Introducing Dynagraphs

Description: Students explore dynagraphs, an alternative to Cartesian graphs, to develop a feel for various types of functional relationships.

Technology Strength: By dragging or animating an input marker and watching the output dynamically change, students get a very compelling visual understanding of independent variables and functions that emphasizes the dynamic relationship between function inputs and outputs.

Objectives: Explore dynagraphs; develop a feel for various types of functional relationships

Prerequisites: Basic understanding of the term function

Suggested Grade Level: 8 to 11

Sketchpad Level: Beginning

Suggested Duration: 30 minutes. Be sure to give students enough time to write detailed and precise descriptions of the dynagraphs (Q3 and Q4). To reduce the amount of time required, students could skip Q4 or the Explore More section.

Suggested Classroom Setting: Whole Class, Student Pairs

Preparation: Review the Activity Notes. For a student-pairs activity, preview the student sketch, work through the steps on the worksheet, and make a copy of the worksheet for each student. For a whole-class presentation, use the presentation sketch.

Materials: None

Student Worksheet(s): Introducing Dynagraphs

Student Sketch: Introducing Dynagraphs.gsp

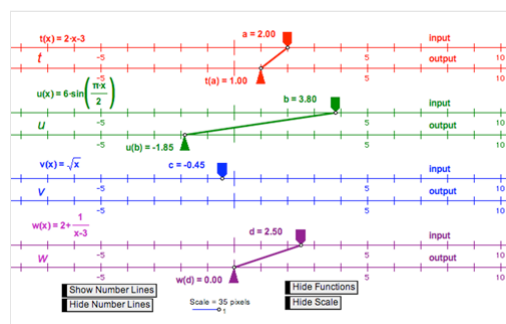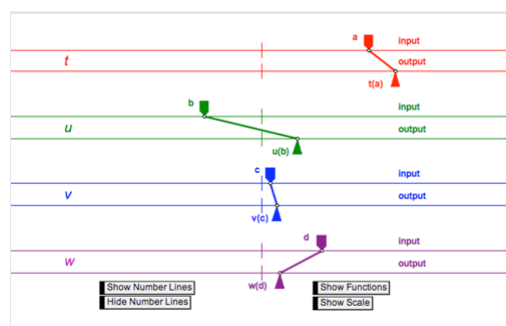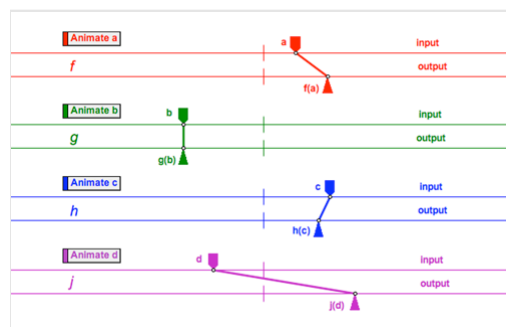**Presentation Sketch:** Introducing Dynagraphs Present.gsp

Vocabulary: Function, absolute maximum, absolute minimum

Sketchpad Version: GSP5

Using the Sketch:

Students use a dynamic new model called *dynagraphs* to explore functions. On both pages, students adjust the dynagraphs by dragging the input markers above the axis pairs. On page 1, students are given four different dynagraphs. For each of the four dynagraphs, students drag the input marker, observe the output marker, determine whether the dynagraph represents a function, and then write a detailed description of the function.

On page 2, students initially explore the dynagraphs with unmarked axes and follow the same procedure as before. They then press the *Show Number Lines* button to mark (number) the axes and use these to solve for unknowns. In each case, they must first choose the correct function dynagraph and then use that dynagraph to find the unknown. In the Explore More section, students investigate the absolute maximums and minimums of functions.

Sketch Tips:

Sketch Tips show skills needed in this activity, and the step at which the skill is first used.

Sketch Tip	Tip Sheet or Tip Video
Select, deselect, and drag objects with the **Arrow** tool	Using the Arrow Tool
Step 3: Change to a different page using page tabs	Moving Between Pages