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## Wetlands Activity Three “Don’t Spill the Beans”

**Academic Question:** How do we effectively sample an area?

**Objective(s):**

- To introduce students to species area curve models
- To allow students to develop their own species area curve

**Materials:**

(All materials are per group.)

- One bag of 13-15-bean soup. If necessary, get several different bags of beans and mix together. Ultimately, each group should have a mixture of several different kinds of beans.
- One 8.5 x 4.5 (or similar) bread pan (Cheap aluminum pans work.)
- One 16 oz. soda bottle cap (screw-on type)
- Yellow sticky pad

**Process (Activities):** In this activity, a pan of beans will represent a diverse wetland environment with the different beans symbolizing different species. The underlying question of this activity is: “How many samples must be collected in order to obtain a true representation of the populations of a given habitat?” In real life applications, sampling is a very labor intensive and expensive activity. Species area curves are developed to give scientists information on the most efficient number of samples needed in order to complete their work, compile data, and provide solid scientific information.

1. This lab works best in groups of 2 to 4 or can be done as a demonstration.
2. Place a generous portion of beans into each pan making sure that the beans are of a uniform nature.
3. Have students use soda cap to dip out a level sample of beans.
4. Place beans on table and organize into columns of like “species”
5. With a sticky note, label this group of columns “sample one” and place the label beside the group.
6. Count the number of columns.
7. Write this number on the sticky note and label it “total number of columns (species)-sample one”.
8. Have students “dip” out another sample.
9. Separate into columns like above (step 4).
10. Label columns “sample two”.
11. Count only the number of new and **different** columns/species and add to total number of species from sample one.
12. Write this number on the sticky note and label it “total number of columns (species)-sample two”.
13. Continue sampling/dipping until no “new” beans (species) occur.
14. Have students develop a graph with “Sample Number” being the “X” axis and “number of different species” being the “Y” axis.
15. The graph should resemble a gentle curve leveling out toward the maximum number of species.
16. The level part of the curve corresponds with the most efficient sample number.
17. Have students write down how many samples are necessary to effectively and efficiently sample their pan of beans.

**Application:** Have students discuss how this activity represents sampling in a local wetland area. Lead students into a discussion on different sampling techniques (nets, seines, coring devices, surveying equipment, etc.). Have students discuss how some sampling techniques are not as effective as others (i.e., using a kick net only samples epi-benthic organisms, not all organisms in a stream).

**Extension:** For further activities on Species Area Curves and biodiversity, check out the Cyberways and Waterways web site's lesson plan area in the Teacher's Lounge. You must sign in as a teacher and go to:  
[http://www.cyberwaysandwaterways.com/en/myHomePage/teachersLounge/221\\_lessonPlans.xml?show=Biodiversity](http://www.cyberwaysandwaterways.com/en/myHomePage/teachersLounge/221_lessonPlans.xml?show=Biodiversity).

If you need a teacher login, email [dragonfly@4empowerment.com](mailto:dragonfly@4empowerment.com)

**Evaluation:** Students should report on their species area curve model including the graph. The report should contain the number of samples they feel is necessary to efficiently obtain a representative sample of the population. Ask students how a larger or smaller sampling device would have affected their data. Have students explain reasons why developing a species area curve is important.

**Time Frame:** 1-2 class periods

**Grade level:** 6<sup>th</sup>-12<sup>th</sup>

**TEKS Correlation:**

Biology: C2A, C2B, C2C, C2D, C3A, C3C, C3D, C3E,

Environmental Systems: C2B, C2C, C2D, C3A, C3D,

Aquatic Science: C1A, C2A, C2B, C2C, C2D, C2E, C3A, C3D

Mathematical Models: 2