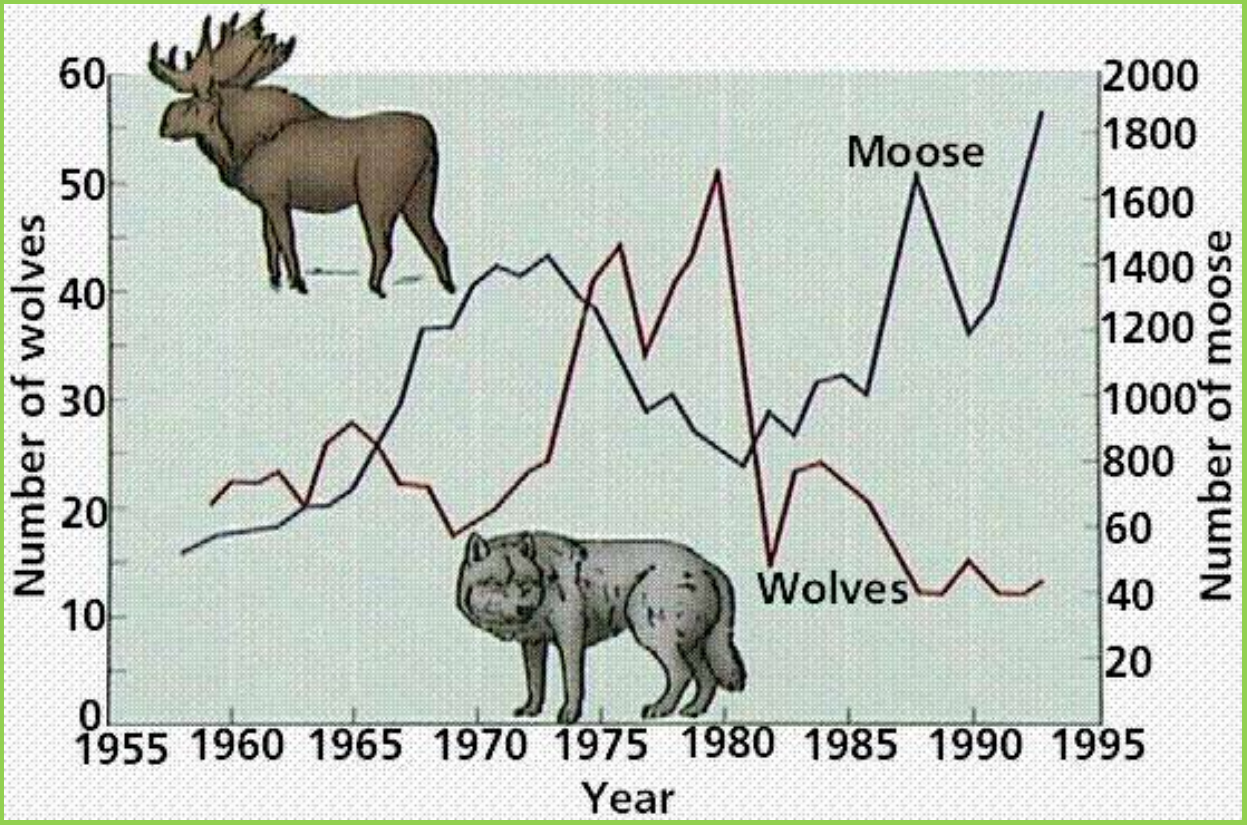
Environmental Science

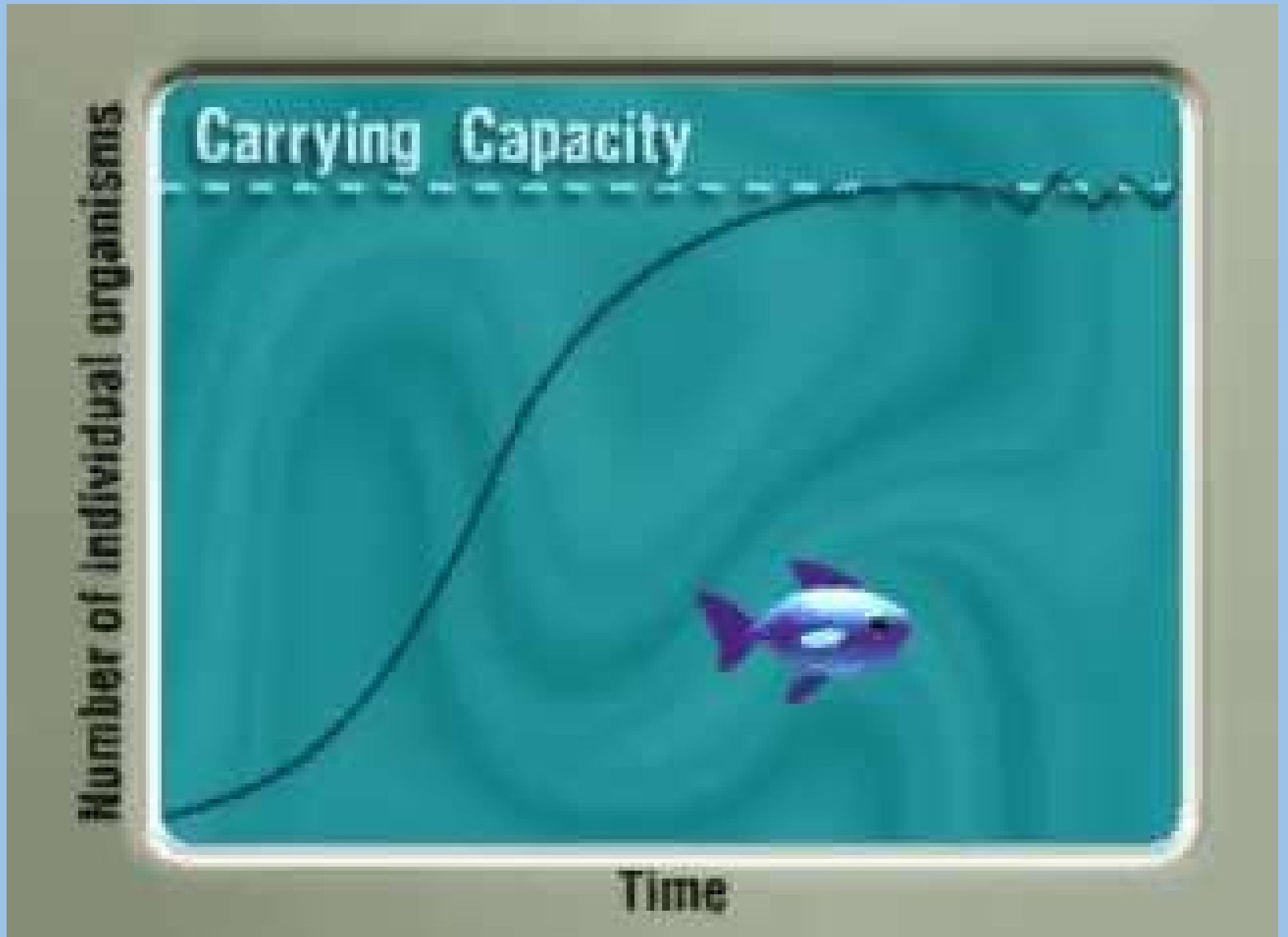
Week 7 Unit 3 Populations Chapter 8

Understanding Populations

9/29 How Populations Change in Size CH 8
Obj. TSW understand populations, how they grow, and are regulated by limiting factors. P. 58 NB



1. What are the three main properties of a population?
2. Describe Exponential growth?
3. What is Carrying Capacity?


Carrying Capacity
Number of individual organisms
Time

Oh, Deer!

What do you think happens to a population when resources change?

- ½ of you will start as **RESOURCES**; ½ of you start as **DEER**.
  - Each generation the **resources** choose if you are "**water**," "**food**," or "**shelter**."

Water = hands on throat Food = hands on stomach Shelter = make a tent shape with hands

  - Each generation the **deer** choose if you're searching for "**water**," "**food**," or "**shelter**."

Water = hands on throat Food = hands on stomach Shelter = make a tent shape with hands

- All deer and all resources will start in lines facing AWAY from each other.
