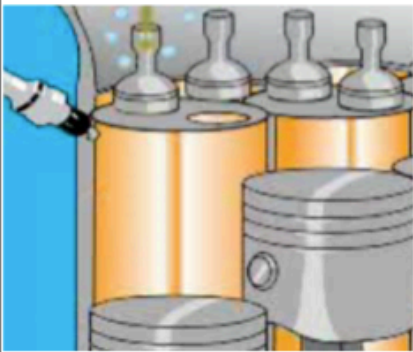


Academic Discourse Transcript– 9th grade Physics

At the start of class, students worked silently on whiteboards for 5 minutes on the following prompt, which was projected at the front of the classroom:

Date: 4/10/13 Objective 7.7 I can solve engine problems.	
Catalyst: The diagram shown below shows two pistons at various stages in their cycle. The pistons use thermodynamics to move up and down, which then move the wheels on the car. Explain on your whiteboard how the pistons are able to move. Use the words: <u>particles</u>, <u>transfer</u>, <u>kinetic energy</u>, <u>thermal energy</u>, <u>work</u>, and <u>spark plug</u>.	
Turn In: SIO#7.9 Tonight's HW SIO#7.10	

When the timer goes off, Noemi raises her hand.

Teacher: OK...Noemi.

Noemi: Um, everything...oh, um, if everything starts and the gas is coming from the, like, piston. That's a piston right? [looks at teacher; teacher gestures to other students]...oh well, everything is pushed by the gas and it makes energy.

Jordy: [inaudible on recording, but he asks Noemi a question]

Noemi: Oh, um, well I don't know if I'm right, but I put that it has kinetic energy when it moves. [Carlos raises his hand] Um, Carlos?

Carlos: I agree with you. I would also like to share out my answer. I don't know if I'm correct or incorrect, but like, yeah. I put that pistons are able to move when molecules work. Or, in other words the kinetic energy increases making the particles move faster, which causes pressure. That's what I put.

Noemi: So I was right?

Carlos: Uh, yeah. [Some students giggle; Carlos looks around] Christopher, would you like to contribute?

Christopher: Uh, like, I didn't really get it, but I remember from the diagram—oh, not the diagram, but the video we saw—it showed like the gas molecules. It went in, and then like it came out. So I thought it might have probably done work and then the rest went to the environment.

Gabriel: What's the spark plug?

Christopher: I'm not sure.

Gabriel: Would anybody like to go up? [*looks around and gestures toward Cassie*]

Cassie: I wrote that the particles are being entered the system. The energy causes the particles to move and expands the motion of the particles. This means that the kinetic energy increases and then the pistons do work. Work releases the energy and causes the pistons to move.

Lizbeth: Can you repeat it? You kind of said it fast, too fast for me to catch on every word you said.

Cassie: [*laughs, speaks louder*] I wrote that the particles are being entered the system. The energy causes the particles to move and expands the motion of the particles. This means that the kinetic increases and then the pistons do work. Work releases the energy and makes the pistons move.

Lizbeth: Thank you.

Jordy: Does everyone understand how it works?

Jose: [*~5 sec pause*] I don't.

Jordy: Well, what don't you get?

Jose: I don't know. I just don't get it.

Jordy: Well, would anybody like to go up and explain it to him? [*Kevin raises his hand*] Kevin.

Kevin: [*walks up to the front of classroom with his marker*] Um, I believe that gas comes in from here [*points*] and then the particles come in. And then there's particles right there [*points*]. And this is the spark plug so when it sparks it heats them up and so they start moving faster, and when that happens it applies work to the piston, which is right here [*points at board*]. And then that's how a piston moves up and down, which is how it moves the wheels. Does that clarify?

Jose: Yes.

Carlos: [*looks around and doesn't see any hands*] Yamilette, would you like to add anything? Do you agree with Kevin?

Yamilette: I put ...

The discussion continues for another five minutes until students resolve their questions.