Classroom Transcript:
Forces at a Distance Lesson 1

Teacher: All right, let's put our thumbs up. If you think that the connection; the fields that student 3 and student 2 are talking about. If you think that's related to the force that's causing the vibrations, you're gonna put a thumbs up; if you think it's probably not related to the force, you're gonna put your thumbs down. You can do somewhere in the middle. What do you think?

Student 1: What do you mean by fields?

Teacher: What do we mean by force?

Student 1: What do you mean by the fields?

Teacher: And what do we mean by the fields. We've got to say more about that. What do we mean?

Student 2: I guess like around it, or in that particular spot in the space between, around like where it can hit.

Teacher: Where what can hit?

Student 2: Like the force field.

Student 1: The magnets create the sound, because it couldn't be like right directly on the coil.

Teacher: Couldn't be directly on the coil. Cause it's not touching? So maybe there's some space in between. Have you ever noticed a field, when dealing with magnets or electricity? Have you ever noticed not quite touching something, but feeling the effect of the electricity or the magnetism.

Student 2: Yeah.

Student 3: I don't know if y'all tried it but when you fill up one and you can't really put them together and you try, you can feel it slip off.

Teacher: Give me a thumbs up if you've tried that: how magnets will turn one round the other way and you can't push them together.

Student 1: Yeah I tried that.

Student 2: You can put them on the table and then just do this and they'll push away. You don't even have to touch them. You just do that.

Teacher: Is that what you guys talk about when you say 'the field'? So there's something going on in the space between that we can't see, and that's what you mean by field? What do people think now? Student 5.

Student 4: I don't think that, because, if that was true, wouldn't it pull away from the coil?
Teacher: Okay, so you're saying so maybe that's going to push it the opposite way. So you're saying that you would feel that in the magnets? Say more about what you're saying.

Student 4: Like. Instead of just. So you have the magnet in your hand and you're putting the coil. Wouldn't it push away if it was, like, what they just said?

Teacher: What do you guys think? Could you have felt that in your hands?

Student 4: So then if it's not magnetic, why is it connecting?

Student 5: Why is it what?

Student 4: If it's not magnetic what's the point of saying that there's two sides, one that connects and one that doesn't. Why?

Teacher: Student 6 is raising her hand. What do you think?

Student 6: I think that it still has a force; when you flip it it's a force, but it's a negative force.

Teacher: What do you mean?

Student 6: A negative. I don't know. It's like the opposite of a. It's like when you. When you flip it; when it pulls away it's like a negative thing.

Teacher: Okay, so you're saying a pushing force, right?

Student 6: Yeah.

Teacher: Okay, Student 7?

Student 7: So, Student 6, I have a question. When you said what you said, do you mean if the coil isn't magnetic, what would the magnet have anything to do with it? Is that what you meant? Yeah, then I agree, because if the coil isn't fully magnetic then the magnet can't do anything but just sit there.

Student 2: I mean it does do something. It makes it run, it makes it work.

Teacher: Speak louder so we can all hear.

Student 2: I mean it does do something. It makes it louder I guess, or makes it work, it makes it run.

Student 7: Yeah, but you can't. You could say it has something to do with it, but you can't really say it's the main cause because we basically just agreed that the coil isn't magnetic, and what I'm thinking is that the magnet isn't the main thing that's making the sound.

Student 2: It is.

Student 7: Like the wire's important but nobody's saying that that's the main thing. But it's something to do with it. But everybody's focused on the magnet. What I'm saying it that the magnet is necessary, but it's not the most important thing.

Student 2: But I mean without the magnet you won't be able to hear anything.
Student 7: Yeah, exactly. What I'm saying is that it's not the main thing we should focus. It's not the most important piece, but it's still necessary. Like the wires are necessary, but we're not focused on that the way we are with the magnet.

Student 2: So what is the most important thing?

Teacher: Can you guys speak up a little bit? I think you're having a good discussion; I want us to be able to hear it. What's your question, Student 2?

Student 2: So what is the most important thing?

Student 7: I don't know. That's what I'm trying to figure out.

Student 8: I think it is the wire. It could be the coil. Because without the wire...

Student 7: Probably the wire's the most important.

Teacher: Let's hear from Student 9. He's had his hand up for a little bit.

Student 9: I feel like, in my opinion, everything has its important role. Like the wire brings all the electricity to the iPad, or the source, or whatever.

Student 7: Actually, I think, more, I agree with Student 9. I think there's not one most important thing. I think every thing's sort of equal, because without the coil the speaker wouldn't work; without the magnet the speaker wouldn't work. So everything relies on each other.

Student 6: I agree, because the wires kind of have to, like they attach to the source, and the magnet, kind of. Without the magnet you can't really hear any sounds, and so that's why you need like everything.

Teacher: Well I'll tell you what. It sounds like we've got some good ideas. It sounds like we've got some agreement on certain things; it sounds like we're disagreeing on certain things, and we need to investigate more. So I'm gonna tell you what we'll finish up today with, and what we'll do tomorrow. Tomorrow, I'm going to get all these questions out. I want to figure out where are our questions and what can we do to answer the questions; so like what can we investigate?