

A program designed to help kids see how math is used. It is based on the math that expresses the relation of habitat mixes for targeted wildlife populations. For years wildlife managers have known that the right mix of grassland (unmowed and mowed), trees, shrubby areas, water, and prey species in the case of predators can increase a desired animal. Most animals succumb to disease rather than being eaten.

This program has been very useful in reaching students with math fears. As one student put it, his teacher and I "tricked" him into doing math and enjoying it. If you emphasize the manipulation of habitat and the impact that has on the wildlife, and hold off explaining the formulas until they've mastered increasing the wildlife population, you can get those kids who freeze up at the word math or the sight of numbers to realize they can do math when it matters to them.

In real life, most wildlife areas manage for more than one species, so the mix can get pretty complicated. In real life, one also has roads or trails where wildlife can become victims of accidents. In real life, the more dense a population becomes in an area, the more parasites and diseases they have. This last is a part of the balance of nature that separates the theoretical from the actual. The mix of habitats for any species can be expressed in long equations that are nothing more than addition, subtraction, multiplication, and division. If you are familiar with and can use a spreadsheet program the instructions below will let you enter these equations into the formula for columns that can be manipulated by students to maximize a particular species. As in nature, though there are limits to how high a population can go before disease and parasites begin taking a larger toll than birth rates can compensate for.

Turkeys are primarily tall meadow species but need oak and evergreen forest for seeds and winter cover from wind and snow. They require some water, but not a lot. Road kills are common as turkeys swallow gravel from road sides and are hit by cars.

Cats and dogs running in turkey nesting areas are responsible for 75% of the mortality of turkeys. They may eat eggs or chicks before they can fly, or simply keep the hen from the nest until the eggs and chicks die.

For a spread sheet on turkey populations, set up 9 columns. Only the last two will have a formula. The other 7 columns are for students to put in variables they pick as their instincts suggest. The premise is that this is for a hundred acres. All numbers in columns A-G must add up to no more than 100.

The column to the far left is A. and the title of that column is BRUSH. This is the shrubby stuff that may die back in winter and tall grasses. Turkey use this for nesting sites and some food sources such as insects and seeds.

Column B is Turf Grass. This may be mowed yearly and is used for nesting material, hiding places, and home for insects turkeys eat.

Column C is Cats and Dogs. These kill turkeys.

Column D is Oak, a high quality food for turkey. Depending on where you are you can change this to beech, holly, pine, or other large seed producing tree.

Column E is Forest. This can be any mix which provides winter cover, seeds and insects.

Column F is Insects. This is food for chicks and adults for part of their diet.

Column G is water. A quarter acre is about all turkey would need be it a pond or stream as long as it remains unfrozen in winter. You should set this at a quarter acre and not make it a variable. It is not included in the formula for turkey.

The last two columns are the ones with formulas.

Column H is the turkey. Set the formula for this column as $2 * A2 - B2 - 0.9 * C2 + 0.4 * D2 + 0.3 * E2 + 0.3 * F2$ where line two of the spread sheet is the first with numbers and * is multiplication.

Column I is for the parasites and diseases. This can be a simple $H2 * .05$. The more of the target population like turkey, the more parasites and diseases. You should explain there is no getting around this.

If your spread sheet allows you to add color, using a different color for each column A-F keeps students organized. Start off with 0 in all columns A-F

The rules for students is that the area they are working with is a hundred acres, so across any row, the

numbers cannot exceed 100. They can change the numbers in columns A-F and see the changes in the numbers of turkeys. They are not allowed to enter data into Column G-I. Those are either set or done for them.

Their job is to find the mix of habitats, predators, and insects that will maximize the number of turkey and keep the parasite column to about 1/2 of the turkey population.

Negative numbers or 0 in the turkey population means the turkeys are gone. Some things to note: The best mix of habitats that includes a high number of cats and dogs will lead to a population crash.

Fractions expressed in decimal form are fine as variables. 0 must be any column that does not have another number.