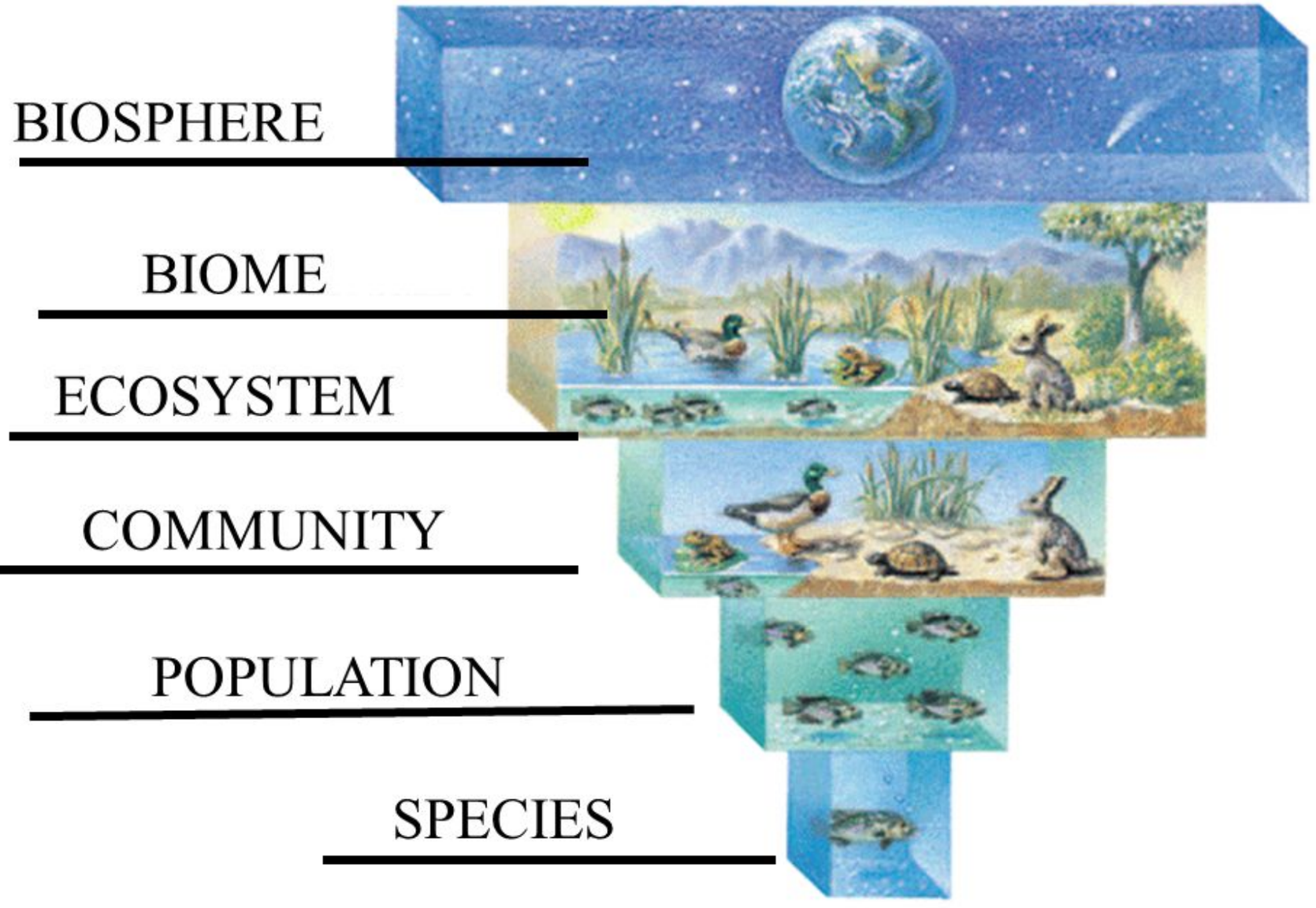
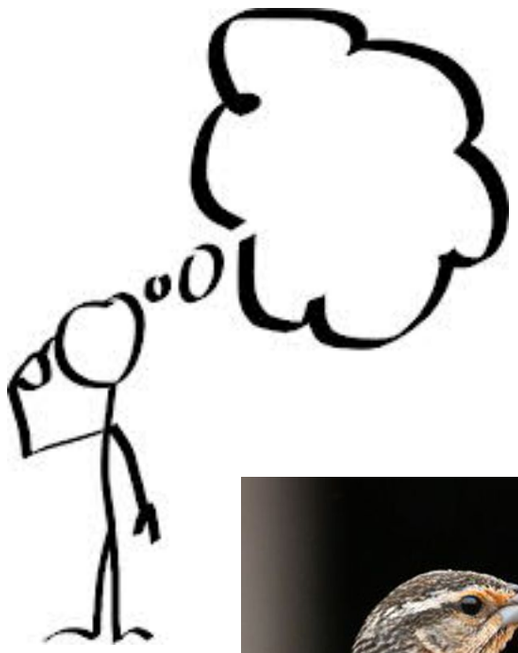
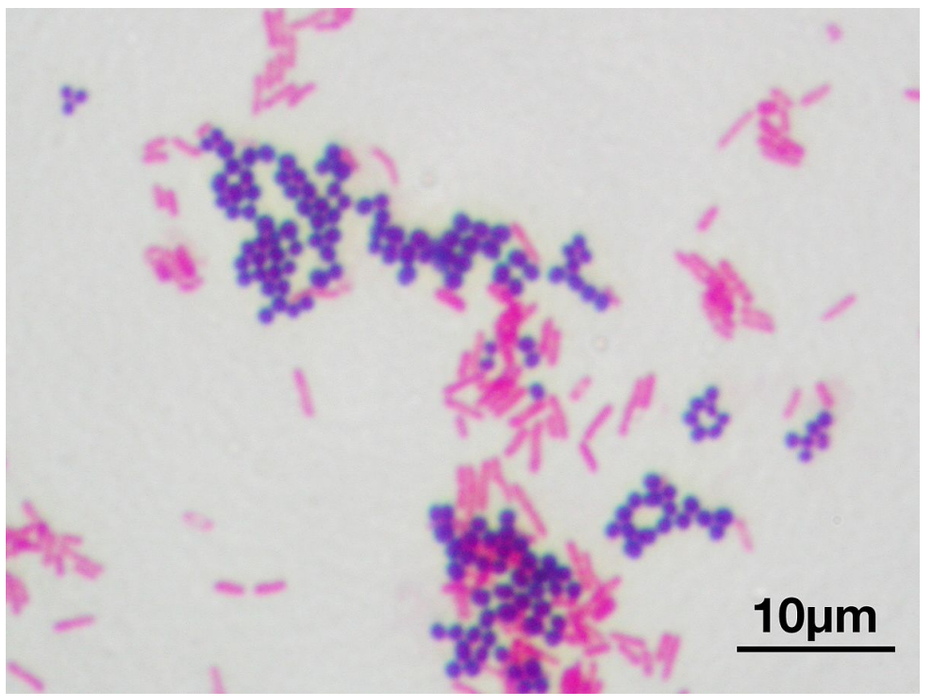
Ecology Chapter 4

