Name _____ Section _____

Period 18 Activity Sheet: Information Transfer

Activity 18.1: Information Transfer Using Electrical Energy

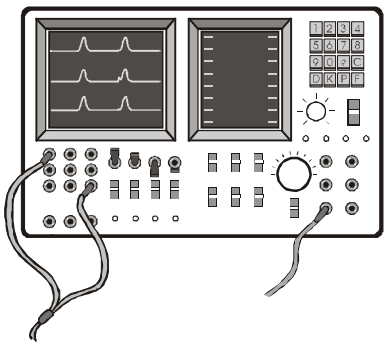
a) Loudspeakers

1) Briefly connect the loudspeaker on your table to a 1.5 volt battery. Place your hand on the speaker as someone quickly connects and disconnects the battery. What do you feel? What happens to the loudspeaker cone as you connect and disconnect the battery?

2) What makes the loudspeaker cone move?

b) Microphones

1) Your instructor will demonstrate a microphone connected to an oscilloscope. Draw or describe the pattern you see on the oscilloscope screen when the microphone is not in use.



2) What happens to the pattern on the screen when someone speaks into the microphone?

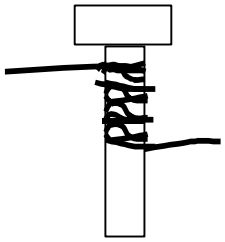
3) How is sound transferred by a microphone?

4) How is a microphone similar to loudspeaker? How do they differ?

c) Building a loudspeaker

1) Cut a piece of wire about 3 meters long. Wrap the wire around the top half of the bolt, leaving about 10 cm of each end of the wire free.

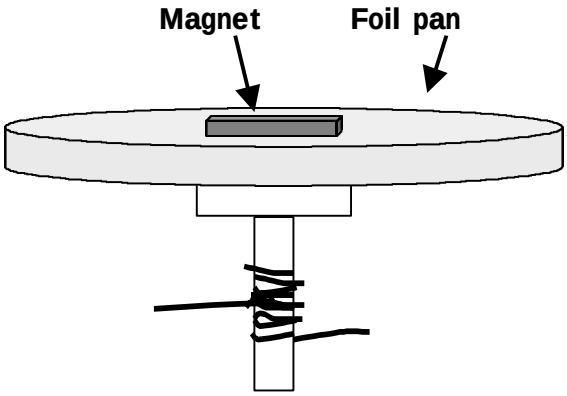
2) Using sandpaper, scrape the insulating coating off of about 5 cm of each end of the wire.



3) Place the head of the bolt against the bottom of a foil pan.

4) Place a magnet on the other side of the pan so that the magnetic attraction between the bolt and the magnet holds the pan in place.

5) Attach the ends of the radio leads to the ends of the wire wrapped around the bolt.



6) What do you hear when you turn on the radio?

7) Explain how your loudspeaker works.

8) How is the loudspeaker similar to the buzzer you built in Period 16?

Name _____ **Section** _____

d) Telephone Pickups (Optional Activity)

1) Place the two telephone pickups several centimeters apart. Be sure that one pick up is connected to the oscilloscope and the other is connected to the generator. What happens when the pickups are moved near one another?

2) When held close together, the two pick ups act like a transformer. Explain how information could be transferred from one pick up to the other.

e) Carbon Telephone (Optional Activity)

1) Try the Styrofoam cup "telephones." Turn on the amplifier that is connected between the cup and the loudspeaker. Have one person speak into the cup while someone else listens at the speaker. Describe what happens.

2) Use an analog multimeter to measure the resistance of the cup. Connect the meter leads to the terminals at the bottom of the cup. What happens to the resistance as you speak into the cup?

3) How could a change in resistance of the carbon in the cup affect the loudspeaker?

Activity 18.2: Information Transfer Using Radiant Energy

a) Free play radio

1) Examine the free play radio. List the energy conversions that take place when the radio is operated from its solar cell.

2) List the energy conversions that take place when the radio is operated by turning the crank.

3) What type of energy transfers information from a radio station transmitter to the radio?

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b) Energy transfer with beams of radiant energy

Your instructor will demonstrate energy and information transfer with a laser beam.

1) How is energy transferred from the radio to the loudspeaker?

2) How is the laser beam's energy modulated to transfer information from the radio?

3) Connect a solar cell to the white amplifier/loudspeaker. What happens when an LED flashlight connected to a radio shines on the solar cell? What type of radiant energy transfers information?

4) Point a TV remote control at the solar cell connected to the amplifier/loudspeaker. Describe what happens. What type of radiant energy transfers information?