The main goal of this assignment is for you to interview an elementary aged child, between grades 2 and 5, to find out his or her ‘model for magnetism.’ The child’s model will probably be very different from the one you developed in class, but nevertheless should be very interesting. Although you will interview your own child independently, other members of your group will also interview children and together you will produce a group report. It **would be best if different group members interview children of different ages.** That way your group will have a range of student ideas to think about and analyze. [You’ll arrange this when you meet together as a group during class to plan your interviews.]

On the next several pages is the *Interview Protocol Form*. This is what will guide you during your interview. You will also share this with the instructor and with other members of your group. We provide you with some specific questions about magnetism to ask all children (Parts 1 and 2), but you and your group members will also need to come up with at least one of your own questions (Part 3). You will need to have available during your interview at least two magnets, a paperclip, a toothpick and other small objects you can find. Try to include an assortment of items that will and will not be attracted to a magnet. After you and your group members complete the interviews, you will submit your interview protocol form to your instructor to be graded. Your group will also need to complete a single, common report to submit for a grade. The details of the report, as well as the grading criteria, are provided in a separate document. Finally, you will also assess the contributions that each group member (including yourself) makes to the group effort. A version of the assessment form is also provided in a separate document. You will have the opportunity to begin planning your interview with your group during class time, but after that you will need to communicate with your group members via the groups’ feature in Blackboard. [Your group has already been setup and you can access it anytime.]

You will need to make observation notes during your interview(s) on the *Interview Protocol Form* (IPF) to keep track of the child’s responses and actions. You will also need to protect each child’s identity, so do not use her/his real name. Assign a pseudonym and list the child’s age and grade on the IPF.

During the first part of the interview, you will find out what materials the child thinks would be attracted to a magnet, and how two magnets can affect each other. In the second part you will be trying to find out each child’s model for how a magnet works. During the third part you will ask questions that you and your group developed, and that should give you additional insight into how the child thinks about magnets and magnetism.
Interview Protocol Form:

[I instructor grading: Part 1 ___; Part 2 ___; Part 3 ___; Part 4 ___; Total ____]  

Your name _________________________ Group # _____  

Pseudonym of child ___________________; Age ______ ; Grade ______  

Interview Part 1: Sorting objects—what kinds of materials are affected by a magnet?  

Lay out on a table the following materials: a paperclip, a toothpick, a penny, a paper cup, a nail, an empty soda can, a pencil, a binder clip, and any other small materials you have around. You should also have a magnet with you.  

Point out the materials you have on the table and say to the child, “You’ll get a chance to play with these materials shortly, but first I want to ask you: What do you think would happen if I brought this magnet near the materials here? Do you think the material will move towards the magnet, away from the magnet, or will nothing happen?” [You can let the child look at the magnet, but do not let him/her bring it near the materials yet! You are trying to learn about their thinking before they get a chance to try it out. If the child says he or she doesn’t know, then demonstrate what happens with one material that is attracted to the magnet and one material that is not attracted. Then ask the student to make predictions for the other materials.]  

Record the child’s predictions. [You can make a table of the predictions if appropriate.]
Now give the child a chance to test out her ideas with all the materials. Were there any surprises? If so, how did the child react?

Record your observations.

Try to see if the child can make a generalization from her observations with all the materials. Ask, “Can you make a rule for what kinds of materials seem to move towards (be attracted to) a magnet, and what kinds of materials seem not to be affected by the magnet?” [If the child has trouble answering this question, then just move on to the next part of the interview.]

Record the child’s rule.

Interview Part 2: Investigating how two magnets affect each other and describing a model for how magnets work

Next, put the various materials aside and bring out the second magnet. Focus the child’s attention on the two magnets. Ask: “What do you think would happen if you were to bring these two magnets near each other?”

Record the child’s prediction.

Next let the child try it and play around with the two magnets for a short time. Depending on which sides of the magnets the child brings together, he/she will observe the magnets either trying to come together (attract) or trying to push each other away (repel). It is likely that if the child continues exploring with the two magnets he or she will observe both sorts of behavior (attraction
and repulsion), but if not, then suggest to the child that she turns around one of the two magnets and bring them together again. Make sure the child is aware that two magnets can either attract or repel, depending on which sides of the magnets are brought together.

Record what the child does.

Next ask the child to be really creative: “What do you think is inside each of these two magnets that cause them to pull towards each other when they are facing one way, and push each other away when one of the magnets is turned around?” Ask the child to draw pictures (using the worksheets at the end of this document). You should write down what the child says as he or she explains what the diagrams are trying to show. Give the child as much time as he/she needs while you encourage the child to include as much detail in their drawings as possible and say as much as possible. This set of pictures and his or her comments represents the child’s model for magnetism. Ask any follow-up questions you deem appropriate that would allow you to gain more insight into the child’s model.

Photograph or collect these drawings and written comments (to later scan them).

Summarize the child’s thinking, and write down any interesting quotes. Include any follow-up questions you asked and the child’s responses.
Interview Part 3: Asking your own questions

Your group will develop one or more additional interview question(s) about magnetism that would help you further describe each child’s way of thinking about magnets (that is, to further describe their models). For example, you might ask about the shape of a magnet (in which case you’ll need to obtain magnets of different shapes (e.g., horseshoe vs. bar vs. disc) affect magnetism, or how strong a magnet is (e.g. how many paper clips can it pick up or how close does a paperclip need to be to the magnet to be attracted to it), or about how they think magnets are made. There are many possibilities; be creative! You will fill in the Part 3 interview question(s) after your group meets during class. All members of your group need to ask the same additional interview questions.

After your group meets during class to discuss Part 3, write down the question(s) you group decides to ask, so that each group member has a record of it and can ask it (them) during his or her interview.

Group Interview Question(s): [Describe the scenario and the question]
During your interview record what the child does and/or how she/he responds. Include any additional probing or follow-up questions and the child’s responses. Include any drawings the student makes.

Interview Part 4: Summary of Child’s Model

Summarize your child’s model for magnetism; that is, how he or she thinks about why magnets behave the way they do and what he or she thinks might be inside magnets.
Two Attracting Magnets

**Directions:** Draw a picture and explain what you think is happening inside or on the surface of the magnets when they pull each other together (attract each other). [The interviewer can write down what the child says.]
Two Repelling Magnets

Directions: Draw a picture and explain what you think is happening inside or on the surface of the magnets when they push each other away (repel each other). [The interviewer can write down what the child says.]