- When we say go, deer will race to get to the resource they need! **NO CHEATING**! **Stick to the resource that you started with**!
- If a deer "catches" the resource that they were looking for, the resource they caught becomes a deer for the next generation! (The deer that got the resource "reproduced" and the resource became its offspring).
- **If a deer does NOT get the resource** they were looking for, **they die**. ☹ Any dead deer become a resource during the next generation.
- Before each generation we will record the # of deer and the # of resources, and see what happens over time!
- **Predators!** One person will be **the Wolf**. The Wolf will stand in the middle between the resources & the deer. If the wolf catches you then you become a wolf also.

pHET – Natural Selection Activity Page 61 NB

Answer the following questions in complete sentences.

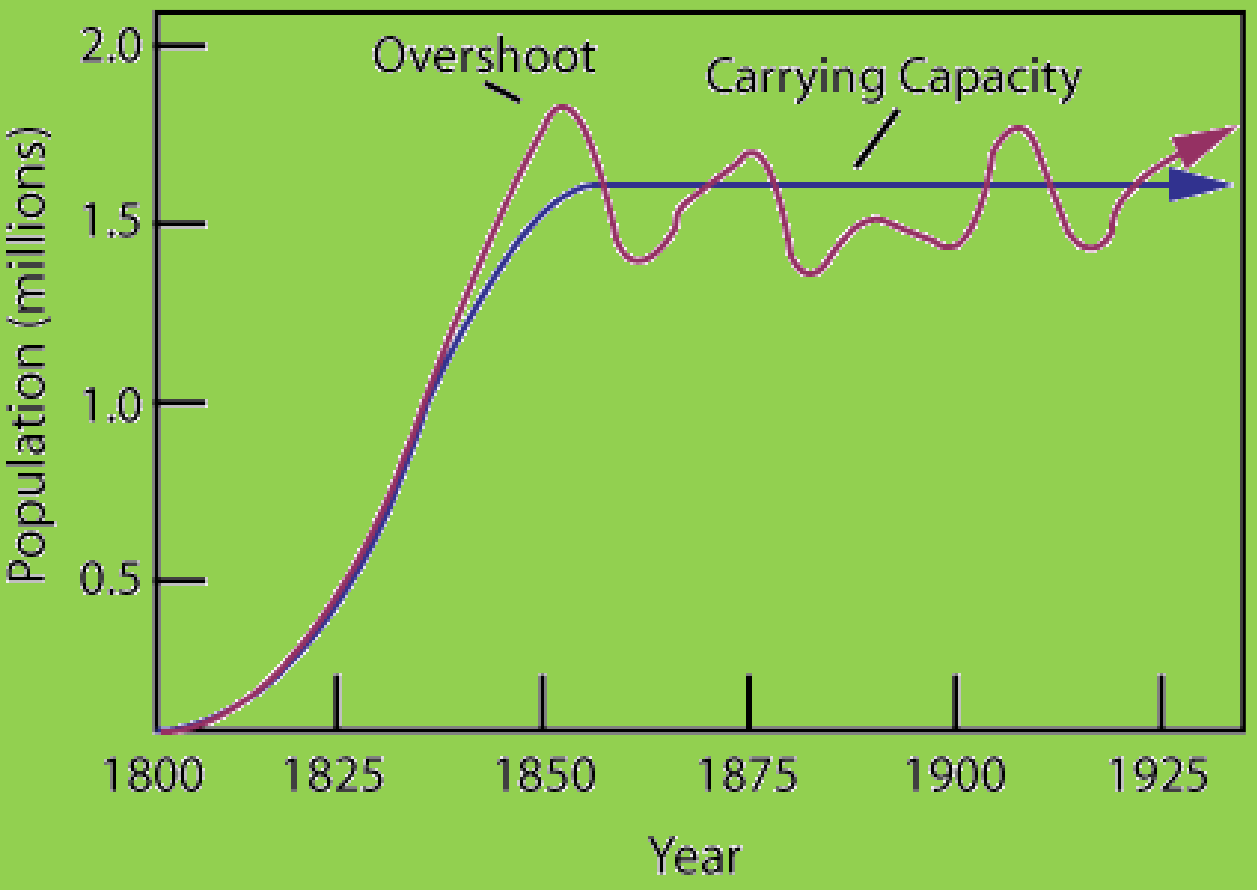
- What bunny did you select?
- What Environment did you choose?
- What mutation did you add?
- What selection factor did you choose?
- What does it mean if your Bunnies have

"Taken over the World!"

