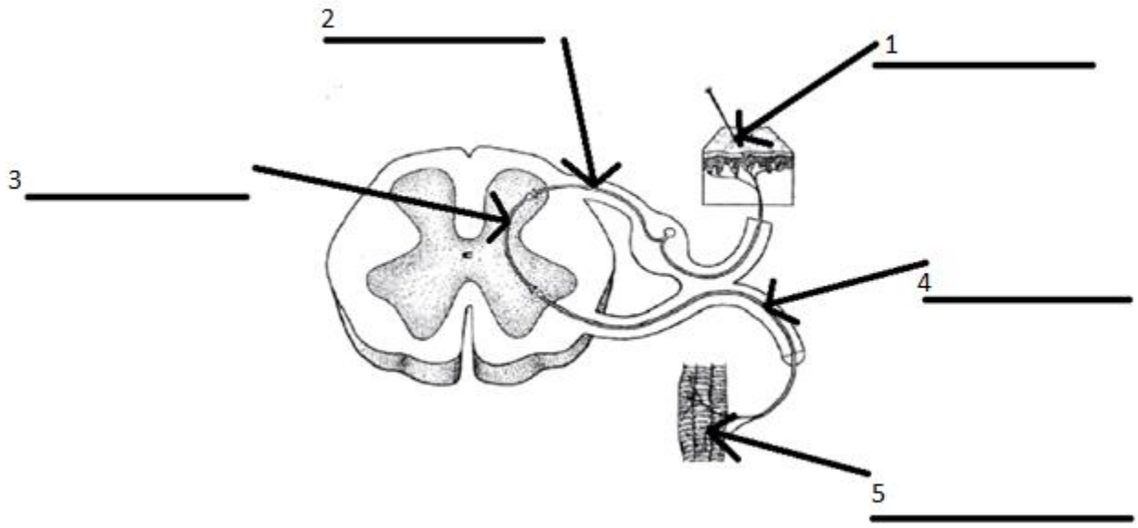
What is a normal response for the Achilles reflex? (1 mark)

_____

What is a normal response for the Babinski (plantar) reflex? (1 mark)

_____

Label a typical reflex arc, labeling the essential components in order from 1 to 5: (5 Marks)



What is an advantage of having reflex reactions? (1 Mark)

_____

_____

Why might newborn's reflexes differ from those of an adult? (1 Mark)

_____

_____