Name: _____

Date: _____

Parameters in Secondary School Mathematics: Logistics Functions
Big Picture and Introduction

We find parameters in many places, if we look for them.

In their beginning algebra experiences, students learn about slope and intercept and the effects of changes in these parameters across representations of linear relationships. They see the "slope-intercept" form of an equation, using given as $y = mx + b$.

In later algebra experiences, students encounter the quadratic formula, which often includes $y = ax^2 + bx + c$ as the general form of a quadratic equation. Students might learn about how changes in the values of a, b and c relate to patterns in such things as changes in graphs and tables and the existence of roots of a quadratic equation.

In trigonometry, students learn about period, amplitude, phase shift and related ideas that appear across different representations of trigonometric functions.

Students learn about equations and graphs for conic sections that are based upon characteristics of the objects, such as focus and directrix. As an example, if the center or the radius of a circle is "changed," we have a different circle.

In geometry, students learn that two isometries of the same type can be distinguished based on particular things. For example, "changing" the center or angle of a rotation might lead to a different rotation.

The general idea behind all of these learning scenarios is looking at the effects of changing parameters. In this activity, you will consider the effects of parameters for logistic functions.

*Note: This activity introduces the idea of "**pre-punch**" and "**post-punch**" questions. Both kinds of questions help us to think about the mathematics underlying what we are doing and to avoid the trap of simply "watching" what happens on the screen without paying attention to the mathematics we can learn from the experience. The phrases reflect the need to think about the mathematics before and after you punch any keys, drag anything, click on anything, or otherwise interact with the technology tool.*

Answer each pre-punch question before you use your TI-Nspire to explore the mathematics. Answer each post-punch question after you carry out the indicated technology work.

Parameters in Secondary School Mathematics: Logistics Functions
Planning for Instruction

Classroom Practice

- Choose at least one of the ideas in the introduction (and summarized on page 1.2 of the tns file). Create an activity for secondary school students to help them understand parameter effects. Be sure to think about what pre- and post-punch questions you might ask to help your students make sense of what they see and do.

Parameters in Secondary School Mathematics: Logistics Functions
Discussion Questions

Mathematics

- In this activity, what is the role of conjecturing? What is the role of claims and evidence?

- What kinds of claims might students make? What counts as acceptable evidence to support or refute these claims?

Technology

- What is the minimal set of TI-Nspire skills that you needed to participate in this activity? What variations on the activity would be appropriate for students with more technology skills?

- How would this experience be different in a non-dynamic environment?

Learning Goals

- What might students learn about parameter effects through this activity?

- How does this activity help students to reason with symbols?

Parameters in Secondary School Mathematics: Logistics Functions
CAS Results

The following is a sample of the CAS results that prospective teachers might generate on page 1.14 of the tns file.