- How does Natural Selection work?
- Give an example of a Producer and Two Consumers. What level are they?
- Draw a Food Chain of the ecosystem.

9/29 What limits Population Growth? CH 8.1

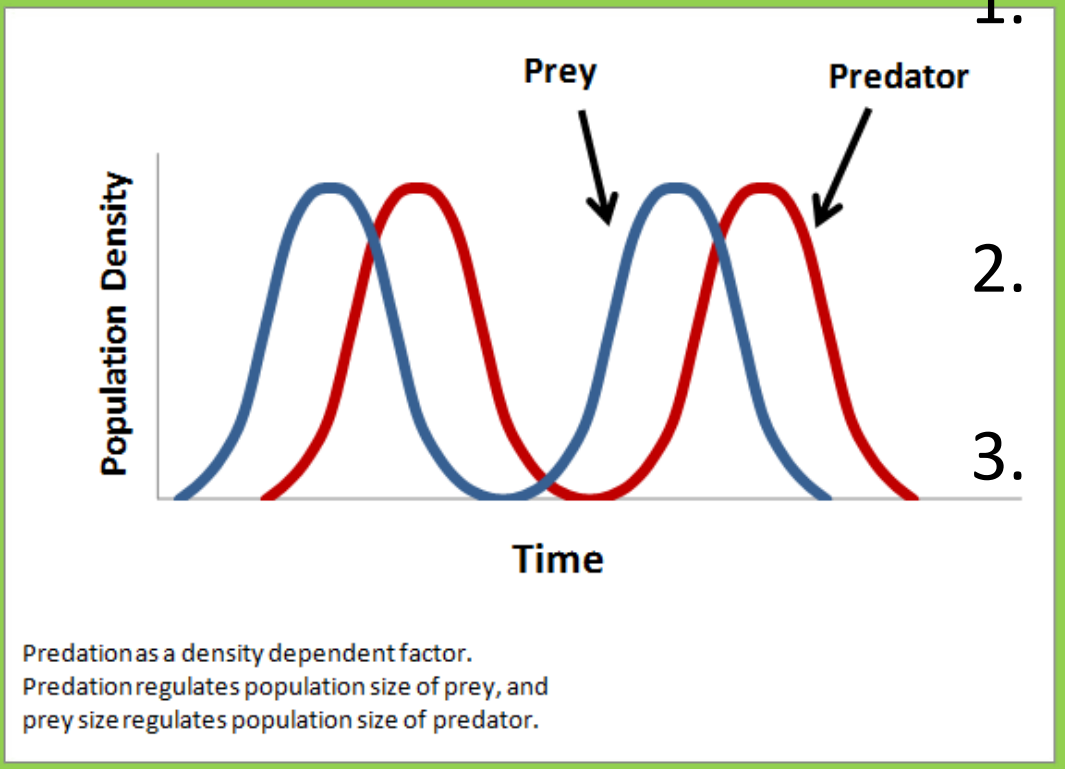
Obj. TSW learn to draw a carrying capacity graph and calculate growth rate of a population. P. 60NB



1. Draw a Carrying Capacity graph.
2. Choose an ecosystem. Label 5 Limiting Factors for that graph.
3. Calculate the Growth rate of a population that has a starting population of 100 individuals, there are 10 births, 5 deaths in a given year, What is the growth rate for the year?

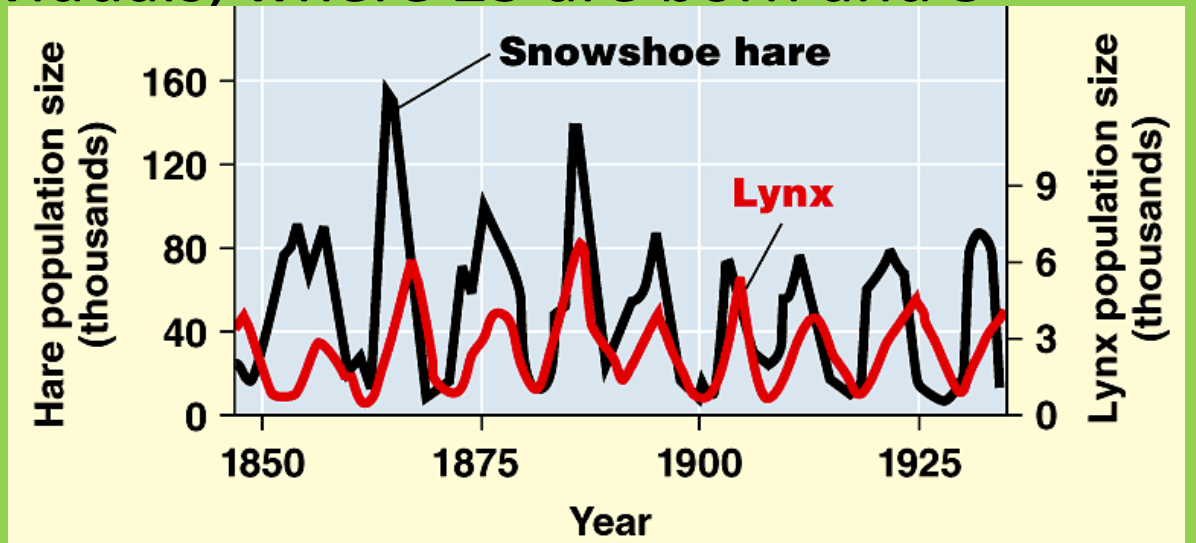
9/30 Limiting Factors CH 8.2

Obj. TSW learn the difference between types of limiting factors. P. 62NB



Predation as a density dependent factor.
Predation regulates population size of prey, and prey size regulates population size of predator.