Species, Communities and Ecosystems
4.1





What is a species?



What is a species?

A group of organisms that can interbreed and produce viable offspring?

- similar genetics 99.9%
- similar anatomical feature
- breeding behaviours

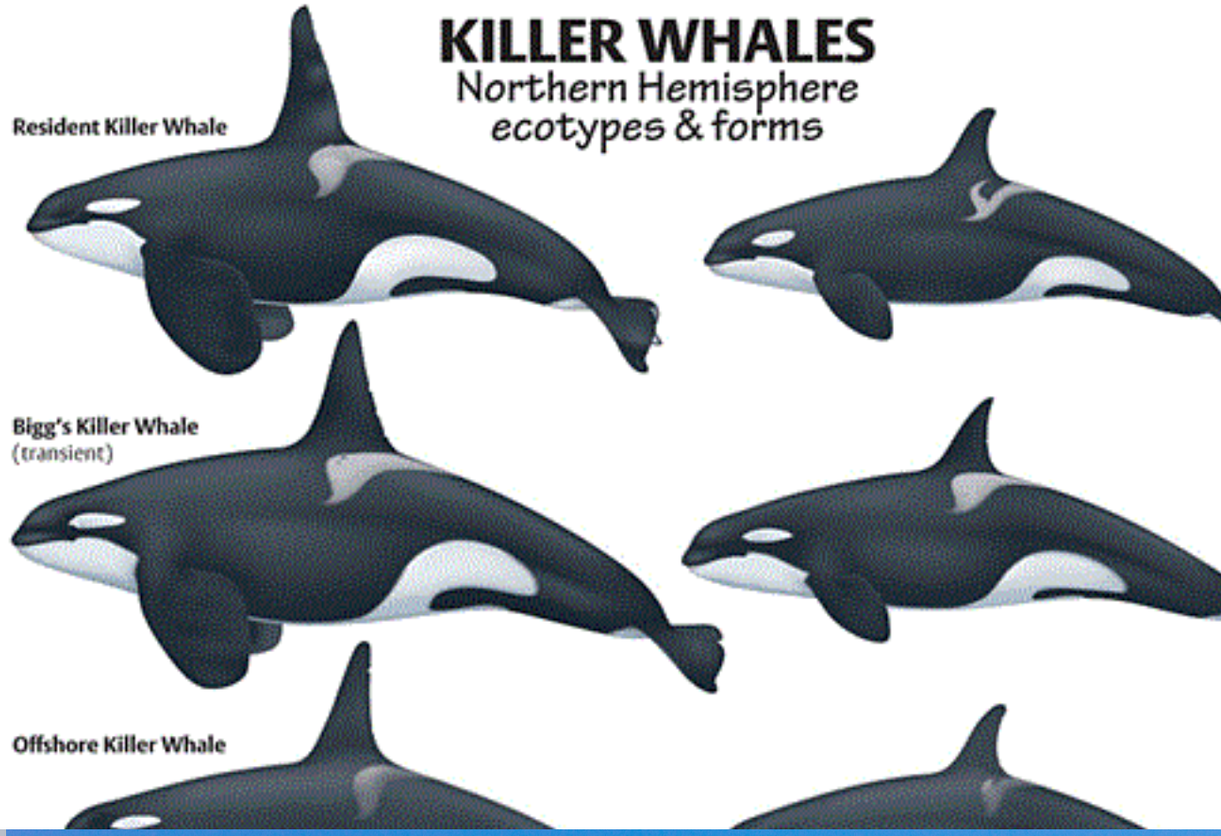
What is a Population?

