

## Physics Teaching Web Advisory

### Web-based Assistance for Teachers of Physics

Dean Zollman, Sytil Murphy, Scott Stevens,  
Michael Christel & Brian Adrian

The **Synthetic Interview** provides the teacher with an interface that is very similar to conversing with an expert. The video and other information are stored in a database and are presented when a teacher asks a question.

A teacher selects one of four experts to ask a question about the pedagogy of teaching physics.



The teacher asks a question about the teaching of physics.

The question is matched by the Pathway search engine to one of 7,600 responses in our multimedia data base.

An experienced teacher provides a pre-recorded response.

Auxiliary information can be popped up as needed.

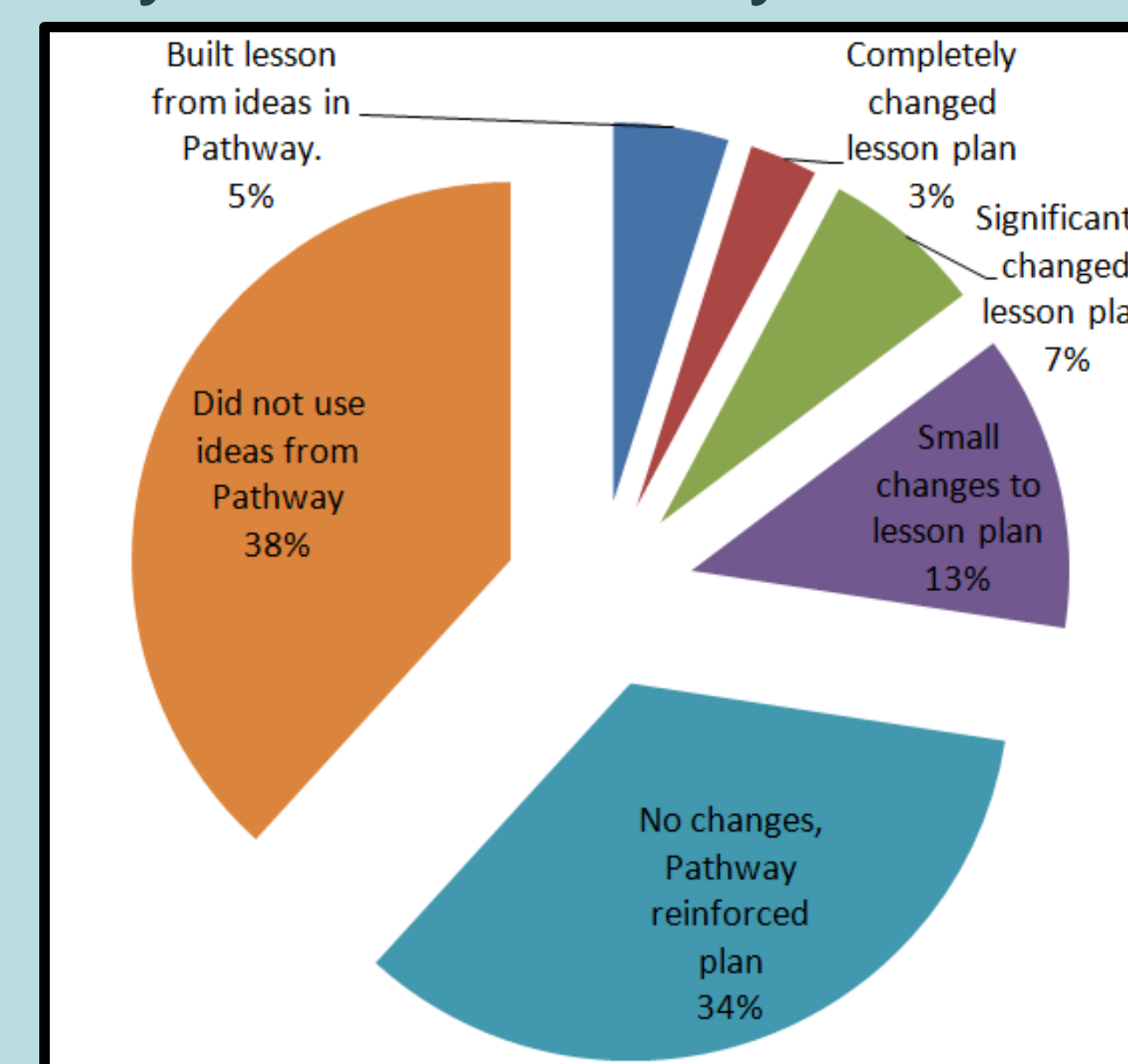
Similar questions which have been asked by other teachers can be selected, or the user can send the question to comPADRE, the digital resource for physics and astronomy education.

