



Unit on Force and Motion: January 7th

Eliciting Students' Ideas about Interactions of Forces + Straight Line Motion



To understand the language in these commentaries...

It is important to have read our Discourse Primer, found at:

http://tools4teachingscience.org/tools/discourse_tools/primer.html

The commentaries also draw upon the language of our Discourse Tools, which should also be reviewed first:

http://tools4teachingscience.org/tools/discourse_tools/index.html



As you watch this video episode...

Keep track of where you are by noting the time codes in the left-hand column. In the right-hand column are important features of the classroom discourse.

In one or more of the time segments, we ask you to do more than follow along—we leave the discourse commentary section blank. Here we ask you to listen closely to the video and fill in the commentary yourself.

The teacher's commentary for these sections can be found at the end of the document. Compare what you heard with what the teacher noted.

Summary of Episodes:

1. Small groups slide a wooden block along a few carpet squares & smooth table to compare what sliding "feels" like on their pulling hand.
2. Small groups slide a wooden block + a heavy brick along surfaces to contrast this with the previous experience.

Time points	Commentary
0:09→2:07 Yael, Jady, & Bradley discussing block on carpet	<p>The purpose of this activity is to have students collect some qualitative data (how it feels) to slide a block across different surfaces when the block is lighter & heavier. As students collect their data during the activity, I'm interested in hearing: 1) what they notice/pay attention to, 2) how they use their own everyday language to describe forces & motion.</p> <p>Important Ideas/Language I heard:</p> <p>Yael: "it stops at every bump" "this one might get stuck ... because of the splinters" "I don't know how to describe it!"</p> <p>Bradley: "this one's rougher and this one's a lot more smooth" "it's sticking" "if you turn it either way, it wouldn't make a difference ... well, I'm not sure."</p> <p>Jady: "it's catching" "[on the desk] it just glides right over it"</p>

Questions I pose to help students say more:

“What do you notice about that side [of the block]?”

“Why do you say that?”

“What about on just the desk? Have you tried it?”

“Does it make a difference – the splintery side vs. the other side?”

“Tell me about the difference. What does it feel like?”

Other key discourse moves:

Paraphrasing & revoicing S’s statements

“You were wondering ... “

“You were telling me before about ... “

“Tell me more about ...”

2:08→ 4:36

Important ideas/language I heard:

Destiny & Hilina,
sliding block on
carpet squares

Hilina:

“The hairier [the carpet is] it will not get caught and the shorter and no hair it has then the more it gets caught”

“I thought it would be that the hairy one would get caught, but that’s not what I felt”

“Yeah, you can go faster because it’s more smooth and there’s no tension getting you caught.

Destiny:

“Because probably the material ... it’s like skating, if you try to skate on carpet, you go SLOW. I know, because I’ve tried. But if you try it on something smooth you’re able to go because you aren’t getting caught in the carpet.” (*This is the kind of student experience you should LEVERAGE, that is, bring it up periodically, use it as a context to understand force, motion*)

Questions I pose to help students say more:

“Is that what you expected?”

“Tell me more about ‘faster’ – why do you think it’s faster on here [the table] than on the carpet?”

Other key discourse moves:

Paraphrasing & revoicing

“I heard you saying ‘faster and smoother’ – can you tell me more about that?”

“I like the idea of ‘tension’ – make sure that you write that down on your notes.”

4:37→6:40

Important ideas/language I heard (you fill in below, then check your observations against teacher commentary at end of this document)

Clayton, Samson, &
Juan summarizing
their observations
from sliding the
block on carpet
squares.

Questions I pose to help students say more:**Other key discourse moves:**

6:40→7:38

Important ideas/language I heard:

Yael, Jadyn, Bradley
sliding block + brick
on carpet

Yael & Jadyn deciding whether or not the direction of the splinters on the block matters. They decide that as long as you are pulling the block “with” the direction of the splinters, then it doesn’t matter.

Yael “pretends” to slide the block on carpet (but really he’s holding it in the air so you can see the bottom of the block) and then he imagines how the block will interact with the carpet. THOUGHT EXPERIMENT.

7:39→end

Important ideas/language I heard:

Liliana, Sydney,
Shawna sliding block
+brick on carpet

Sydney:

“The brick + block, since the brick is made of cement and cement is really heavy it makes the block more heavy because it puts more pressure on it.”

Liliana:

“It has trouble going up like from the more flatter one.”

Questions I pose to help students say more:

“So what are you noticing?”

“How did the brick and block compare to just the block?”

“Tell me more about the pressure part.”

END OF LESSON

Teacher’s
commentary from
4:37→6:40

*** Important ideas/language I heard:**

Clayton:

“The block slid easier on the desk than on the four carpet pieces ...”

Samson:

“ [continuing Clayton’s talk] ... because it was smoother and could glide through without any obstacles.”

Questions I pose to help students say more:

“Did it feel different to pull it on the four different kinds of carpet?”

Other key discourse moves:

“Tell me more about the ‘obstacles’ part.”
