

## LESSON 2:

# THE DATING GAME (or Match Making)

In this activity, students will pretend to be from various zoos acting as members of the SSP recommendation committee. They will look at how genetically related the animals are in the zoo community. They will then try to make the best genetic matches by determining which animals need to be bred with which animals. The objective is to keep the population as genetically diverse and healthy as possible. In addition, the students will have to try and provide for the wishes of each zoo involved in the breeding of this species.

The students will find out that it is not as simple as just putting two animals together. Zoos must deal with issues other than genetics and demographics. There are numerous reasons why mating can't or won't take place. Sometimes transportation is a problem, or sometimes there simply is no room to house a new animal. Occasionally, the animal may not be compatible with their intended mate or one of the animals is just too aggressive and/or won't socialize. If a zoo is not going to keep a collection of this particular species, it may not want to breed the animals and may wish to trade for another species it wants to begin collecting and breeding. Zoos try to accommodate the SSP recommendations while keeping with their master plans for the future. So, the students will try to make recommendation while taking into account all the other zoo criteria.

Students will make breeding matches by using mean kinship values that mathematically represents the average genetic relationship of an organism to the rest of the population. By looking at gene frequencies in a population, scientists will formulate a mathematical value that is called the mean kinship (MK) for each captive individual. Complicated mathematical formulas requiring computers are used to assign MK values to each individual in the captive population. So, mean kinship value is a **mathematical measurement of the average relatedness of an individual to the rest of the population.**

The lower the MK value the less related the individuals are or the less genetic material they share. The higher the value the more related they are or the more genes they have in common. **So, the point is to breed the most unrelated or lowest numbers together.** To make this easy, students will work with substituted arbitrary whole number values rather than the zero to one decimal values that reflect the true mathematical calculations. In making breeding recommendations, the students will have to take into account not only the MK values but also the specific requirements for each zoo. In other words, they will have to simulate a real SSP meeting.

## OBJECTIVES

1. The student will be able to make three breeding recommendations, or pair up six animals, by evaluating the numerical genetic values that will keep the genetic diversity the highest among the captive population.
2. The students will be able to simulate an SSP meeting by modeling not only the 3 breeding recommendations but by accommodating the wishes of the individual zoos that house the animals.

## MATERIALS:

One Set of Animal Statistic Cards per Group  
SSP Breeding Recommendation Sheet per student

## PROCEDURE

Create groups of 4 to 6 students. Explain to the class that each group will be acting as the SSP Tiger breeding committee. The goal is to make the breeding recommendations for all the tigers in the zoo community. The group will look at the Statistic Cards for the Tigers. By shuffling these cards, the students will be able to model breeding pairs. They will be able to match mean kinship values and accommodate the individual zoo's requests. Formal recommendations will be made on the SSP Breeding Sheet.

Explain to them that the stud book keeper has supplied the genetic information about each of these tigers. Explain to them that in making a decision they should try to breed the least related tigers first. They will need to take into account, which tigers are the oldest and which is the youngest. Ask students which ones should be bred first, the oldest tigers or the youngest? Logically, the older tigers should be bred first since they might soon be out of their reproductive years.

Also explain that the committee will also need to look at the wishes and plans of each individual zoo that houses each tiger. They need to consider several factors. Does the zoo want a breeding pair? Do they have room for another animal (both on and off exhibit)? Will there be room to keep the babies? Do they have animals that will socialize and get along with new animals? Do they want to keep this species in their collection or do they want to trade or buy another species? Are the animals old enough to breed yet or will they be able to breed later?

Remind students that tigers can live for 20 years and females can begin breeding at 3 to 4 years of age and even earlier, at about 2 years old, in captivity. They can breed every 3 to 4 years (less time in zoos) and have 2-4 offspring. The MK values range between 0-100 and the numbers closest to zero are the least related to the rest of the group, or they have the most different genes.

Also, all new animals must spend 30 days in quarantine to ensure they are free from disease or parasites. This way none of the animals are contaminated.