[www.physicspathway.org](http://www.physicspathway.org)

Pathway uses over 7,600 recorded responses to answer over 7,600 questions about the teaching of physics. In most cases the question can be answered by two of more of our experienced teachers.

## Evaluation

In a case study 19 high school teachers used Pathway for 14 weeks. Each week they reported how they used Pathway in creating their lesson plans.



## Example of teacher use of Pathway

### Useful ideas for lesson on Momentum

- Importance of teaching momentum, even in a survey class
- Ways to transition from Newton's Laws to

### How lesson plan changed

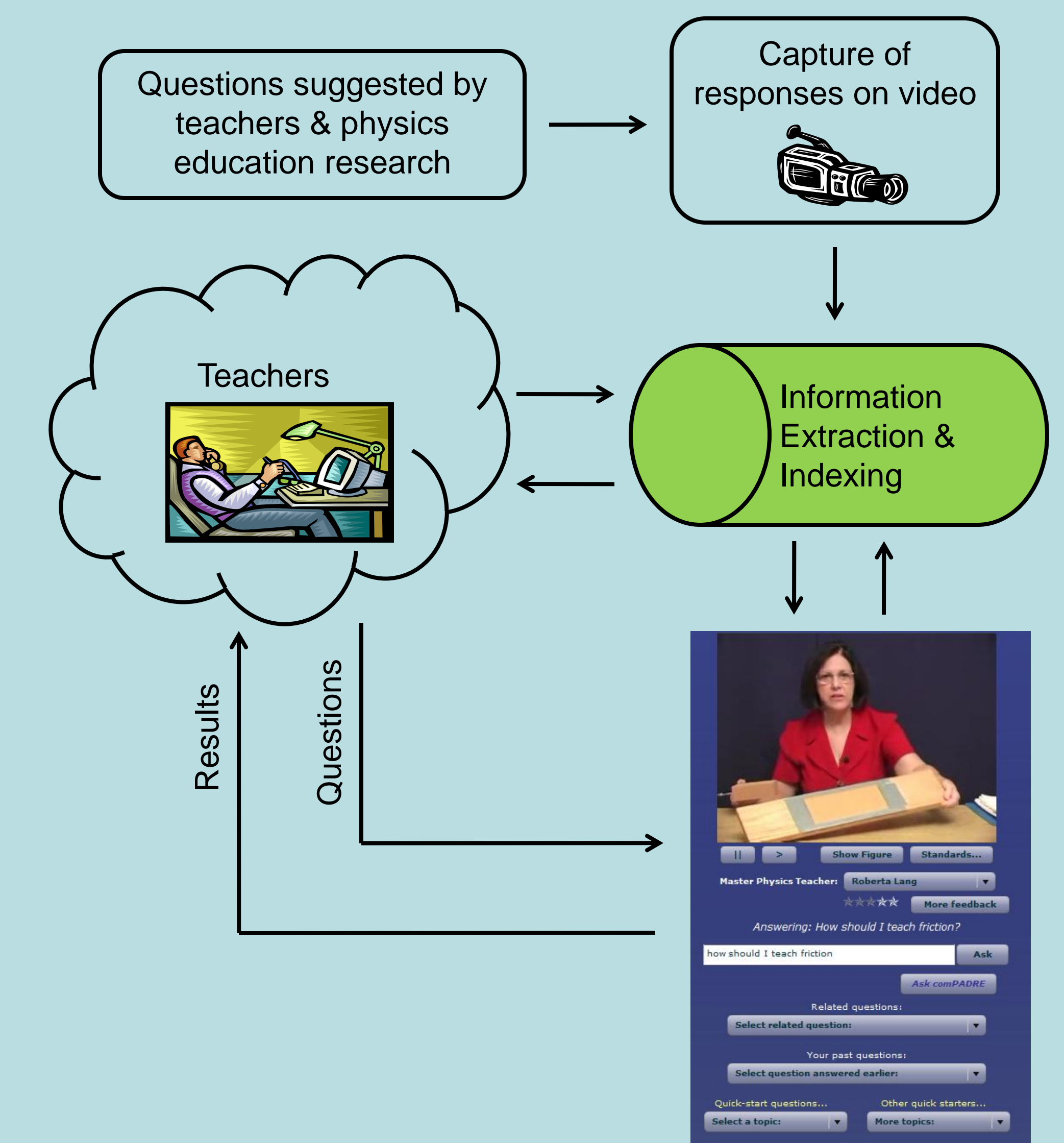
- Included some math but not algebra (Paul Hewitt)
- Added the simple definition of kinetic energy so students could distinguish between momentum and energy, even though we may not have gotten to energy yet (R. Lang).

