**Algebra 2 Advanced – Unit One Plan**

**Arithmetic and Geometric Sequences**

**Big Ideas**

Many problems in real life involve discovering patterns in data and extending these patterns to estimate costs or predict future values. With advances in technology, people frequently use spreadsheets and other programs to increase the speed and accuracy of their work. Once you can model a situation with a function, you get the power of mathematics and technology at your disposal. Of course, mistaking the type of model that applies in a given situation can lead to huge mistakes. As the saying goes:

 To err is human. To really mess things up requires a computer.

The focus of this unit is to recognize situations that are effectively modeled by arithmetic and geometric sequences and to use both the recursive and closed forms of the sequences to extend the models and predict future values.

**Real-life Applications**

Car depreciation

Cost Estimation

Efficient Use of Construction Materials

Compound Interest

Population Growth

Spread of disease

Bouncing Balls

**Key Terms**

Arithmetic Sequence – a sequence obtained by adding the same number to each term of the sequence to obtain the next term.

Geometric Sequence – a sequence obtained by multiplying each term of the sequence by the same number to obtain the next term.

Recursive Function – a starting value is given along with a rule that allows you to obtain any value from the previous value.

Closed Form – a formula is given that allows you to obtain any value if you know its place in the sequence.

**Day 1**

**Objective(s) –** Students will be able to:

* Collect and analyze data that is modeled by a geometric sequence;
* Predict values beyond the data set; and
* Explain why a line-of-best-fit is inappropriate in this situation.

**Agenda**

1. Welcome – Brief overview of course and expectations
2. Outline big ideas and goals of the unit plan
3. *Bouncing Ball* Investigation
4. Process *Bouncing Ball* Investigation
5. Notes on Arithmetic Sequences

**Assignment 1-1**

2-36, 2-37, 2-7 and 2-8. 2 review problems from Algebra 1

**Day 2**

**Objective(s) –** Students will be able to:

* Extend an arithmetic or geometric sequence; and
* Write a rule for an arithmetic or geometric sequence in recursive form.
* Write a rule for an arithmetic or geometric sequence in closed form.

**Agenda**

1. Quiz 1-1
2. Quick informal assessment of pattern recognition
3. Notes on geometric sequences and recursive form
4. Guided Practice
5. Time Permitting – Arithmetic Sequences and the Power of Excel

**Assignment 1-2**

2-43, 2-46, 2-71 and 2-73 – 2 review problems from Algebra 1

**Day 3**

**Objective(s):** Students will be able to:

* Use an Excel spreadsheet to generate arithmetic and geometric sequences.

**Agenda**

1. Quiz 1-2
2. Process homework and Quiz 1-1
3. Prep for Computer Lab
4. *Excel Spreadsheets for Sequences*
5. Review of Linear Equations in Two Variables

**Assignment 1-3**

* *Linear Equations in Two Variables* Worksheet
* Find a car that you want to buy in a newspaper or Internet advertisement. Print or cut out the advertisement and attach it to a blank sheet of paper with your name on it.

**Day 4**

**Objective(s):** Students will be able to:

* Relate the recursive form of a geometric sequence to car depreciation

**Agenda**

1. Quiz 1-3
2. Process Quiz 1-2 and homework.
3. Car Depreciation
4. Clear and Muddy
5. Review of Simultaneous Equations

**Assignment 1-4**

* 2-13 (Use recursive form for equation), 2-24, and 2-39
* *Review of Simultaneous Equations*

**Day 5**

**Objective(s):** Students will be able to:

* Apply their knowledge of sequences in a new situation.

**Agenda**

1. Process Quiz 1-3 and homework
2. Performance Task 1-1 (Storage Bins)
3. Review of Solving Quadratic Equations by Factoring

**Assignment 1-5**

* *Solving Quadratic Equations by Factoring*

**Day 6**

**Objective(s):** Students will be able to:

* Multiply polynomials

**Agenda**

1. Quiz 1-4
2. Process homework
3. Review of polynomial multiplication
4. Challenge Problem

**Assignment 1-6**

2-10, 2-13, 2-14 (Find closed form), 2-81, 2-98, 2-99 and 2-100,

**Day 7**

**Agenda**

1. Team Test with Life Lines
2. Process Team Test
3. Clear and Muddy

**Assignment 1-7**

2-29, 2-77, 2-110, 2-111, 2-112, 2-113, 2-114, and 2-115

**Day 8 (Extra Practice and Enrichment)**

**Agenda**

1. Complete practice sheets aligned with quizzes and *clear and muddy* feedback. Students who are clear on everything will complete an enrichment activity.
2. Challenge Problem

**Assignment 1-8**

2-122, 2-123, 2-124, 2-125, 2-126, 2-127 and 2-128

**Day 9**

**Agenda**

1. Unit 1 Test