

1) **Category – Parts of NXT**

- a) **100 points** – Name the part of the NXT that understands its program and follows it.
 - i) **Solution-** What is the NXT Computer brick?
- b) **200 points-** Name the part of the NXT that allows it to move
 - i) **Solution-** What are the motors?
- c) **300 points-** Name the part of the NXT that reads input from its surroundings
 - i) **Solution-** What are the sensors?
- d) **400 points-** Name the part of the NXT that transmits signals between the NXT computer brick and the sensors.
 - i) **Solution-** What are the wires?
- e) **500 points-** Describe the two different types of sensors
 - i) **Solution-** What are sensors that simply detect the presence of a stimulus and sensors that detect the value of a stimulus?

2) **Category- Parts of Human**

- a) **100 points-** This is the part of the human body which commands the rest of the body
 - i) **Solution** – What is the brain?
- b) **200 points-** This part of the human body allows us to move
 - i) **Solution-** What are muscles?
- c) **300 points-** Give an example of a sensor in your body
 - i) **Solutions** – What is anything involved with the five senses, temperature, etc?
- d) **400 points-** This is what transmits signals between your brain and the muscles and sensors in your body
 - i) **Solutions-** What is the nervous system?
- e) **500 points-** About this many muscles are required for you to walk
 - i) **Solutions-** What is 200?

3) **Category- NXT Movement**

- a) **100 points-** This is where the NXT computer brick gets the information it needs to know to move
 - i) **Solution-** What is its program?
- b) **200 points-** In order to move the NXT, its motors have to perform this kind of motion
 - i) **Solution-** What is rotation?
- c) **300 points-** This is a situation in an NXT program that would cause the robot to stop
 - i) **Solution-** What is the duration of the movement coming to an end?
- d) **400 points-** Name three different types of durations you can give the movement of your robot
 - i) **Solution-** What are unlimited, rotations, seconds, and degrees?
- e) **500 points-** Name two benefits of using a gear train to move a wheel
 - i) **Solution-** What are increases in power or speed or the linear displacement of motion

4) **Category- Human Movement**

- a) **100 points-** This is where a human gets the information it needs to move
 - i) **Solution-** What is the brain?
 - b) **200 points-** In order for you to move, your muscles have to do this
 - i) **Solution-** What is contract?
 - c) **300 points-** These are the two muscles involved in the bending of your elbow
 - i) **Solution-** What are your biceps and triceps?
 - d) **400 points-** Your muscles move your bones by pulling on these, which attach to bones
 - i) **Solution-** What are tendons?
 - e) **500 points-** If your elbow is bending, this action has to occur for it to stop
 - i) **Solution-** What is contraction of your triceps?
- 5) **Category- Human vs. NXT**
- a) **100 points-** Signals that travel through the wires of an NXT are similar to signals that travel thorough this part of the body in humans
 - i) **Solution-** What is your nervous system?
 - b) **200 points-** The touch sensor of the NXT is similar to this part of a human
 - i) **Solution-** What is the skin or any area sensitive to touch?
 - c) **300 points-** The sound sensor of the NXT is similar to this part of the human body
 - i) **Solution-** What are ears?
 - d) **400 points-** The light sensor of the NXT is similar to this part of the human body
 - i) **Solution-** What are the eyes?
 - e) **500 points-** This is the main difference between how humans and robots decide to do something.
 - i) **Solution-** What is that humans can think about actions while the NXT just reads its program?
- 6) **Category- Grab Bag**
- a) **100 points-** This is the name of the type of NXT robot that is programmed for this lesson
 - i) **Solution-** What is a taskbot?
 - b) **200 points-** If the circumference of the NXT wheel is 8 centimeters, how far would a robot move if made to go for 13 rotations?
 - i) **Solution-** What is 104 centimeters?
 - c) **300 points-** Give an example of a type 2 sensor
 - i) **Solution-** What is a sensor that tells you how loud a sound is or another such example?
 - d) **400 points-** This is the main quality seen in Disney's WALLE robot that we are unable to give to our robots.
 - i) **Solution-** What is the ability to think?
 - e) **500 points-** The ultrasonic sensor works by sending out a signal and judging how long it takes for that signal to come back. This is very similar to a process called echolocation performed by several animals. Give an example of one such animal.

- i) **Solution-** What are dolphins, bats, toothed whales, and certain species of shrews and oilbirds?
- 7) **FINAL JEOPARDY** – List the steps involved in a person hearing a sound, then walking toward it.
 - a) **Solution-** What is the ears pick up the sound and send a signal through the nervous system to the brain telling it that a sound has occurred and where it occurred, followed by the brain sending a signal through the nervous system to the muscles of the body telling them to move in the direction of the sound?