What is a Population?

• **Individuals of the same species in the same area,** with the likelihood of interbreeding of any of the individuals

• Geographically isolated population may evolve and become isolated.

• Until reproductively isolated —> still considered the same species



Why to Obtain Nutrients

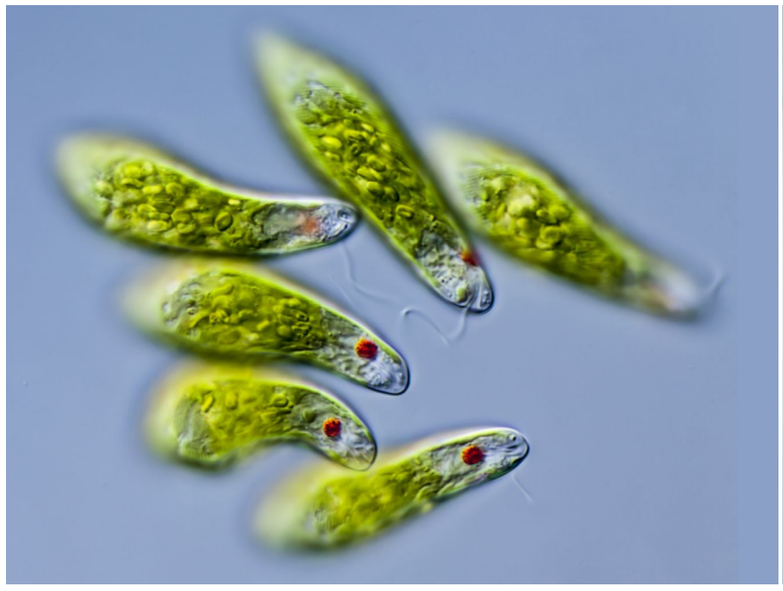
What do you remember the following terms;

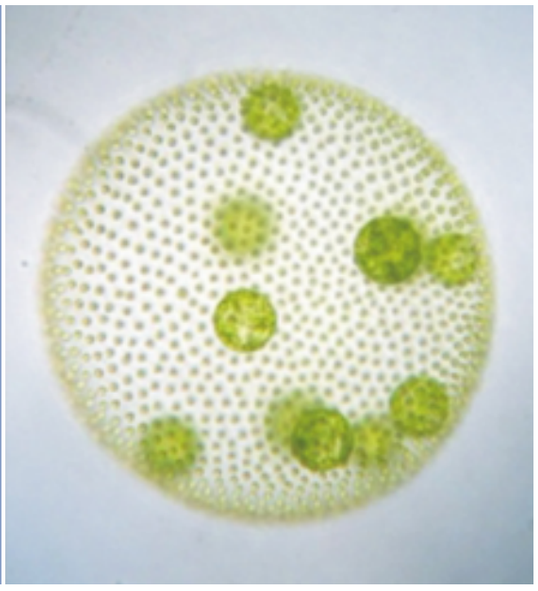
Autotroph
Heterotroph
Mixotroph
Predator
Parasite
Detritivore
Saprotroph
Consumer
Producer

Autotrophs

‘Self feeding’

- make carbon compound as a source of food *usually* using sunlight in the form of photosynthesis
- 99% of plants
- most protista that are algae
- some bacteria
- some mixotrophic (both A & H)





Heterotrophs - Consumers

‘feeds on other’

- get carbon compound by feeding in living or recently dead material
- these ingest
- unicellular use endocytosis
- primary consumers feed on plants
- secondary feed on other consumers
- most don’t fit neatly into any category

Saprophyte vs Detritivore

- feeds dead matter by external digestion
- typically fungi and bacteria
- are decomposers

- feeds dead matter by internal digestion (ingests)
- common in animal life
- dead animals, plants plant litter, feces of animals become energy source

TED Ed

LESSONS WORTH SHARING

Try This…

1. Data based question on page 204

2. Using the oddly designed dichotomous key on 206, determine the nutrition mode for the species sheet provided on Edsby.