1. Limiting factors in the carrying capacity of an area can be density dependent or density independent. Write an example of each factor.
2. Explain how each factor impacts the population.
3. Calculate the growth rate of a population of a 1150 individuals, where 25 are born and 5 deaths.



Finish Acid Test: Ocean Acidification P. 57NB

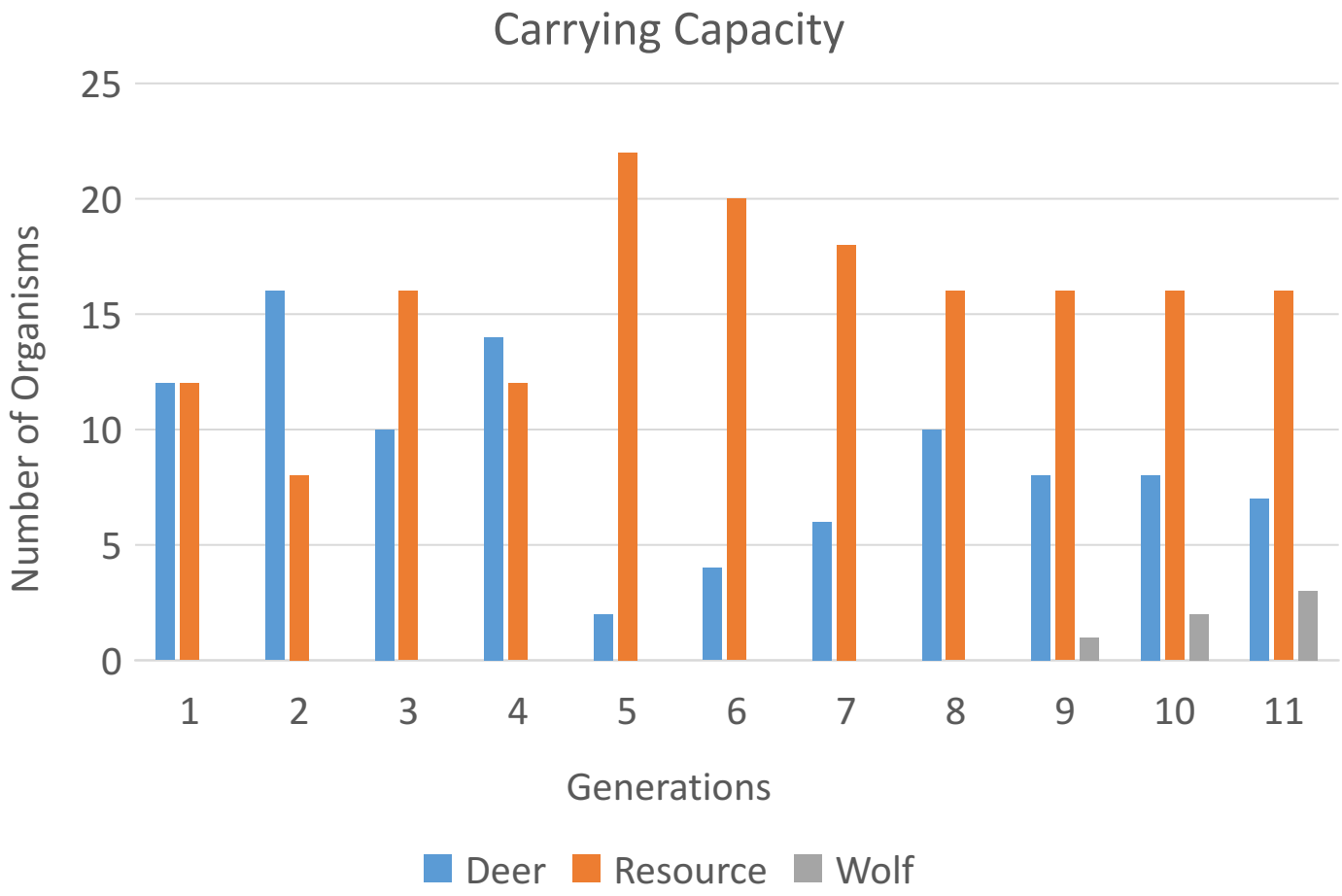
- What is the problem of Ocean Acidification?
- How does it effect shell life?
- What is the solution to Ocean Acidification?

Data Table

Graph

Write an explanation sentence for each of these examples of data. P. 59NB

Generation	Deer	Resource	Wolf
1	12	12	
2	16	8	
3	10	16	
4	14	12	
5	2	22	
6	4	20	
7	6	18	
8	10	16	
9	8	16	1
10	8	16	2
11	7	16	3



Write a summary of how the carrying capacity was maintained in the population of deer. P. 59 NB

Parachuting Cats in Borneo

Biomagnification

- Human activity with the best of intentions can have untended consequences.
- Map of Borneo
- Page 63NB
- storybook

The Day They Parachuted Cats into Borneo

Some time ago, World Health Organization sent supplies of DDT to Borneo to Fight mosquitoes that spread malaria among the people. The mosquitoes were quickly wiped out. But billions of roaches moved into the villages and they simply stored the DDT in their bodies. One kind of animal that fed on the reaches was a small lizard. When these lizards ate the roaches, they also eat a lot of DDT. Instead of killing them, DDT only slowed them down. This made it easier for the cats to catch the lizards, one of their favorite foods. About the same time, people also found that hoards of caterpillars had moved into feed on the roofing materials of their homes. They realized the lizards that previously had kept the caterpillars population under control had been eaten by the cats. And now, all over North Borneo, cats that ate the lizards died from DDT poisoning. Then rats moved in because there were no cats to control their population. With the rats came a new danger, THE Plague,. Officials sent out emergency call for cats. Cats were sent in by airplane and dropped by parachute to control the rats.

Video: Carrying Capacity & Populations p. 65 NB

How does energy flow in an ecosystem?

Draw an energy pyramid for any ecosystem.

