

**Arizona Teacher's Excellence Coalition RTOP Video 3: RTOP rating by K. Falconer / R. Benford  
NAU PHS101 Fall 2001 D. MacIsaac AAPT PIPS Curriculum Optics L5.4**

**III. LESSON DESIGN AND IMPLEMENTATION**

	Never Occurred				Very Descriptive
1) The instructional strategies and activities respected students' prior knowledge and the preconceptions inherent therein.	0	1	2	3	4
Score of 4 because the entire lesson was set up for the students to build upon prior understanding. (02;51)					
2) The lesson was designed to engage students as members of a learning community.	0	1	2	3	4
Score of 3 because there was not enough student-to-student development of ideas. There was good student to teacher interaction and development of ideas. This would give a 2 but there was some student-to-student interaction and discourse over describing the phenomenon, but little or no evidence for student-to-student construction of ideas and understanding.					
3) In this lesson, student exploration preceded formal presentation.	0	1	2	3	4
Score of 3 because although there was little introduction of concepts before student exploration, the teacher did mention what was going to happen in an aside (01;50).					
4) This lesson encouraged students to seek and value alternative modes of investigation or of problem solving.	0	1	2	3	4
Score of 2 because the teacher solicited different answers but the teacher while not condemning the alternative placement of the blocks, encourages all the students to look straight through the thick side and to draw the situation from the top down.					
5) The focus and direction of the lesson was often determined by ideas originating with students.	0	1	2	3	4
Score of 2 because the teacher directed the lesson rather strongly. The teacher set the agenda and showed the students the observations and did not get the students to direct their own participation.					

**IV. CONTENT: Propositional Knowledge**

	Never Occurred				Very Descriptive
6) The lesson involved fundamental concepts of the subject.	0	1	2	3	4
Score of 4 because this is a science course for pre-service elementary teachers. The Arizona Science Standards have optics as a topic for elementary teachers to teach.					
7) The lesson promoted strongly coherent conceptual understanding.	0	1	2	3	4
Score of 2 because there were phenomena described and some articulation of the description but there was little concept building.					
8) The teacher had a solid grasp of the subject matter content inherent in the lesson.	0	1	2	3	4
Score of 4 because he didn't make any factual errors and responded to the student questions with correct answers.					
9) Elements of abstraction (i.e., symbolic representations, theory building) were encouraged when it was important to do so.	0	1	2	3	4
Score of 3 because the teacher made good use of drawings and focused the students on the rays at the critical interfaces and focused the students on the normals. But not real theory was developed, the phenomenon was described and drawn.					
10) Connections with other content disciplines and/or real world phenomena were explored and valued.	0	1	2	3	4
Score of 2 because the students are working with an every day phenomena, but he did not have relevance to everyday life. Could have used an example like the windshield is engineered to help minimize this.					

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**IV. CONTENT: Procedural Knowledge**

Never  
Occurred                      Very  
Descriptive

- 11) Students used a variety of means (models, drawings, graphs, concrete materials, manipulatives, etc.) to represent phenomena.                      0 1 2 **3** 4

Score of 3 because even through the phenomenon was represented in many different ways by the instructor, the students represented the phenomenon only with the prism and drawing. The students could have been encouraged to tell where else does this happen. Questions like this one and the resultant behaviors would increase the instructors' score not only on item 11, but also on several items including 10 and 17.

- 12) Students made predictions, estimations and/or hypotheses and devised means for testing them.                      **0** 1 2 3 4

Score of 0 because the students did not make predictions and did not test ideas for validity.

- 13) Students were actively engaged in thought-provoking activity that often involved the critical assessment of procedures.                      0 **1** 2 3 4

Score of 1 because the students were actively engaged but the students did not consider how they were doing the activity, or how this could be changed.

- 14) Students were reflective about their learning.                      0 **1** 2 3 4

Score of 1 because there was evidence from the female student giving the explanation at the end that she was think about how she understood the phenomenon but there was no evidence that the majority of the students were "thinking about their thinking".