Populations vs Communities

• reproductively isolated group of one species

• usually geographically isolated

- formed by different species living/interacting in the same area.
- form complex relationships
- typically 100's —> thousands of species
- small to large (eg, community of microbes in the colon vs community of species in a lake)

Population Distribution

Geographical Range- the area occupied by the entire population

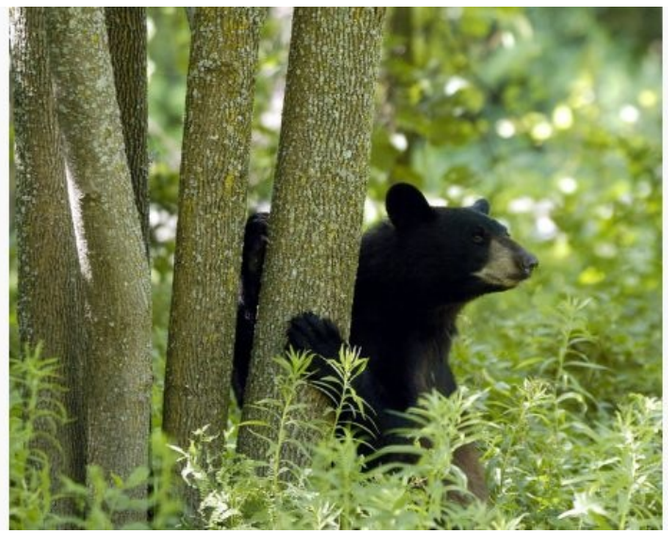
vs

Habitat- the specific environment which the organism lives

Kirkland Warbler

Population Density

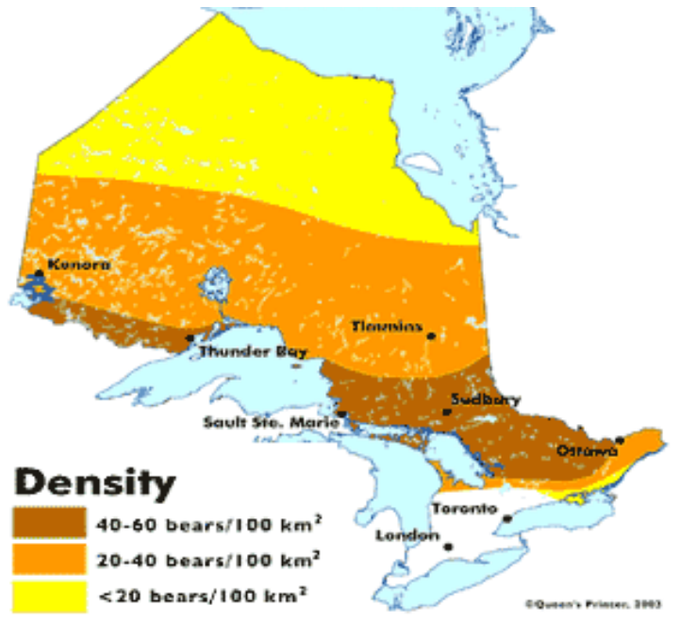
Population Size- # individuals that make up the population at a specific time



