

Replacing Pre-class Textbook Readings with Videos

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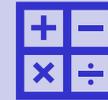


Oregon State
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<https://beav.es/5ur>

Background



Calculus-based
introductory physics



Hybrid lecture/studio
format



Diverse learning
objectives



Oregon State
University



Mechanics

Waves

Electromagnetism

Major Changes



Rapid switch to remote; slow return to in-person



Reduce stress from high-stakes assessments



Focus on multiple representations and physics sensemaking



Shift away from traditional textbooks*

*We have been using Knight for many years

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Get-ready Activities



Completed before
students come to class



Read textbook sections
Answer warm-up questions
Play with simulations



Instructional team
can review responses
before class



Graded for participation

Get-ready Activity 8

Read section 5.5 ([Newton's 2nd Law](#)) and section 5.6 ([Newton's 1st Law](#)).



8-1
Explanation

[Show Correct Answer](#)

[Show Responses](#)

Consider the following three situations:

A: You are in a car when the speed limit changes from 35 mph to 45 mph.

B: You are in a car on the freeway driving at a constant speed of 70 mph.

C: You are in a car waiting for a red light to turn green.

Rank the three situations by the magnitude of the net force on the car from **largest to smallest**.

A

Case A

B

Case B

C

Case C

Example (Top Hat)

Get-ready Activities



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~~Read textbook sections~~
Answer warm-up questions
Play with simulations

**In 2021, I started
replacing textbook
sections with short,
focused content videos**



Instructional team
can review responses
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Graded for participation

Why get rid of the textbook?

- **Students would often tell me how useless it was**
 - Including attached Mastering Physics homeworks
- **Traditional textbooks are expensive**
 - Can run over \$100 for the year
- **In resource surveys, students rarely found the textbook very helpful**
 - Nearly half did not find the textbook helpful or *did not use the textbook at all*

Why Videos?



Short and focused



Match course style more closely



Students are more prepared for discussions



Easy to produce during remote teaching

Process

- **Videos made during remote instruction**
 - **Created short (2-3 slide) presentations**
 - **Recorded video, audio, and shared screen using Zoom on my home computer**
 - **Talked through slides, often annotating or using props**
 - **Captioned by OSU's Disability Accommodation Services**
- **The next slide is an example from one of the presentations**

Forces

- A force is a kind of interaction between objects that can impact the motion of each object
 - There are different *types* of forces.
 - A force always involves two objects.
 - Forces are vectors.
 - Forces are measured in Newtons (N).

Implementation

- **During 2021, I was able to make a preliminary set of videos for all three quarters**
 - **Focused on essential content**
 - **About 100 total videos**
 - **Usually 2-5 minutes each (occasionally up to 10)**
 - **Medium quality Zoom recordings**
- **A few of these have been refined, but most are “good enough”**

Observations



Virtually no students found the videos unhelpful

Almost 2/3
“very helpful”



Fewer students skip videos (but some still do)



Little observable difference to in-class participation

Especially hard to tell with many other changes plus COVID factors



No discernible changes on course assessments

Future work

- **Currently working to incorporate the videos into an open-source OER textbook replacement**
 - **Refine, improve, and expand videos using OSU's lightboard studio**
 - **Pair videos with brief text and exercises**
 - **Broaden applicability to other course formats**
- **I plan to publish and test the Mechanics content when I teach this Spring quarter!**



Thank you!