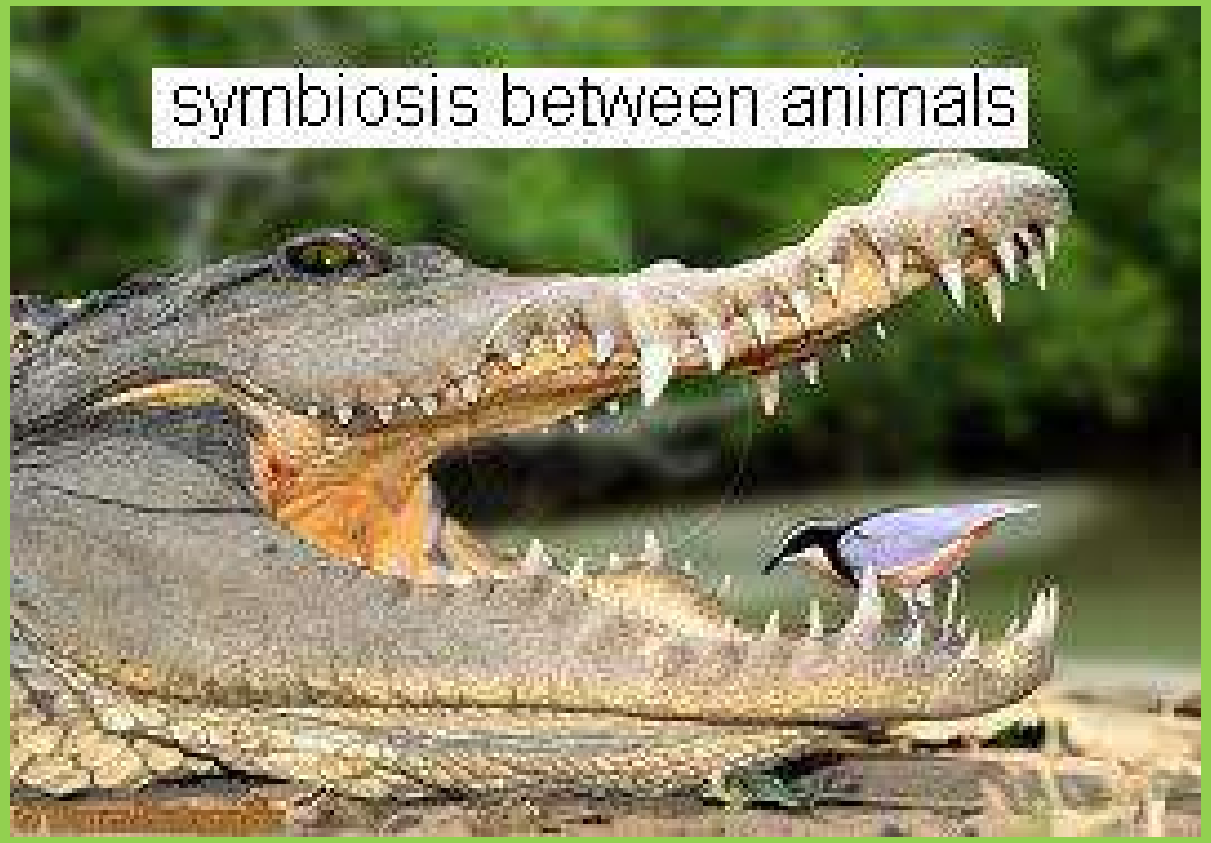
Label the Trophic levels: P, C1, C2, C3

Add your decomposers: Worms, bacteria, fungi

Where is energy lost? What is the lost energy?

How does the loss of energy at each trophic level affect the carrying capacity of these populations?

10/1 How species interact with each other
Obj. TSW identify symbiotic relationships and how they develop an ecosystem. P. 64 NB



1. What is a niche?
2. List the 4 types of interactions between species.
3. Write how the species interact with each other for each type of interaction.

Activity Foldable: Symbiosis

For each type of Symbiosis, Give an example.

Explain whether they benefit or are harmed by the symbiosis.

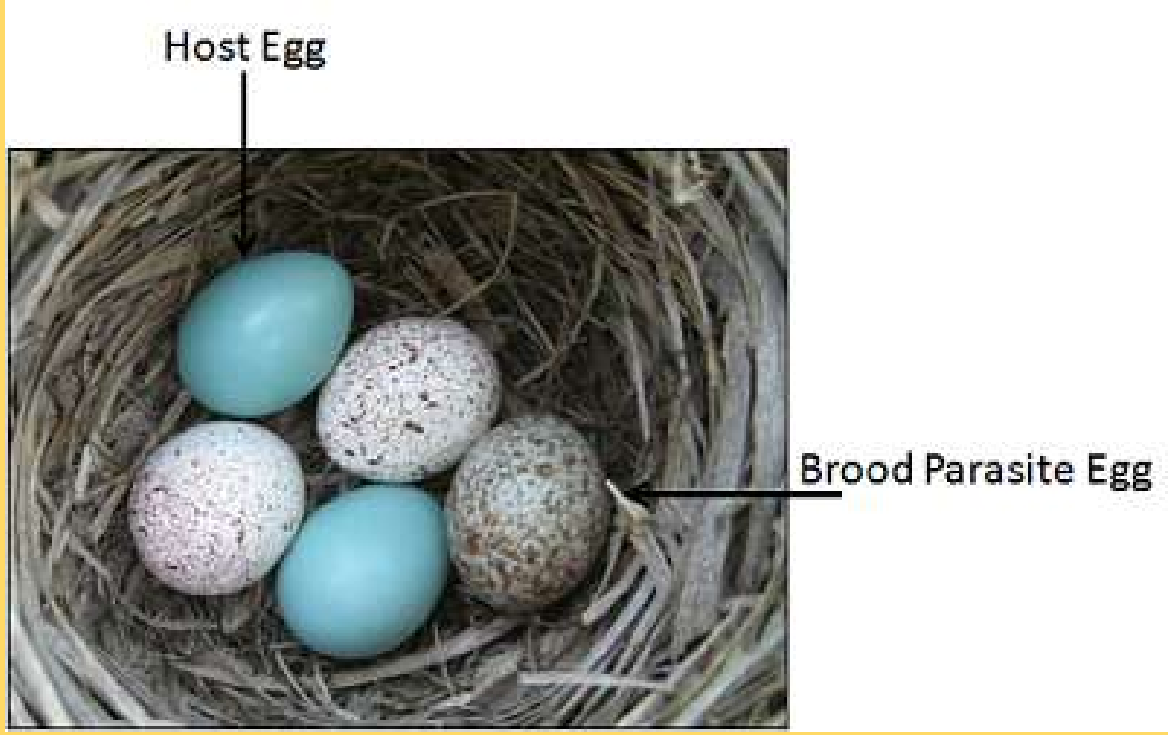
Competition	Mutualism	Parasitism	Commensalism