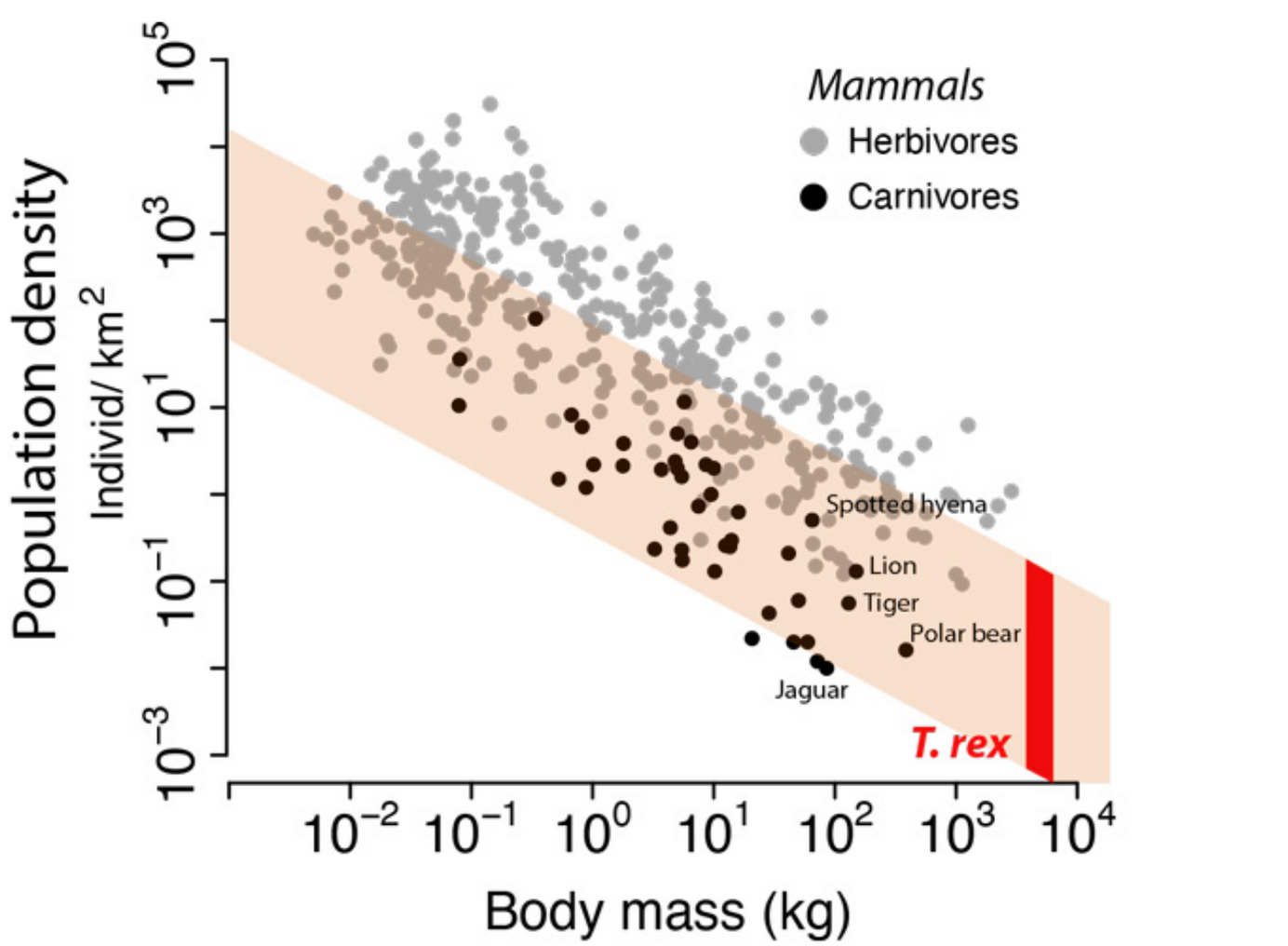
VS

Population Density- individuals per unit area(volume) of their habitat

D=*N*/S N= # of individuals
S= Space occupied



General rule:
Larger species require greater spaces and are less densely populated.



You are likely within 6 feet of a spider right now

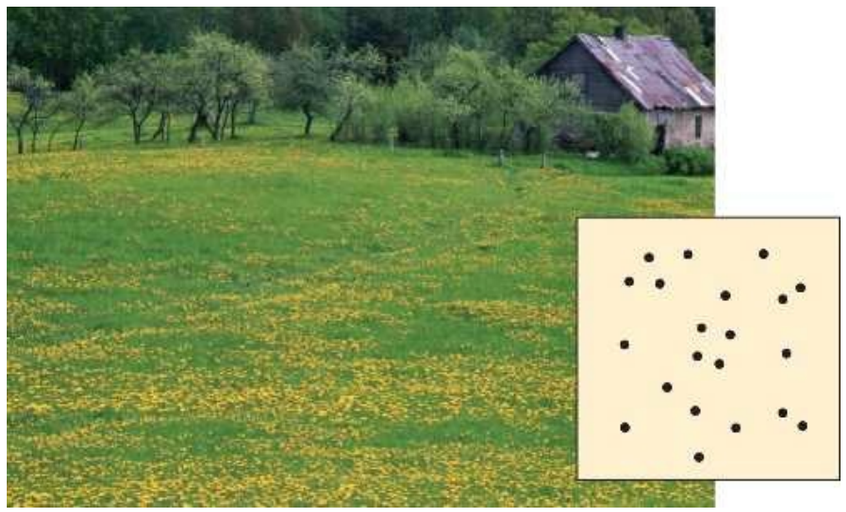
Dispersion of Populations

Dispersion- the way populations distribute themselves in their habitat.

