

## Interdependence Games

Every animal and every plant—every living thing—depends on other living things.

For example, in the far north there lives an animal called the Lynx (see the top photo on the opposite page). A Lynx is like a larger, stronger Bobcat.

Lynxes like to eat Snowshoe Hares (see the bottom photo on the opposite page). A Snowshoe Hare is like the hares that live near us, except they have large hind feet to help them run in deep snow.

Many years ago, scientists saw that there were some years when there weren't many Snowshoe Hares. When that happened, the Lynxes would not get enough to eat, and some of them would die. And Lynxes would not have as many babies, because they didn't have enough food. So the next year, there would not be as many Lynxes.

When there weren't as many Lynxes to eat them, the Snowshoe Hares would have more babies. Soon there would be lots of Snowshoe Hares.

When there were lots of Snowshoe Hares, the Lynxes would have plenty to eat. Soon there would be lots of Lynxes.

And then would come another year when there weren't many Snowshoe Hares....

### A Game To Play: Lynxes, Hares, Leaves

The Referee divides the players into Lynxes, Hares, and Leaves. If you have 10 players, there would be 4 hares, 4 leaves, and 2 lynxes.

- Leaves stand still with hands up at shoulder level (as if about to give a high-five)
- Hares have tails (pieces of white cloth to stick into back pocket, like flag football)

The play area is a big circle. Hares are safe from Lynxes as long as they are in their Hollow Log (touching a square of felt on the ground).

*At the start of each round:*

- The Hares all touch the Hollow Log
- The Leaves stand in a broad circle around the Hollow Log
- The Lynxes stand near the Leaves

*When the Referee gives the signal to begin a round:*

- Leaves cannot move from their spot, and as soon as a Hare eats them, they must put their hands down.
- Hares must leave the Hollow Log to "eat" a Leaf, by giving one Leaf a high five. Hares may eat only one Leaf in each round. Hares are safe and cannot be tagged when they are touching the Hollow Log OR when they are frozen in a crouched position—this means that Hares may not move or get Leaves unless they are standing up. Hares must eat in each round, or they will die from hunger.
- Lynxes try to "eat" a Hare by pulling off their tails. Lynxes must eat in each round, or they will die of hunger. Lynxes may eat only one Hare in each round.

A round lasts 3-5 minutes. At the end of the round, the Referee calls out "End of

Round!” and all action stops.

- If a Leaf has been eaten by a Hare, that Leaf becomes a Hare in the next round.
- If a Hare has been eaten by a Lynx, that Hare becomes a Lynx next round.
- If a Hare has not eaten a Leaf in that round, that Hare dies, rots away, turns into compost, and becomes a Leaf in the next round.
- If a Lynx has not eaten one or more Hares in a round, that Lynx dies, rots away, turns into compost, and becomes a Leaf in the next round.

Play at least five rounds.

### **Ecosystem Crash**

This game shows that when there are too many predators, the predators will not have enough to eat and some will starve to death. And if there are too many plant-eaters (herbivores), they will not have enough to eat.

It sometimes happens that all of one of the organisms—lynxes, hares, or plants—dies. If one organism dies off, pretty soon all the other organisms will die off, too. We call this an “ecosystem crash.”

In this game, there are two ways the ecosystem can crash. If all the Hares die off one round, then all the Lynxes will die off in the next round (because the Lynxes will have nothing to eat), and then everyone will be a Leaf in the round after that. If all the Lynxes die off in one round, more and more Hares will be born, until pretty soon the Hares eat all the Leaves, at which point they will die off.

### **Another Game To Play: Humans, Lynxes, Hares, and Leaves**

What happens if we add Humans to this game?

If you have 12 or more players, you can add a Human. The Human can kill and eat any other creature (Leaf, Hare, and Lynx). The Human cannot be killed by any other creature. The Human can kill as many creatures as they want during any round.

With this rule, the ecosystem can crash very quickly.

### **The Science Behind “Lynxes, Hares, and Leaves”**

For over a hundred years, people working for the Hudson Bay Company in Canada kept records about the populations of lynxes (*Lynx canadensis*). In 1942, two scientists named Charles Elton and Mary Nicholson, showed how the number of lynx rose to a peak about every ten years, then quickly diminished. Elton and Nicholson wrote: “This cycle is a real one in lynx populations, which are dependent upon the snowshoe hare (*Lepus americanus*) for food, and which starve when the hares disappear periodically. It is therefore strong evidence of a similar cycle in snowshoe hares.”

Later, four scientists—Charles J. Krebs, A. R. E. Sinclair, Rudy Boonstra, and Stan Boutin—showed that the relationship between lynxes and hares is more complicated

than Elton and Nicholson believed. In fact, lynxes and hares are connected with every other organism in the forest where they live. These four scientists also say that humans can cause such big changes that the populations of lynxes and hares could both collapse.

### **Interdependence**

What can the Human do to keep the ecosystem from crashing? Or think about this question—What would happen if the Lynxes started killing more Snowshoe Hares than they needed for food?

If the Lynxes killed too many Snowshoe Hares, pretty soon the Snowshoe Hares would die out. Then the Lynxes would have nothing to eat, and they would starve to death.

But the Snowshoe Hares also depend on the Lynxes. If there were no animals that ate Snowshoe Hares, more and more Snowshoe Hares would be born. All those Snowshoe Hares would eat up all the vegetation, and then they would have nothing to eat, and they would die.

We Human Beings have to remember that we, too, depend on other living things to stay alive. We have to remember that we should only kill just enough plants and animals to keep us alive.

We believe humans can have a positive impact on each other, and on the natural world. We depend on the natural world to keep us alive, and the natural world depends on us, too!