Explain **Symbiosis** here:

Competition

Mutualism

Parasitism



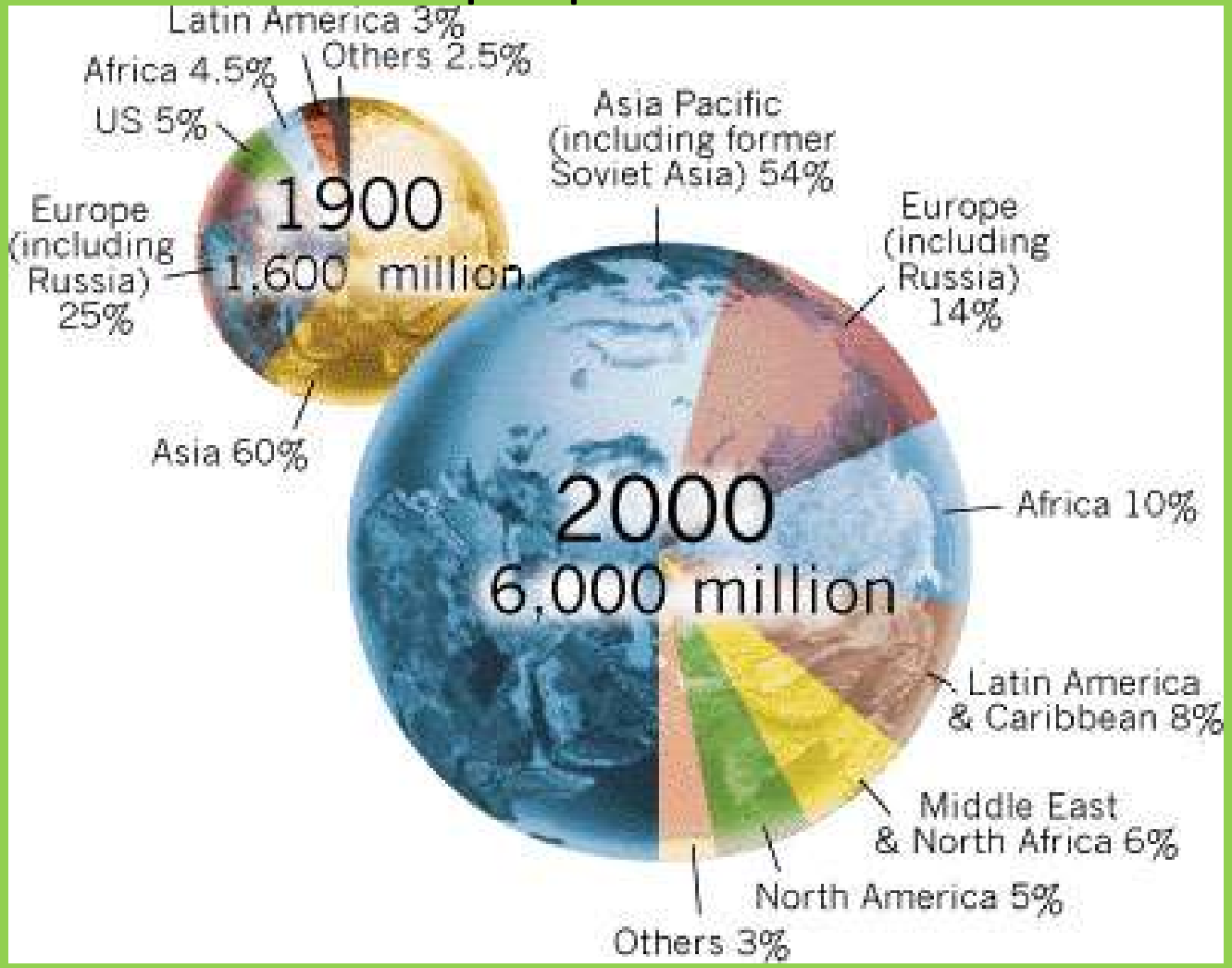
Commensalism

Time to write your 5 Points of Questions for Chapter 8

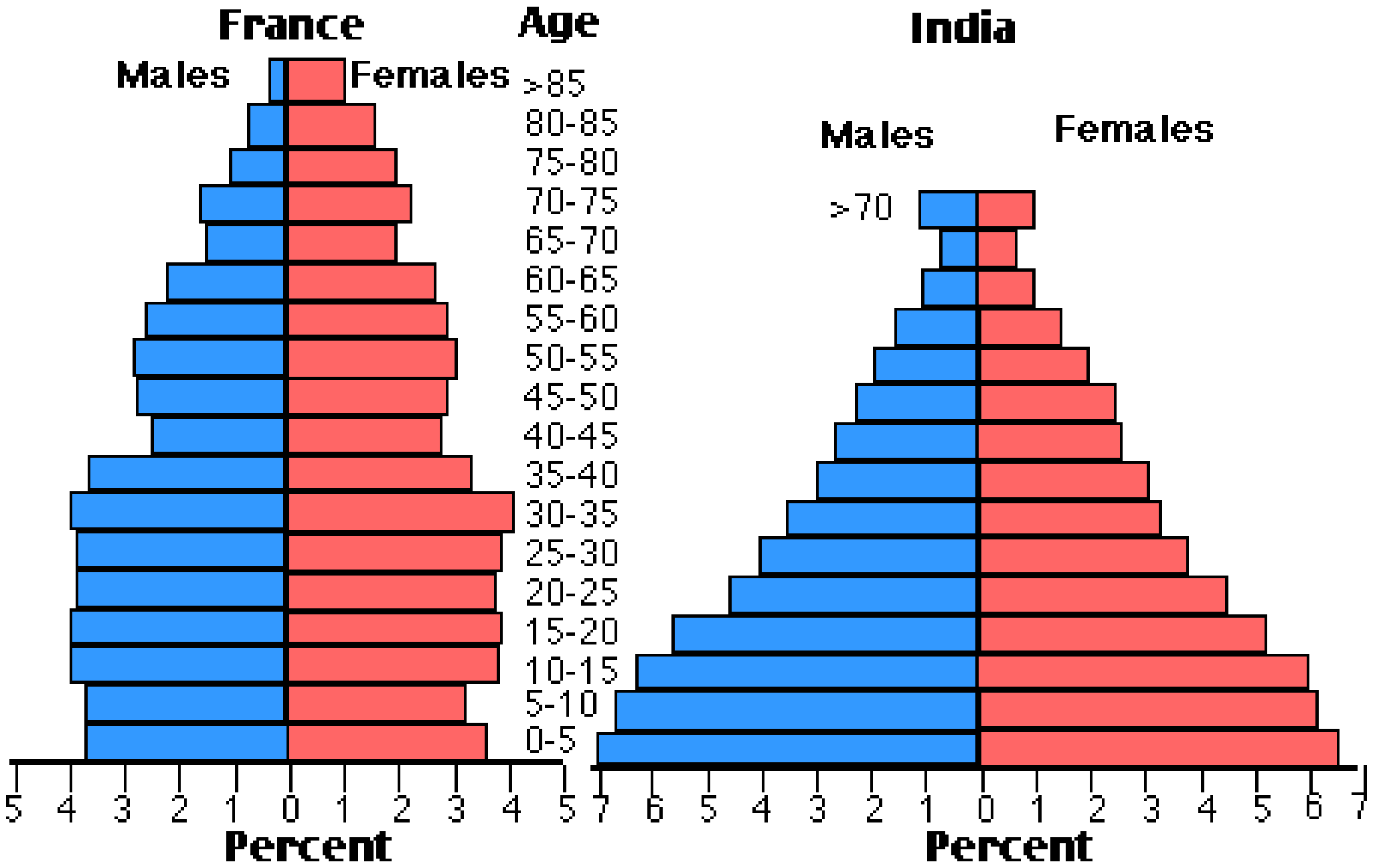
- Level 1 – Easy, one word answer
- Level 2 – Medium difficulty, write a sentence or two.
- Level 3 – Challenging, explain, give examples show the significance of the concept or topic.