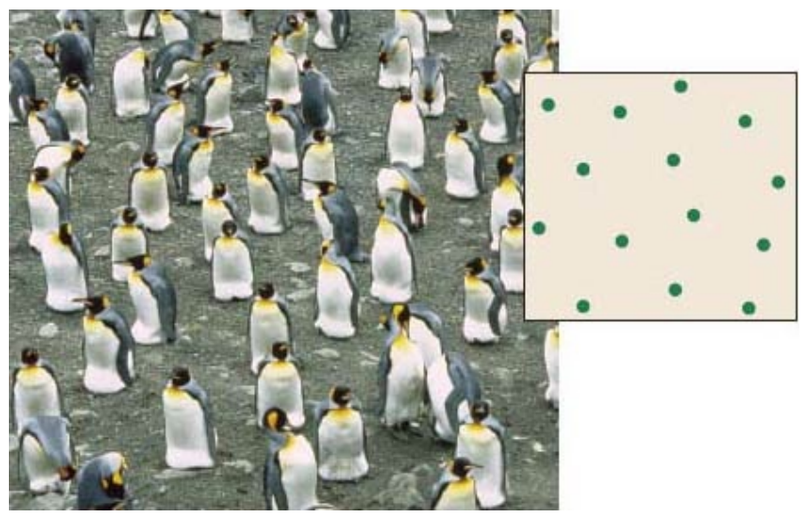
3 Types

(A) Clumped

(B) Random



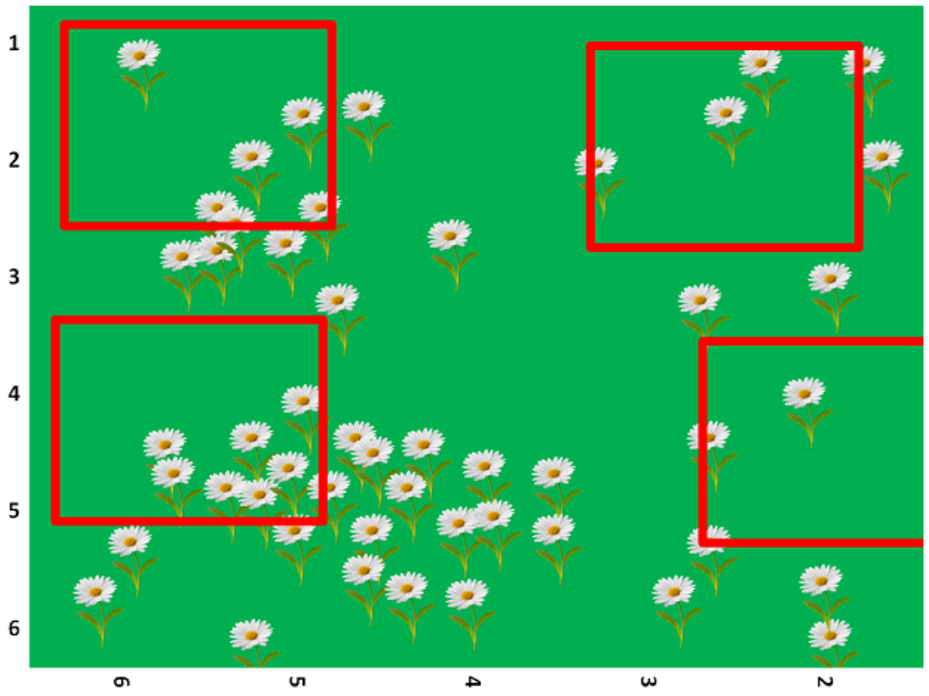
(C) Uniform



Methods of Sampling a Population

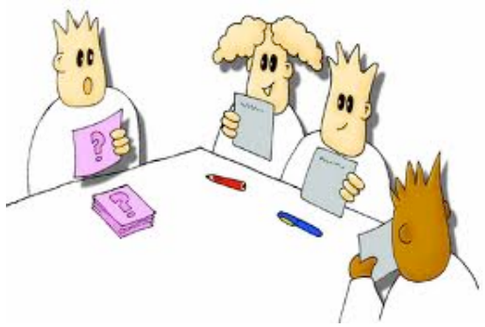
Organisms that don't move

- quadrat sampling

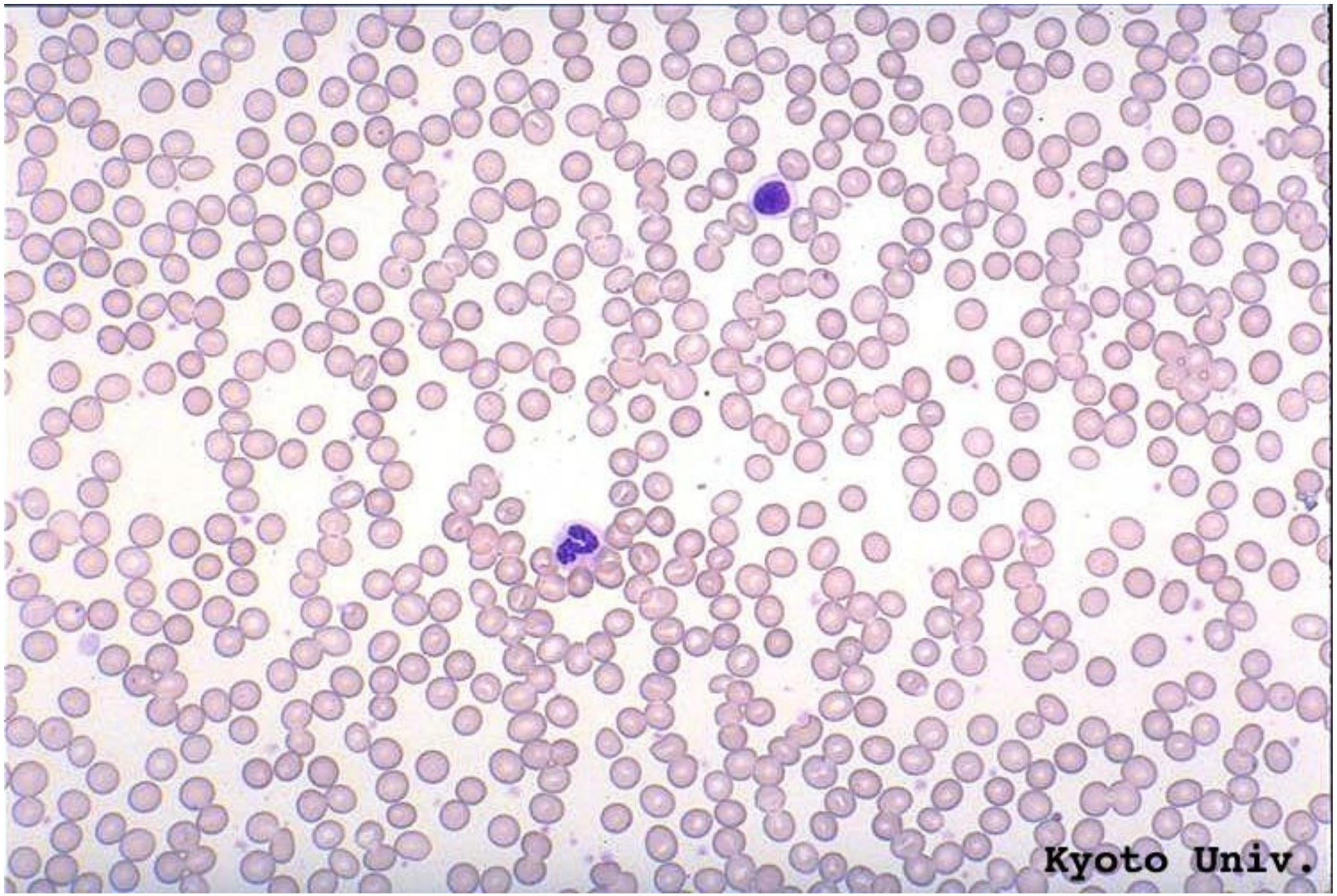


Organism that move

- catch and release



How many blood cells are on this slide?