<p style="text-align: center;"><u>Zoo # 1</u></p> <p>Sex: Female</p> <p>Age: 10</p> <p>M.K. = 0</p> <p>Zoo Master Plan/Special Concern: Zoo has room for only one animal in their exhibit. However, they could use the space they have to expand. If tiger cubs will increase attendance than the zoo could afford to expand the exhibit and build a separate holding behind the scenes to house mother and babies together dad separately</p>	<p style="text-align: center;"><u>Zoo #2</u></p> <p>Sex: Male</p> <p>Age: 11</p> <p>M. K. = 0</p> <p>Zoo Master Plan/Special Concern: Zoo is remodeling and building a new exhibit. So, the quarantine facility will temporarily be closed. During this 6 months of closure, the quarantine facility will be used to house the ?????</p>
<p style="text-align: center;"><u>Zoo #3</u></p> <p>Sex: Female</p> <p>Age: 9</p> <p>MK= 30</p> <p>Master Plan/ Special Concern:</p> <p>Zoo has the largest tiger exhibit of all zoos. They could house several pairs and would like to acquire more tigers. They have an extra young giraffe that is still small enough to travel. They would like to keep the stud book on the captive tiger population.</p>	<p style="text-align: center;"><u>Zoo #4</u></p> <p>Sex: Male</p> <p>Age: 3</p> <p>MK = 40</p> <p>Master plan/Special Concern:</p> <p>This male is very aggressive an could hurt a female. He has a past history of not socializing well.</p>

<p style="text-align: center;"><u>Zoo # 5</u></p> <p>Sex: Female</p> <p>Age: 5</p> <p>M.K. = 30</p> <p>Zoo Master Plan/Special Concern:</p> <p>This animal has questionable ability to socialize. She did not get along with the older male that was at the zoo. She does attract large numbers of visitors and is a big draw for the zoo.</p>	<p style="text-align: center;"><u>Zoo #6</u></p> <p>Sex: Male</p> <p>Age: 10</p> <p>M. K. = 35</p> <p>Zoo Master Plan/Special Concern:</p> <p>This zoo has room to house just two animals. There is no extra space for an offspring to be separated from the father.</p>
<p style="text-align: center;"><u>Zoo #11</u></p> <p>Sex: Female</p> <p>Age: 6</p> <p>MK= 80</p> <p>Master Plan/ Special Concern:</p> <p>This zoo has just lost a couple of keepers and is working on budget cut backs. The keepers don't have time to do enrichment activities for the cats. They would like to add more giraffes possibly</p>	<p style="text-align: center;"><u>Zoo #12</u></p> <p>Sex: Male</p> <p>Age: 1</p> <p>MK = 10</p> <p>Master plan/Special Concern:</p> <p>This male is fairly young and won't mature for at least 3 years. This zoo is very active in creating enrichment activities for its animals. There are plans for a new tiger exhibit in 2 years. They would like to fill the exhibit with tigers.</p>

<p style="text-align: center;"><u>Zoo #9</u></p> <p>Sex: Female</p> <p>Age: 1</p> <p>MK= 10</p> <p>Master Plan/ Special Concern:</p> <p>This tiger is still too young but will be breeding age in a couple of years. Zoo has the no room for this baby when it gets older.</p>	<p style="text-align: center;"><u>Zoo #10</u></p> <p>Sex: Male</p> <p>Age: 8</p> <p>M. K. = 20</p> <p>Zoo Master Plan/Special Concern:</p> <p>This animal still has several years left to breed and socializes very well. His companion passed away and he has been very lonely. He is used to sharing his exhibit.</p>
<p style="text-align: center;"><u>Zoo #7</u></p> <p>Sex: Female</p> <p>Age: 1</p> <p>MK= 10</p> <p>Master Plan/ Special Concern:</p> <p>This tiger is still too young but will be breeding age in a couple of years. Zoo has the no room for this baby when it gets older.</p>	<p style="text-align: center;"><u>Zoo #8</u></p> <p>Sex: Male</p> <p>Age: 11</p> <p>MK = 19</p> <p>Master plan/Special Concern:</p> <p>This male has never produced any offspring. He has mated with several females but no babies were produced. He responds poorly to keepers. This zoo wants to start a collection of giraffes.</p>