### Lesson Plan on Sound Changes due to Pathway in red

Monday	Tuesday	Wednesday	Thursday	Friday
<p>What is sound?</p> <ul style="list-style-type: none"> <li>Call sound energy</li> <li>Address difference between sound and light</li> <li>Compare eyes and ears and relative speeds</li> <li>Talk about lightning and thunder</li> <li>How is sound created?</li> <li>Describe as longitudinal and connect to transverse</li> <li>Lab-Sound in a Can</li> <li>Demo-Whale sounds</li> <li>How fast does sound travel?</li> <li>Lab-Sound in a Can</li> <li>Video-tube with cork dust in it to show longitudinal wave</li> <li>Demo-broken speaker</li> <li>Online app of sound propagation</li> <li>What makes different sounds?</li> <li>Look at the difference between snapping fingers on computer</li> <li>Explain how helium affects voice</li> <li>Frequency range</li> <li>Ultrasound</li> <li>Audio</li> <li>Infrasound</li> <li>DEMO-range of hearing</li> <li>Uses</li> <li>Ultrasound</li> </ul>	<p>How does sound move?</p> <ul style="list-style-type: none"> <li>Does sound need a medium to move?</li> <li>How does the medium affect the sound?</li> <li>Sound is louder when listening to hammer on table if you put ear on table</li> <li>Lab-Sound in a Can</li> <li>Demo-Whale sounds</li> <li>How fast does sound travel?</li> <li>Lab-Sound in a Can</li> <li>Video-tube with cork dust in it to show longitudinal wave</li> <li>Demo-broken speaker</li> <li>Online app of sound propagation</li> <li>What makes different sounds?</li> <li>Look at the difference between snapping fingers on computer</li> <li>Explain how helium affects voice</li> <li>Frequency range</li> <li>Ultrasound</li> <li>Audio</li> <li>Infrasound</li> <li>DEMO-range of hearing</li> <li>Uses</li> <li>Ultrasound</li> </ul>	<p>Sound intensity and Sound Level</p> <ul style="list-style-type: none"> <li>Inverse square law</li> <li>Intensity</li> <li>Amplitude</li> <li>Decibel scale</li> <li>Just mention decibel, don't make them know how it works</li> <li>Example, corner school of fish</li> <li>Refraction, Refraction and diffraction</li> <li>TRANS-range of hearing and problems</li> <li>How we hear (model of the ear)</li> <li>Video-cochlear implants</li> </ul>	<p>Sound intensity and Sound Level</p> <ul style="list-style-type: none"> <li>Inverse square law</li> <li>Intensity</li> <li>Amplitude</li> <li>Decibel scale</li> <li>Just mention decibel, don't make them know how it works</li> <li>Example, corner school of fish</li> <li>Refraction, Refraction and diffraction</li> <li>TRANS-range of hearing and problems</li> <li>How we hear (model of the ear)</li> <li>Video-cochlear implants</li> </ul>	<p>Graduation-No Schools</p>

Pathway has created a digital library for physics teaching. More than a collection of materials, Pathway combines

- state of the art digital video technology,
- natural language interface and searching,
- links to contemporary research on physics teaching and learning,
- modern pedagogy and
- the knowledge of experienced teachers.



Links to the National Science Education Standards are available to aid the teachers.