Sampling/Surveying Natural Populations

Sampling is important to monitor and manage natural populations.

eg. East coast cod fishing industry, monitor threatened or endangered species

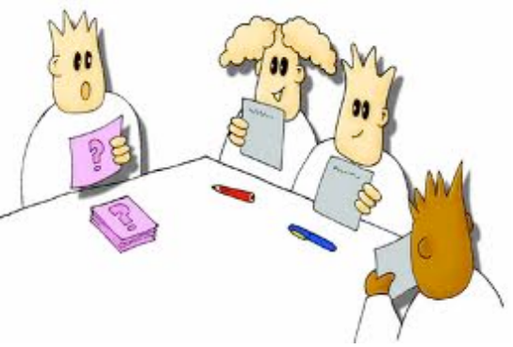
Sampling/Surveying Natural Populations

Sampling methods- Quadrats

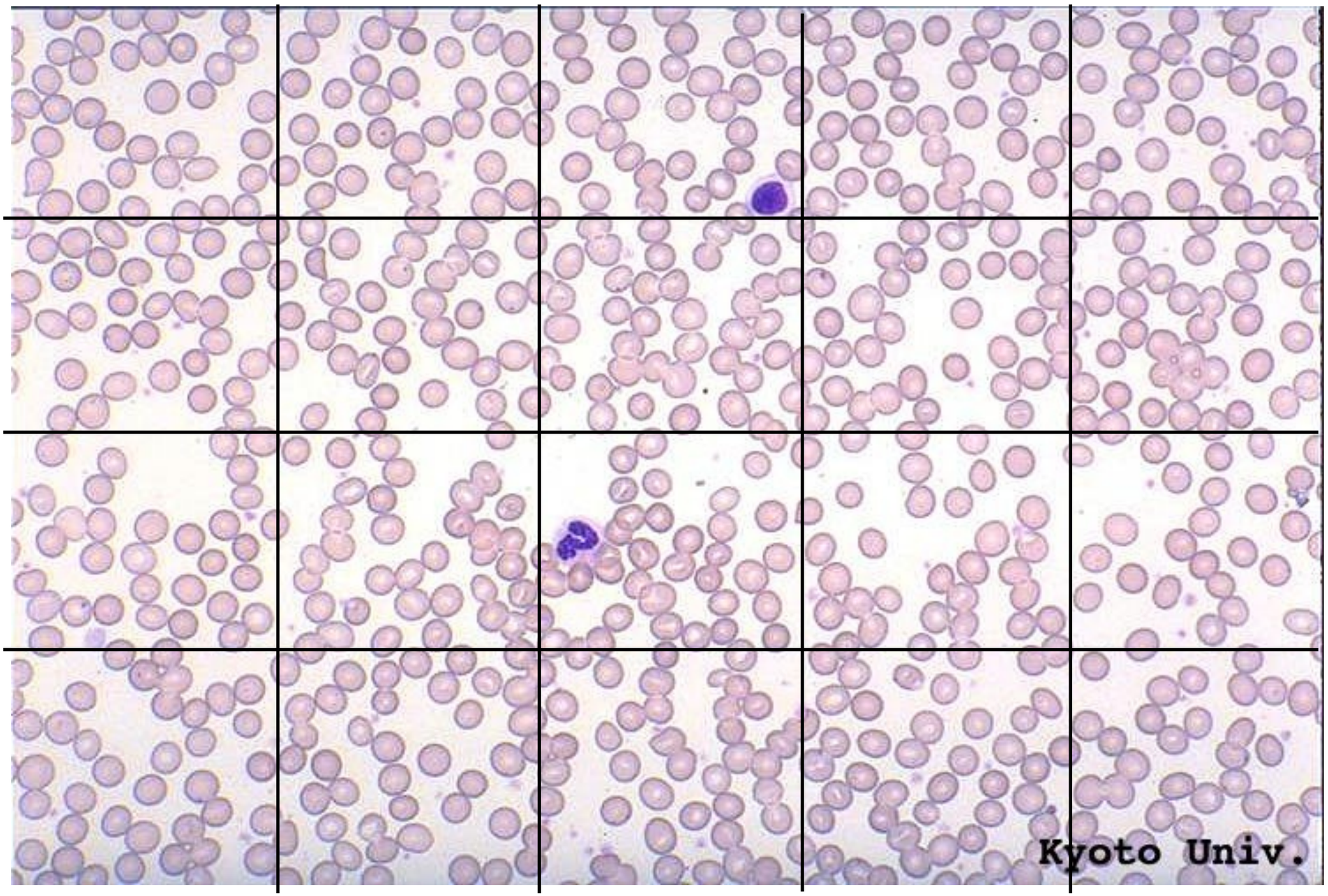
1. Square quadrats are constructed of a standard size

