**Math and Humane Education**

by Paul Dewey

Preschool through High School Grades

John Venn (1834–1923) was an English mathematician who probably never imagined that his work would someday be used to teach students about animals and animal-welfare issues! Mr. Venn's specialty was logic. The diagrams that bear his name can be used to graphically illustrate the relationships among ideas or facts in almost any subject area while also reinforcing the mathematical concept of sets.

Basically, Venn diagrams are used to show characteristics that are shared or not shared among two or more groups. Here are some examples of what unlabeled Venn diagrams look like:

- Figure 1
- Figure 2
- Figure 3
- Figure 4

The circles can be formed with yarn or string on a tabletop or drawn on a bulletin board, chalkboard, or student work sheet. Below you will find ideas for just a few of the things you can teach children about animals with each type of Venn diagram pictured in Figures 1–4.

**Figure 1 Venn Diagrams**

Venn diagrams like those in Figure 1 are good for emphasizing that two groups are separate, that is, mutually exclusive. An individual member must be in one group or the other and will not fit in both groups at the same time. Try setting up two circles (see Example A), one labeled *Wild Animals* and the other labeled *Domestic Animals*. Students can place pictures of animals in the appropriate circles. The lesson can be used to emphasize that wild animals are better left wild, that they do not make good pets, and that we already have plenty of domestic animals. You can also discuss where domestic animals come from, that is, were dogs always domestic animals? Remind students that domestication is a process that takes hundreds of years.

**Figure 2 Venn Diagrams**

Venn diagrams like those in Figure 2 are good for emphasizing that two groups have some shared members or characteristics as well as some members or characteristics that are unique to each of the groups. One possible activity is shown in Example B. First, label the two overlapping circles, one *Endangered Animals* and the other *Animals Native to the United States*. Within the intersection of the two circles are animals that are both endangered and native to the United States. Outside the circles are listed animals that are not endangered and not native to the United States.

**Figure 3 Venn Diagrams**

Venn diagrams like those in Figure 3 show the shared and unshared traits of three groups. (If you're really feeling brave, you could try using four or more groups, but it is not recommended.) Since the Venn diagram itself is more complex here, it is probably best to keep the concepts and group labels simple, as in Example C. The three circles can simply be labeled *I like dogs*, *I like cats*, and *I like people*. Students can sign their names in the appropriate intersections; most will probably sign in the center. (If a student signs outside all three circles, send him to the school psychologist.)

Finally, for older or more advanced students, simply challenge them to create their own Venn diagrams from scratch. Some kids will really get into it and amaze you with their creativity and unique ways of looking at the animal world.

Here's one last example for you always to keep in mind.

**Figure 4 Venn Diagrams**

Venn diagrams like those in Figure 4 are good for emphasizing that one or more groups are part of another larger group as well as having unique members and characteristics. In Example D, the larger circle could be labeled *Cats* and one or more smaller circles within the larger one are labeled with different types of cats, such as *Lions*, *Tigers*, *House Cats*, and so on. You can even make another set of smaller circles, within the *Lion*, *Tiger*, and *House Cat* circles that contains different species or breeds of lions, tigers, and house cats. (See Example E.) Students can write sentences to describe what is shown by the circles, such as:

- Some cats are lions.
- Some cats are lions.
- All lions are cats.
- No lions are tigers.

About the author: Paul Dewey is a part-time computer consultant for NAHIE and a former middle school teacher.