**Additional Examples of Classroom Discourse**

1. **Closed discourse (Lesson 3, Asaf)**

Teacher: Has anyone looked at the structure of the lens in their eye? Tell us, in your opinion, which is larger, the middle or the edges?

Student: The middle.

Teacher: The middle is thicker, that’s right. When we say “lens,” when we talk about a lens, what we mean, very simply, is a piece of glass that’s unequal in thickness accross its full length.

1. **Open discourse (occuring as the teacher demonstrates an optical phenomenon;  
   Lesson 4, Asaf)**

Teacher: So what do we see here? There’s a container of water with a phosphorus substance in it. Okay? You can just look through it and see the laser beam that is crossing it inside. There’s a mirror here now, look at the bottom of the mirror…. That surface is also a mirror. Now see what happens the moment I turn on the laser beam. Okay….

Student A: It’s a mirror?

Teacher: Some of the surface is a mirror. Who can explain what we’re seeing here?

Student B: We’re seeing a mirror image.

Teacher: What do you mean by “a mirror image”?

Student C: It’s an image of the course that the laser beam takes….

Teacher: Okay. Here we actually see the laser, but there’s something strange. The laser is actually trapped.

Student C: Yes. It’s cut at some point.

Student D: It’s cut every time the laser touches the water.

Student C: No, every time the laser, like, hits the color.

Teacher: When it comes out of the water?

Student C: Yes, when it comes out of the water. It’s broken from below, and then the mirror…

Teacher: And then it hits the color of the water, is that right?

Student D: Yes.

Teacher: And then, in fact, it’s reflected. Let’s look straight down from overhead. We see the mirror, don’t we?

*Several students talk at the same time and confirm that they do.*

Teacher: How can this be? What phenomenon is actually happening here?

Student E: Is the beam refracted?

Teacher: Yes, there’s refraction, but there’s something more. It’s the beam hitting the color….

Student C: It’s the reflection.

Teacher: That’s right. The whole thing here is really a phenomenon of reflection because the laser is always in the water. It never leaves the water and moves to some other substance.

Student B: How can that be? It doesn’t make sense.

Teacher: Let’s look into the water. There is mainly reflection. The angle of incidence, where it lands, is always equal to the angle of the reflection.

*The students ask several questions at the same time.*

Student E: But they aren’t right angles.

Teacher: It’s not a right angle but they’re equal. Meaning, if you draw a vertical line, this is the angle of incidence and this is the angle of reflection. Do you remember that a few lessons ago I showed you this red optical fiber? So it’s the same principle, okay?

*The discourse continues in this manner for another 20 seconds.*