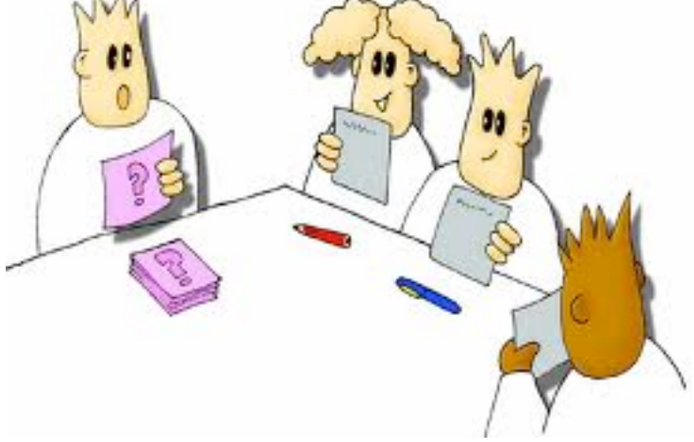
2. Placed randomly quadrats in sample area and make counts

3. Repeat several times and average results



How many blood cells are on this slide?





In a study of canadian golden rod (Solidago altissima) in a field at Point Pelee, a biologist randomly placed seven 1.0 by 1.0 m quadrats in a field that measured 100 m by 100 m.

a. Estimate the **population density** if the biologist found 0, 1, 2, 2, 0, 1, & 3 plants in the seven quadrats.

b. What is the estimated **size** of the population in that field?

Sampling/Surveying Natural Populations

Sampling methods- Tag and Recapture

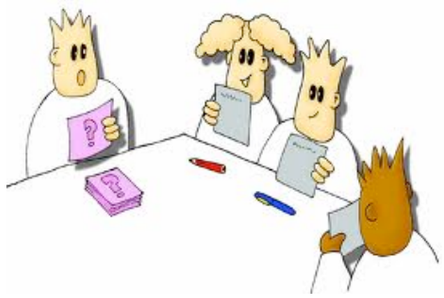
1. A known number of individuals are captured and marked

2. Released and allowed to time to randomly move through range

3. A second number of individuals are captured and counted as marked or unmarked

$$\frac{\text{Total marked (M)}}{\text{Total Population (N)}} = \frac{\text{Number } \textbf{\textit{re}} \text{ captured (m)}}{\text{Size of second sample(n)}}$$

$$\mathbf{N = \frac{Mn}{m}}$$



Volunteers at Point Pelee spend days marking and later recapturing blue gill fish (Lepomis macrochirus) in an effort to determine the population size in the Pelee marsh.

Last year volunteers captured 180 fish on September 12. A week later they returned and recaptured 210 fish of which 30 were marked.

Estimate the blue gill **population** during that week in 2014.

Sampling/Surveying Natural Populations

Sampling methods- Tag and Recapture

Assumptions-

- all individuals are equally likely of being captured
- capture and marking does not adversely affect individuals
- time allows random redistribution
- no population changes occurred during sampling time
- markings are not lost