- 15) Intellectual rigor, constructive criticism, and the challenging of ideas were valued.                      0 **1** 2 3 4

Score of 1 because there was some articulation of the group ideas but competing ideas were not even offered.

**V. CLASSROOM CULTURE: Communicative Interactions**

- 16) Students were involved in the communication of their ideas to others using a variety of means and media.                      0 1 2 **3** 4

Score of 3 because there was within group communication using drawings and protractors to measure and quantify. There was some between group communications, but not to the group as a whole.

- 17) The teacher's questions triggered divergent modes of thinking.                      0 1 **2** 3 4

Score of 2 because the instructors set up was divergent but it was clear the teacher was looking for a specific answer.

- 18) There was a high proportion of student talk and a significant amount of it occurred between and among students.                      0 1 **2** 3 4

Score of 2 because the class had a lot of student talking while the teacher moved around to various groups but the teachers also did a lot of talking.

- 19) Student questions and comments often determined the focus and direction of classroom discourse.                      0 1 2 **3** 4

Score of 3 because the students are discussing in their groups and with the teacher. This discourse is central to the development of the description of phenomenon. The teacher asks the students any thing else to add and the teacher answers several student questions, which were not central to the idea he was doing. There needed to be more group to teacher discourse and group-to-group.

- 20) There was a climate of respect for what others had to say.                      0 1 2 **3** 4

Score of 3 because the teacher closed down some of the student exploration. (position of block, etc.)

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V.	Student/Teacher Relationships					
		Never Occurred			Very Descriptive	
21)	Active participation of students was encouraged and valued. Score of 2 because students were encourage to describe the phenomenon but not explain it on their own. The teachers actually describe the phenomenon for the students before he asked for their descriptions.	0	1	2	3	4
22)	Students were encouraged to generate conjectures, alternative solution strategies, and ways of interpreting evidence. Score of 1 because there was one "right" answer but it was derived from the students work. For the teacher, there was only one path students should be taking.	0	1	2	3	4
23)	In general the teacher was patient with students. Score of 2 because the teacher missed the opportunity to capitalize on the students trying the block in different orientations. The teacher could have looked at why is the effect more pronounced in the edge on view compared to the top rotation.	0	1	2	3	4
24)	The teacher acted as a resource person, working to support and enhance student investigations. Score of 3 because there is a lot of evidence for teacher's interactions with the groups, the teacher is too often answering questions instead of directing inquiry.	0	1	2	3	4
25)	The metaphor "teacher as listener" was very characteristic of this classroom. Score of 3 because the teacher was listening to the students, the students were listening to him (reciprocity) but teacher was too directive.	0	1	2	3	4

**Scores by section and total RTOP score for video vignette #3:**

Section	Score
LESSON DESIGN AND IMPLEMENTATION	14
CONTENT-Propositional Knowledge	15
CONTENT- Procedural Knowledge	6
CLASSROOM CULTURE-Communicative Interactions	13
CLASSROOM CULTURE-Student/Teacher Relationships	11
<b>Expert RTOP Rater's Final Score for this Video Clip:</b>	<b>59</b>

**Instructor's Comments:**

Video vignette #3 is also edited to portray particular scores on RTOP items. This video portrays an intermediate RTOP score, which requires more discussion for every item than either vignette #1 or #2. This clip shows a wide variety of pedagogy in different sections of the lesson, including some lecture, small-group collaborative learning, a fair amount of whole-group interaction, and some demonstrations. There is also some recapitulative discussion of the nature of scientific explanation.

The video has deliberately edited to show lacks in some RTOP categories, making scoring challenging. The intent of this video vignette series is NOT to prepare professional RTOP evaluators, but to foster critical evaluation and reflection upon your own teaching practice via the RTOP instrument. If you do not exactly replicate the expert RTOP ratings but you can identify sections of the lesson and critique each in terms of reformed teaching practices, you are in the right place.