Concept Maps: Theory, Methodology, Technology
Proc. of the Second Int. Conference on Concept Mapping
San José, Costa Rica, 2006

TEACHING CONCEPT MAPPING AS ASSESSMENT TO TEACHER CANDIDATES
SOME SUCCESSES AND A PROPOSAL FOR NEXT STEPS

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Abstract. Concept maps have been shown to be a viable method for assessing student understanding. Concept map as assessment methodologies have been developed that use both closed-ended concept maps (Ruiz-Primo, Shavelson 1996) and open-ended concept maps (Stoddart, Abrams et al 2000). Concept mapping as assessment was taught to teacher candidates in a Masters of the Arts of Teaching program at the Empire State College as part of a course on educational evaluation (assessment of student learning). The purpose of this paper/poster is to inform the community of the ways in which teaching concept mapping as assessment was successful, and the ways in which it was not successful, as well as to propose next steps.

1 Successes and Next Steps

All of the teacher candidates were able to create concept maps representing their expert knowledge for a unit they were teaching, and were able to link these concept maps back to their state standards. The teacher candidates saw the value of concept maps as assessment. Most of the teacher candidates were able to use their own concept maps as an aid in their teaching.

The course then instructed the teacher candidates to have their students construct concept maps on the same topic as the teacher concept map they had created. The intention was to then use both the teacher and student concept maps to show the teacher candidates how to analyze concept maps. This is where the process broke down. Many, but not all, of the teacher candidates felt that the rules of their schools prevented them from involving their students in course assignments.

To remedy this situation for anyone who is interested in teaching concept mapping as assessment, I propose that the concept mapping community form a collaboration. We would identify topics about which teacher candidates would likely be interested in assessing their students. We would find teachers who would be willing to have their students create concept maps on these topics. These concept maps would be published in a reference set. We would also seek non-teacher subject matter experts to create concept maps on the same topics. These expert maps would also be added to the reference set. Once this reference set was created, teacher candidates would be able to analyze student concept maps and compare them to their own teacher concept maps even if they were unable to have their own students create concept maps during the time period of a course.

Student assessment is dominated by multiple choice tests in many schools today. If we are to promote concept maps as a viable alternative or supplement to multiple choice tests, we need to continue the development of concept mapping as assessment methodology, but even this development will come to naught if there are not practical resources to use in teaching these methods to teacher candidates. This proposal will take the next step in solving the problem of teaching concept mapping as assessment to teachers and teacher candidates.

This paper offers to start the proposed reference set by showing some examples of teacher concept maps. The examples are all on science topics since the course I taught was only for science teacher candidates, but the range of topics covered in the proposed reference set could certainly cover other subjects as well. A complete reference set on each topic would consist of a set of student concept maps representing both high and low performing students, one or more teacher concept maps, and one or more non-teacher subject matter expert concept maps. It should be noted that these teacher concept maps were created to express teachers' expert understanding of a topic with regards to a specific unit they were teaching. A teacher teaching a different unit on the same topic might have made different choices as to what to include in the concept map.

There are plenty of assessment resources available on the internet for teachers to use, but, as I have found from teaching this course, many of these resources are incomplete because they lack examples of student work. I feel it is important that the collaboration proposed in this paper makes sure to do the hard work of getting permission to include a complete range of student work in the reference set.

While the main purpose of this paper is the proposed collaboration, it is also an example of the sort of minimalist paper the collaboration could publish. In this case, teachers could benefit from the work that these teacher candidates have put into thinking about what is important in the topics they are teaching. Many granular publications, in addition to longer regular publications, could build up over time to help us improve the way that concept mapping as assessment is taught.

I have reproduced the two concept maps for which their authors have given explicit permission to share their work. The other teacher candidates who produced quality concept maps, but who did not respond to my request for permission to share their work, have been listed as authors of this paper in honor of their work. There is not so much of an imperative for school teachers to publish, but I think it is important to honor the work they do. If I subsequently receive permission to share additional concept maps, I will make them available in the web version of this paper. To contact the author, please email robert@robertabrams.net.

2 References

Stoddart, T., Abrams, R., Gasper, E., & Candaday, D. (2000). Concept Maps as Assessment in Science Inquiry Learning – a report of methodology. The International Journal of Science Education, 22(12), 1221-1246.

Ruiz-Primo, M.A. & Shavelson, R. (1996). Problems and Issues in the Use of Concept Maps in Science Assessment. Journal of Research in Science Teaching, 33(6), 569-600.

