How will climate change impact the endangered Carolina Northern Flying Squirrel?

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Introduction: The goal of this lesson is to teach students about one approach that scientists use to forecast the impact of climate change on species. Students will learn how abiotic factors (e.g. temperature) control species distributions, and how changes in these factors due to climate change can cause shifts in a species range. Students will use real data on the endangered Carolina Northern Flying Squirrel to build and project a simple ecological niche model based on temperature. Results from this model will be compared to recent studies on the health and distribution of the Carolina Northern Flying Squirrel's habitat, the Southern Appalachian Red-Spruce-Fraser Fir Forest. Students will synthesize these data in order to determine what steps will be needed to conserve Carolina Northern Flying Squirrels under climate change.

Standards addressed:

NC Essential Science Standards: Bio.2.2.1, EEn.2.6.4

Common Core Math Standards: S-ID* (* includes Modeling)

Next Generation Science Standards: HS-LS2-2, HS-LS2-6, HS-LS4-5, HS-ESS3-5, HS-ESS3-6

Learning objectives: Students will:

1. Use real data on the locations of endangered Carolina Northern Flying Squirrels in North Carolina to build a simple ecological niche model based on temperature.
2. Project this model using climate change forecasts provided by the U.S. Environmental Protection Agency.
3. Interpret the meaning of the model projection for Carolina Northern Flying Squirrels based on temperature/elevation relationships.
4. Evaluate data from two recent scientific studies and synthesize these data with their model results to determine a prognosis for Carolina Northern Flying Squirrels under climate change.
5. Propose conservation options for Carolina Northern Flying Squirrels given the data.

Appropriate grade level: High School.

Group size: Divide the class into 3-5 students per group.

Setting: Indoors.

Approximate time of lesson: 1-2 class periods; no homework.

Resources needed for students: Paper, pen or pencil.

Resources needed for educators: Blackboard, computer and projector.