Date _____

Aim: How do species help shape biological communities?

HABITAT – the physical location where a species lives

NICHE - the functional role of a species in an ecosystem (the "job" of a species)

Example: scavengers (hyenas, crows, vultures) rid the environment of dead carcasses (carrion) and aid in the decomposition process

a. **fundamental niche**

the full range of conditions and resources a species could theoretically use if there were no competition

b. **realized niche**

the parts of the fundamental niche that are actually used by the species (smaller because of competition)

Species Significance within a Niche

SPECIALIST versus GENERALIST

- narrow niche
- adapted to very specific conditions
- prone to endangerment when conditions change

Examples:
koalas
pandas
hummingbirds

- broad niche
- wider range of tolerance
- can adapt to changing conditions well

Examples:
cockroaches
raccoons
horseshoe crabs

INDICATOR SPECIES

an organism whose presence, absence or abundance reflects a specific environmental condition because they are ESPECIALLY vulnerable to change

- "nature's early warning system"
- can reflect the changing "health" of an ecosystem

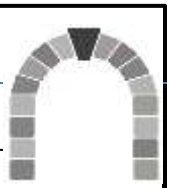
EXAMPLES:

1. Frogs (and other amphibians, like salamanders) - permeable skin absorbs toxins quickly
   → limb mutations and other dysfunction?
   Minnesota 1995 case study – still not "solved" – chemicals? parasites? UV radiation – combo?

2. Lichens - sensitive to heavy metals or acids
   - good indicators of air pollution (esp. SO_2) if lichen population decreases or is absent

3. Birds (especially birds of prey such as eagles and falcons)
   - decline in bird populations helped indicate the negative effects of DDT (eggshell and beak abnormalities)

KEYSTONE SPECIES



species whose role is vital for the survival of other species and the ecosystem itself

EXAMPLES:

1. starfish of the Tatoosh Islands (Washington State) – the study that coined the term "keystone species"
   When starfish were removed from tidal flats, mussels took over and crowded out other species – biodiversity of the ecosystem decreased by 50% within one year

2. sea otter of the Pacific Northwest – Sea otters keep sea urchin populations in check; an overpopulation of sea urchins would destroy the kelp forests that serve as the base of the food chain as well as a habitat for many organisms.

3. prairie dogs of the Great Plains – Prairie dog colonies aerate and help fertilize and retain water the soil allowing a greater diversity of plants to thrive

4. gray wolf of North America (Yellowstone) – Grey wolves were hunted to local extinction in early 1900's. A "trophic cascade" occurred: Elk populations increased → overgrazed territory affecting many other species. After being reintroduced to the park in 1995 – the ecosystem's struggling populations of fish, beaver, willow, and songbirds recovered.