Examples of Teacher Concept Maps that could be included in the proposed reference set.

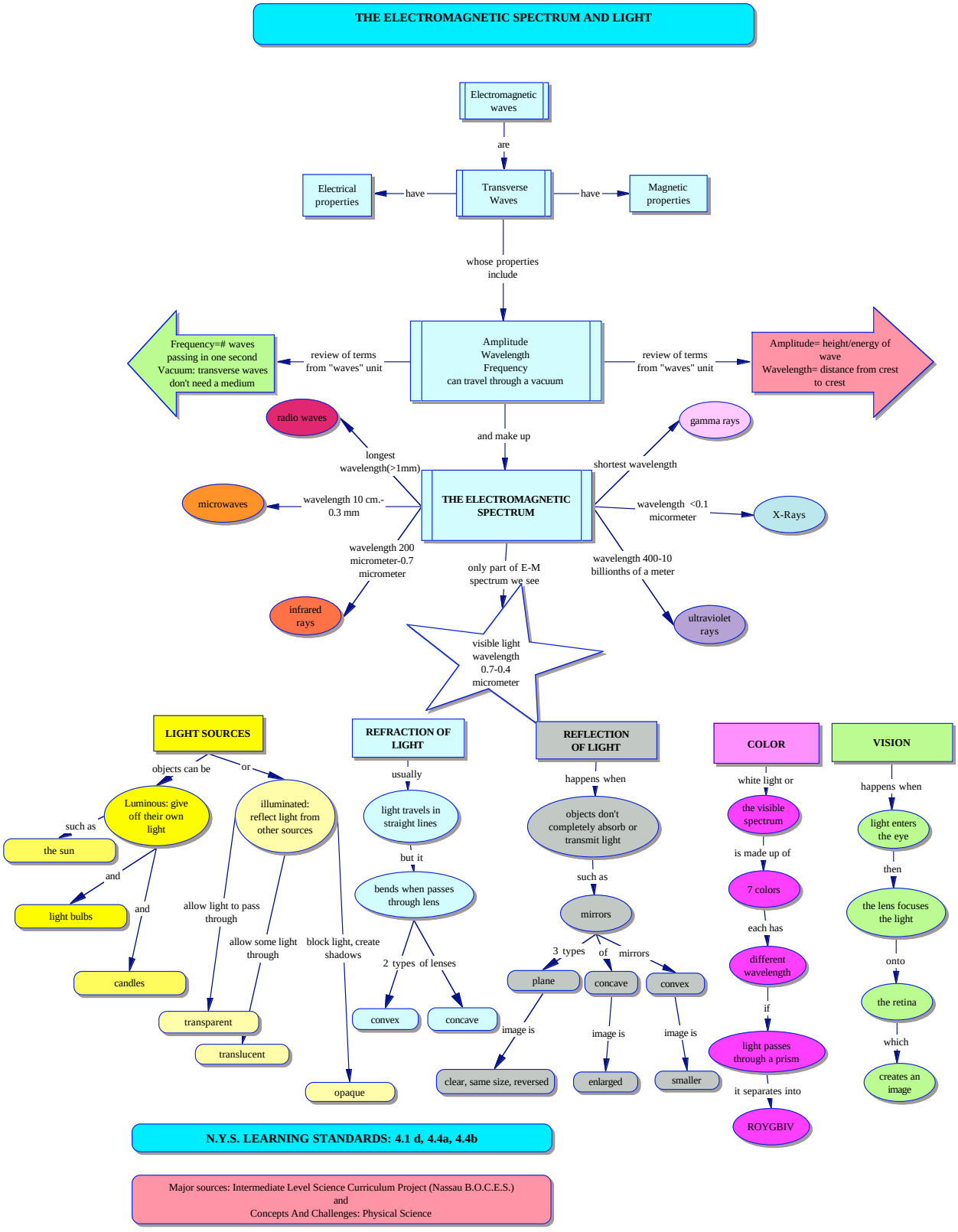
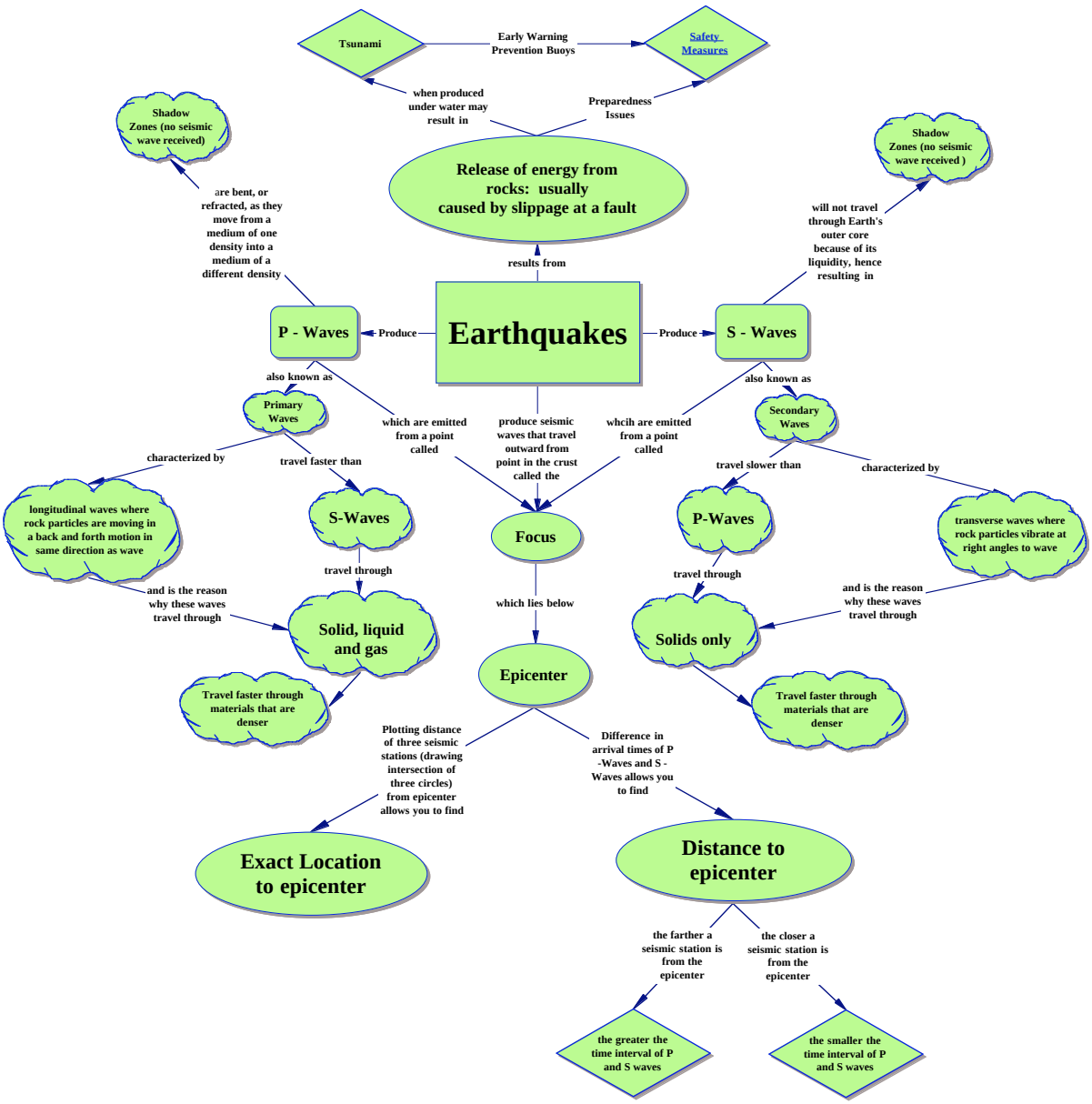


Figure 1: A concept map on the Electromagnetic Spectrum by Roberta Whitehorne**.**



Sigda, Robert B. Ph.D., UPCO's Physical Setting Review (2006)
UPCO-United Publishing Co., Inc

2.1j Properties of Earth's internal structure (crust, mantle, inner core, and outer core) can be inferred from the analysis of the behavior of seismic waves (including velocity and refraction). Analysis of seismic waves allows the determination of the location of earthquake epicenters, and the measurement of earthquak magnitude; this analysis leads to the inference that Earth's interior is composed of layers that differ in composition and states of matter.

2.1l Earthquakes and volcanoes present geologic hazards to humans. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.

Another portion of 2.1l also elaborates on plate tectonics which I intentionally stayed away from for this particular assignment. I am thoroughly aware of the importance of plate tectonics to earthquakes, however, that area is a 1,000 pound gorilla that I did not want to tackle in this assignment.

The website utilized for Earthquake Safety Measures
http://members.tripod.com/~Sidlinger/esm.htm

Figure 2: A concept map on Earthquakes by Arnold Rosen.