

# Sell! Sell! Sell!

The decreasing wildlife habitat of the west.



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## Abstract:

This lesson allows students to formulate an understanding of the recursive process, iterations, and geometric patterns while giving them a contextual basis to introduce the ideas of geometric patterns, limits, and fractal geometry. Students will use recursion and fractals to understand the decreasing wildlife habitat of the west.

Level & Standards: 7<sup>th</sup> – 10<sup>th</sup> grade;

**Montana Standard 1** -- Students engage in the mathematical processes of problem solving and reasoning, estimation, communication, connections and applications, and use appropriate technology. **Montana Standard 7** – Students demonstrate understanding of and an ability to use patterns, relations, and functions

Time: 2 class periods or 90 minutes

Materials: Sell Sell Sell worksheet, rulers, colored pencils, fine graph paper

Objectives: Students will be able to  
discuss land development and decreasing wildlife habitat  
model using concepts of reiteration, geometric sequences,  
be introduced to fractal geometry

## Downloadable File Links:

Sell Sell Sell Student Page  
Graph paper (small squares)

## Teacher Notes

This hands on project involves making a model of a land use idea and examining what happens as you continue to subdivide the land.

## Assessment Ideas

Option 1 -- After students have discussed the other options for the location of the wildlife habitat and worked through the activity, they may graph the remaining area after the first, second, and third sales of a different strategy. Students will then write a paragraph describing the advantages of the new sale strategy as it relates to wildlife optimization.

Option 2 – Students will research other instances of where the pattern created in the activity is seen, used, or advantageous. They will organize a presentation, including visual examples. This presentation will include historical uses, i.e. quilting, native artwork, architectural detail.

Option 3 – Students will choose a mathematical idea introduced to explore. They can discover the idea of approaching the limit, the ratios of subsequent terms, geometric sequences, infinite series, recursion, and show the application of the idea in various setting, i.e. financial, architecture, population growth, etc.

## Logo Notes

Teachers who have access to a Logo programming language may want to look at some of the recursive procedures that could create geometric models of the problems. A ‘rough’ procedure is listed below. It still needs a little bug repaired but does have some interesting recursive ideas.

```
TO FIVEPLOT :X
  IF :X < 2 THEN STOP
  REPEAT 4 [FD :X RT 90]
  FIVEPLOT :X / 3
  FD 2 * :X / 3
  FIVEPLOT :X / 3
  FD :X / 3 RT 90
  FD 2 * :X / 3
  FIVEPLOT :X / 3
  FD :X / 3 RT 90
  FD 2 * :X / 3
  FIVEPLOT :X / 3
  FD :X / 3 RT 90
  FD 2 * :X / 3
  RT 90 FD :X / 3
  FIVEPLOT :X / 3
  PU
  RT 180 FD :X / 3 RT 90
  FD :X / 3 RT 90
  PD
END
```

Answers to Student Pages: