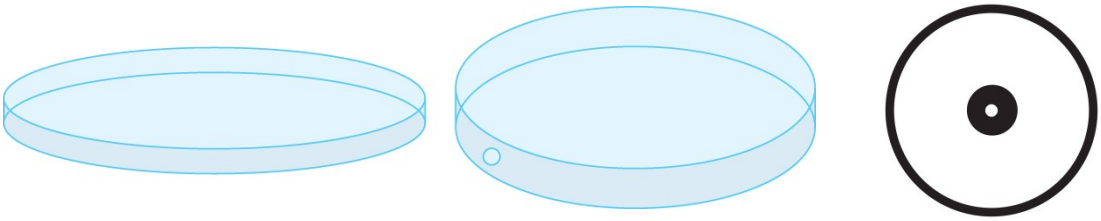
Worksheet: Speakers and Microphone

Name: _____ Group name: _____

1. Build a microphone/speaker with the Petri dish as your vibrating surface. The thin plastic is ideal for vibrations, and will be effective as a microphone surface.

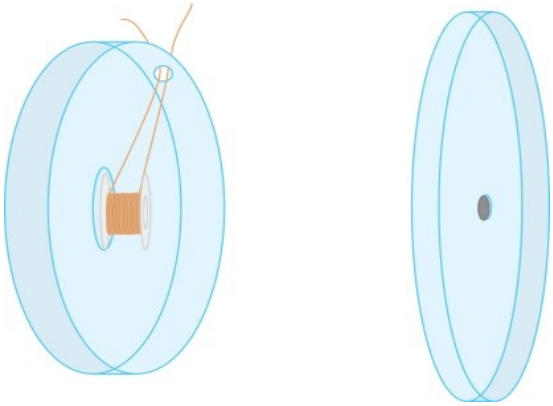
   (a) Center the large top on the template, and glue the magnet to the inside center of the top of the Petri dish with superglue according to the template with a magnet sized ring as a guide for the center of the dish. The glue is at the back of the classroom.

   (b) Use **all** the provided wire to wind a coil on the plastic spool. The more windings you add, the more voltage will be induced, providing a better signal. Wrap neatly and leave 12 inches on both ends to allow for connections. Strip about ½ inch of insulation off the ends of the wire with the steel scraper, used on the wooden block (**not the table top**).

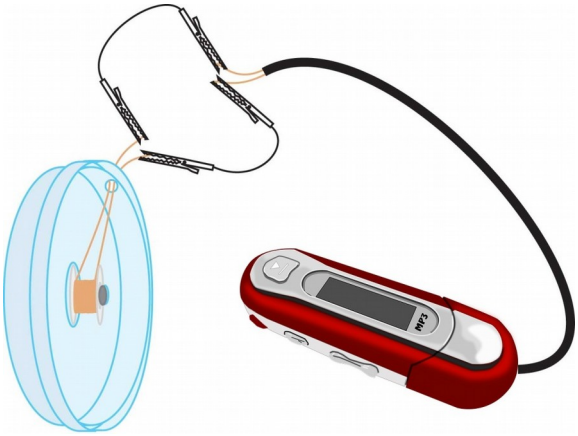


   (c) Glue the spool to the Petri bottom, using the template as a guide for where to glue the spool so it is centered. Before you glue, make sure that the spool seats nicely with the glued magnet in the Petri top.

   (d) Route the wire ends through the hole in the bottom Petri dish. Close the Petri dish. Connect the Petri dish to an MP3 player with the 1/8th inch pin plug-double bare wire and alligator leads.



2. Plug the 1/8th inch pin plug end into the “phones” slot in the MP3 player. Be sure that none of the alligator leads touch each other!



   (a) Press play on the MP3 player. What happens?

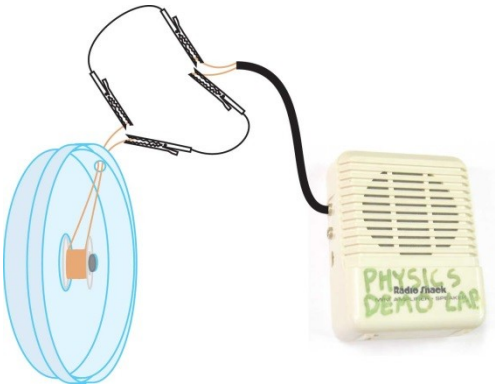
   (b) Compare a speaker to an electric motor. How are they the same? What fundamental aspect of magnetism and electric currents do both devices employ to operate?

3. Include an amplifier in the arrangement. Connect the 1/8th inch pin plug-bare wire between the Petri and the amp Ext SPKR plug. Connect the 1/8th inch pin plug-1/8th inch pin plug wire between the MP3 player and the amp INPUT plug.

   (a) Turn on the amplifier and the MP3 player. What do you observe, how is this different than without the amplifier?

   (b) Explain why the amplifier is used.

4. Now **remove** the MP3 player and plug the speaker into the **amplifier** INPUT slot.



   (a) Turn on the amplifier by rotating the dial on the right side. Speak into the Petri dish, and observe what happens. Do not put your thumb on the surface with the magnet glued to it or you may "damp" the signal. Record your observations.

   (b) What is the name of a device that reacts to sound in this way? _____

   (c) Now compare this new way of using the speaker to an electrical generator. How are they similar? What fundamental magnetic principle do they both employ to operate?

   (d) Explain how the "sound information" is carried through the different media in your setup and how it is converted.

Sound carried as?	Medium?	Hits which Device?	Converted Using what physical principle?	Converted To?
Sound wave				
		Ear		
		Brain	XXXXXXXXXXXXXX	XXXXXXXXX

Do not dismantle your experiment. Instead label it with your name – you will need it next lab.