**What is being learned? What mathematics is the focus of the activity/technology? Is relational or instrumental understanding emphasized?**

This activity introduces one of the biggest ideas in calculus - the instantaneous rate of change. It also introduces the language of limit and derivative. Students would hopefully gain a relational understanding of how instantaneous rate of change is related to what they know about slope, and how we develop the definition of a derivative. The activity uses an intuitive understanding of a limit, and implicitly defines the term.

**How does learning take place? What are the underlying assumptions (explicit or implicit) about the nature of learning?**

Students are provided with specific steps to follow and specific things to try, and then asked to draw conclusions about what they observed by answering leading questions. Mr. Steketee states that by being able to manipulate the points on the graph students will be more involved in what they're learning about and will learn the concepts better.

**What role does technology play? What advantages or disadvantages does the technology hold for this role? What unique contribution does the technology make in facilitating learning?**

The technology allows students to see a theoretical idea in a visual and active way. They can watch the line move from a secant line to a tangent line, and see how the slope changes. Unfortunately, the set-up doesn't allow for easily changing the function, so the exploration is limited to what is provided.

**How does it fit within existing school curriculum? (e.g., is it intended to supplement or supplant existing curriculum? Is it intended to enhance the learning of something already central to the curriculum or some new set of understandings or competencies?)**

This activity is meant to be used as an introduction to one of the major topics in a calculus course. It can be used at the beginning of a calculus course with several other activities to provide an intro to calculus as a whole, or at the beginning of a unit on derivatives and instantaneous rates of change. If limits are included in a precalculus course, it could be used as extended material.

**How does the technology fit or interact with the social context of learning? (e.g., Are computers used by individuals or groups? Does the technology/activity support collaboration or individual work? What sorts of interaction does the technology facilitate or hinder?)**

The technology and most of the activity's questions best support individual usage. Only one student can manipulate the sketch at a time, and a lot of the questions can be answered by reading numbers from the sketch. However, class discussions after each section would be a good way to check students thinking about the point of the questions and their answers.

**How are important differences among learners taken into account?**

The sketch provides a way for visual and kinesthetic learners to see and manipulate what they're learning about. Sketchpad also allows students who prefer working with actual values to see the measurements and tabulate them. There is, however, a lot of reading involved in the activity steps, so the teacher would need to accommodate students who have difficulty.

**What do teachers and learners need to know? What demands are placed on teachers and other "users"? What knowledge is needed? What knowledge supports does the innovation provide (e.g., skills in using particular kinds of technology)?**

There is limited technological knowledge needed for this activity. You need to know how to select and move different items in Sketchpad, and how to use the calculator. Otherwise, the activity provides instructions on everything else. Pre-made sketches like this do not require or provide much in the way of new Sketchpad skills. Teachers need to know that students are most likely to have too many or not enough items selected at any given moment and how to correct that.