BUILD A PROBE TO STIMULATE MUSCLE MOVEMENT

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WHAT WE ARE BUILDING TODAY

- The completed probe can be used to safely stimulate muscle movements to build an understanding of the nervous system and its interaction with the muscular skeletal systems of the body.

- The device can be used as a springboard for discussion on how the body uses electro-chemical processes to produces electricity that carries signals in the nerves between the brain and all regions of the body.
The body has over 600 muscles that control its every movement.

Muscles contract and relax based on messages from the brain through the peripheral nervous system.

To move, for example in the diagram (right), the biceps muscle contracts to move the forearm up and the triceps contract to pull the arm back down.
This contraction takes place at the cellular level as shown in the diagram right.

These muscle fibers or sarcomeres relax and contract, making themselves longer and shorter.

As these cells are connected end to end in strands of muscle tissue, the entire muscle relaxes and lengthens and contracts and shortens.
Muscle movements are generated by the **central nervous system** and passed through the **peripheral nervous system** to the body’s various muscles.
THE NERVES RUN FROM THE BRAIN TO THE SPINAL CORD AND DOWN THE LENGTH OF THE ARM TO THE HANDS AND FINGERS

- These nerves deliver a message to contract or relax based on messages from the brain or spinal cord in the case of reflex actions.

- These messages are electrochemical in nature but basically send these messages to individual or groups of muscles through the nerves.
THREE TYPES OF NERVES

Nerve cells are divided into three main groups:

- **Dendrites** *(which receive outside input and send it to the brain)*

- **Axon terminals** *(which connect back to the central nervous system)*

- **Axon cells** *(which transport messages long distances throughout the body at several hundred miles per hour)*
USING THE DEVICE

- Using the device is simple. Using the previous diagram as a reference, place the probe in various areas to try to cause movements of individual fingers.
- Push the button momentarily and watch for finger actions.
- The strength of the signal can be increased or decreased with a knob.
INITIAL LAYOUT OF ALL PARTS FOR ASSEMBLY
Hook wires through terminals.

Crimp wires and push on sleeves.

Heat the shrink wrap sleeves.
ASSEMBLING THE PROBE

- Attach the wire as shown by twisting it to the bolt.
- Fold the attached wire against the bolt.
- Lay the bolt on a piece of duct tape and wrap the tape around it.
- Put the terminal connector in place as shown.
- Crimp the connector with the end of the wire stripper.
Fold excess wire against bolt as shown.
Place the probe on a piece of duct tape.
Wrap the tape around the bolt and switch to attach the switch to complete the probe.
COMPLETING THE GROUNDING PAD

- Crimp the terminal connector to the wire with the curved end.
- Place the curved end on a 12 x 12-inch piece of aluminum foil.
- Use duct tape to attach the wire to the foil.
- Fold the foil in half toward the wire.
- Next fold foil across in thirds toward the center
- Tape the edges of the foil to complete the pad.
- Crimp red probe wire connector to the red connector on the TENS unit.
- Crimp white wire on the grounding pad to the black connector on the TENS unit.
- See completed wiring.
Completed with TENS unit connected to the probe and the grounding pad.
USING THE COMPLETED UNIT

- Start out by using the power of the TENS unit on the lowest setting (usually 1).
- Gradually increase TENS power as needed.
- Try the probe in various locations where the nerves in the arm and hand run.
- Move the probe to other locations to find other spots where fingers respond to the probe.
Thanks for participating in the workshop!