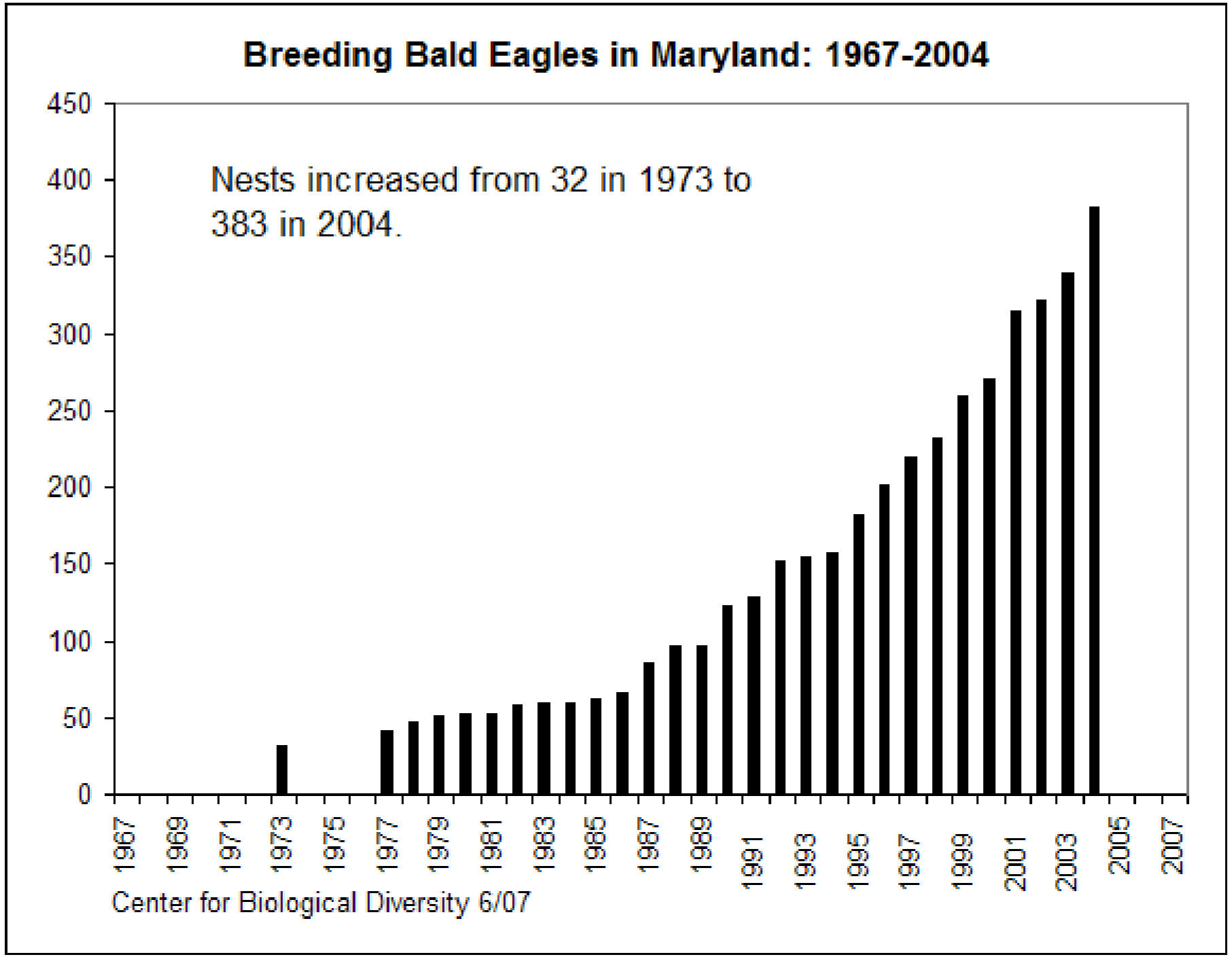
- QUIZ tomorrow ☺

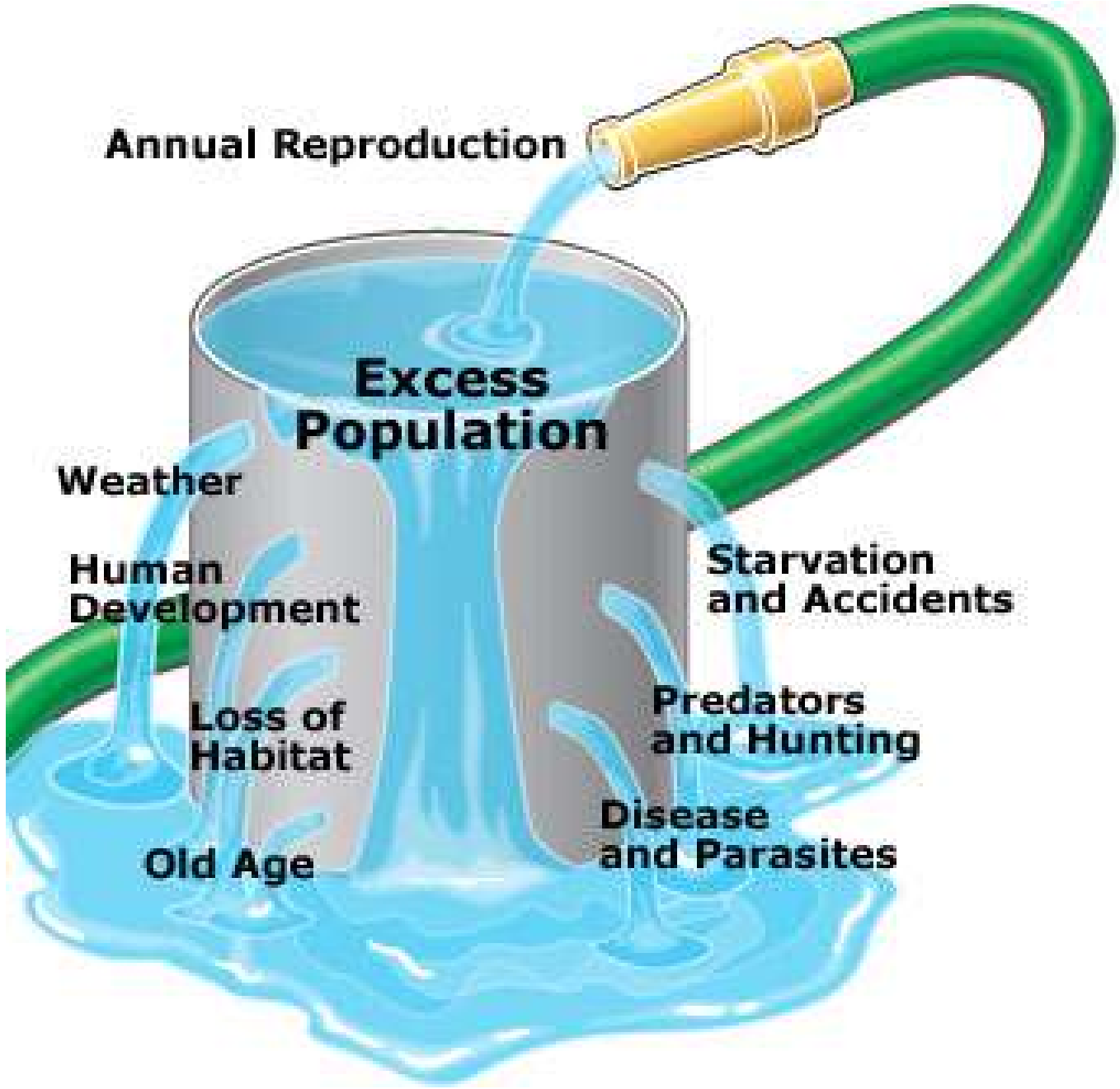
10/2 The Human Population CH 9.1
Obj. TSW learn about the growth pattern of the human population. P. 66NB



1. What is demography?
2. What growth pattern is the Human Population?
3. What shape curve is this? What should the curve be?


France
Age
Males
Females
>85
80-85
75-80
70-75
65-70
60-65
55-60
50-55
45-50
40-45
35-40
30-35
25-30
20-25
15-20
10-15
5-10
0-5
5 4 3 2 1 0 1 2 3 4 5
Percent
India
Males
Females
>70
7 6 5 4 3 2 1 0 1 2 3 4 5 6 7
Percent


Breeding Bald Eagles in Maryland: 1967-2004
Nests increased from 32 in 1973 to 383 in 2004.
450
400
350
300
250
200
150
100
50
0
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
Center for Biological Diversity 6/07


Annual Reproduction
Excess Population
Weather
Human Development
Loss of Habitat
Old Age
Starvation and Accidents
Predators and Hunting
Disease and Parasites

Succession Mt. St. Helens

Pre 1980

Eruption 1980

2010

2010

Succession – Mt. St. Helens

- WS – Mt. St. Helens
- Back from the Dead
- Follow along with the movie in order to fill in the blanks & answer the questions on this worksheet. The answers appears in the order they will appear on screen. I will grade this worksheet on Friday when you take your quiz for a grade.

Succession

- *Primary succession→ the colonization of barren land by communities of organisms
  - Takes place on land where there are NO other organisms
  - Ex. Volcanoes errupting
- *secondary successions→ sequence of changes that take place after an existing community is severely disrupted in some way
- *Ex. Lichens→grasses→shrubs→trees
- *Climax community→ stable, mature community that undergoes little/no change

PRIMARY SUCCESSION

SECONDARY SUCCESSION

LAVA

LAVA COOLED WITH LICHEN

GRASSES/SHRUBS

FOREST

CLIMAX COMMUNITY!

Taboo
Partner 1 look at screen
Partner 2 Look away!

- Populations
- Growth rate
- Carrying Capacity
- Exponential growth
- Density dependent

Taboo

- Niche
- Competition
- Predation
- Parasitism
- Mutualism

taboo

- Commensalism
- Symbiosis