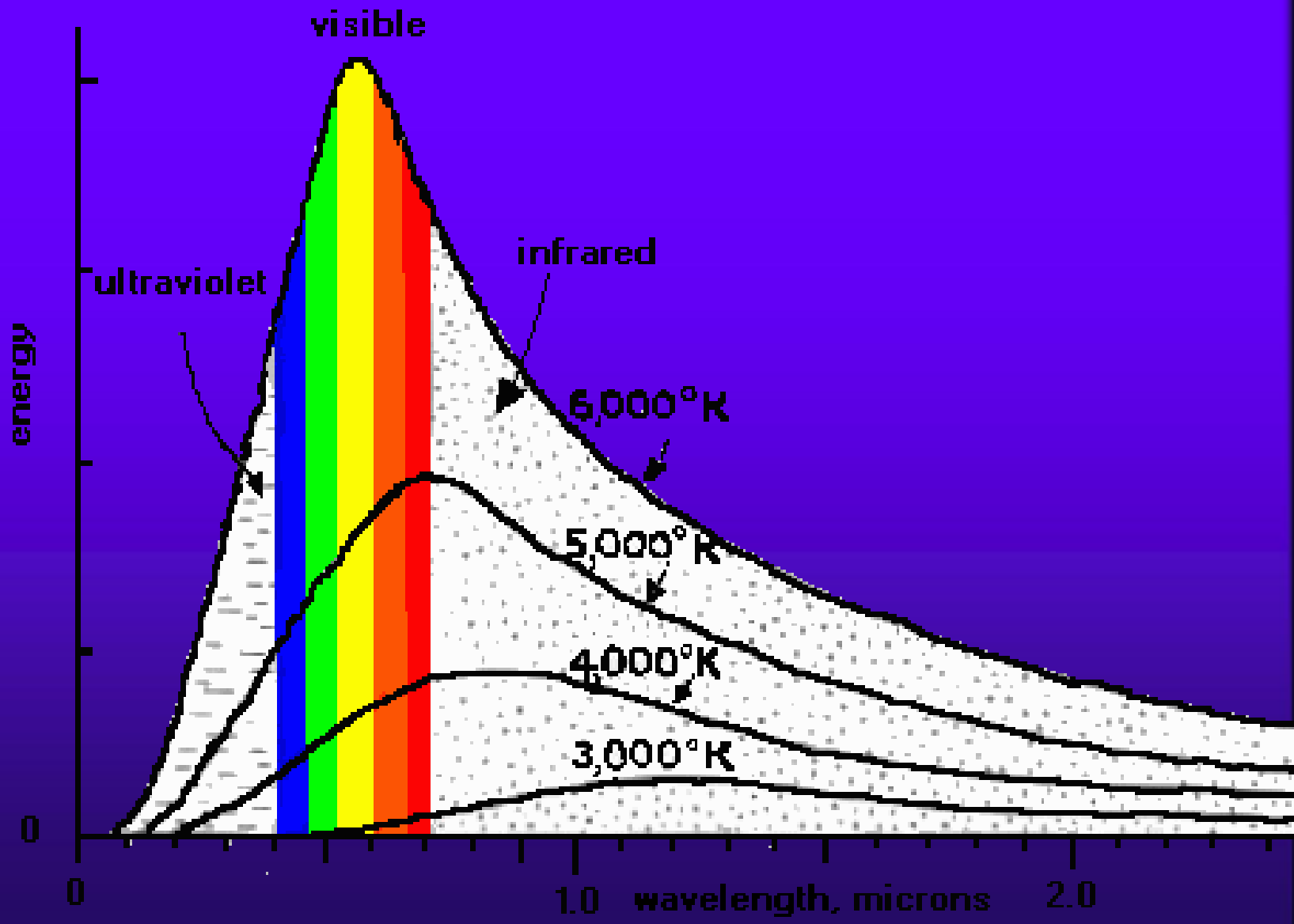
CAHAYA

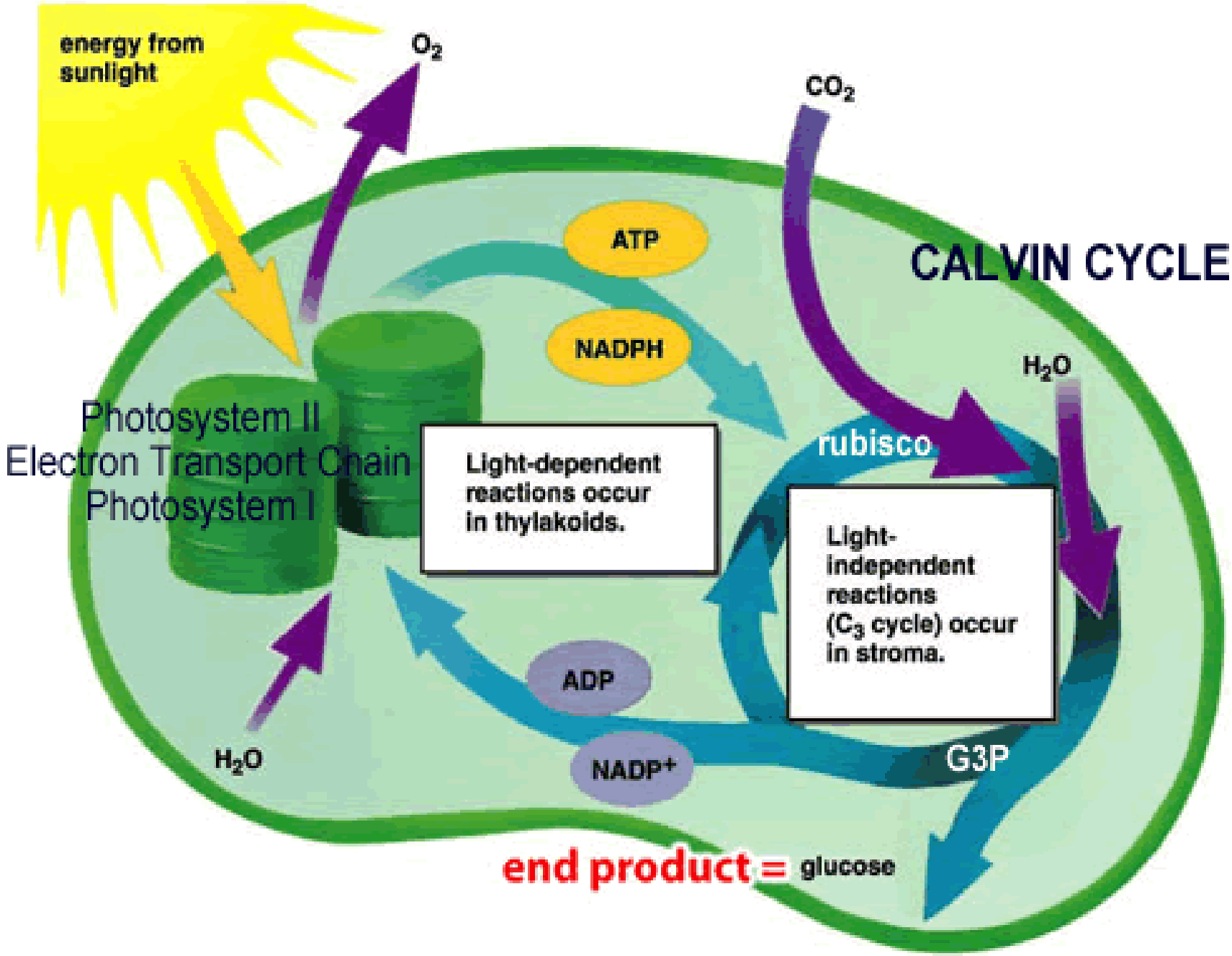
- CAHAYA DENGAN PANJANG GELOMBANG 400- 700 nm ADALAH CAHAYA YANG TAMPAK, DIKENAL SEBAGAI *PAR* (PHOTOSINTETICALLY ACTIVE RADIATION).
- 315-380 nm : UV A
- 280-315 nm : UV B
- LEBIH DARI CAHAYA TAMPAK : CAHAYA INFRARED.

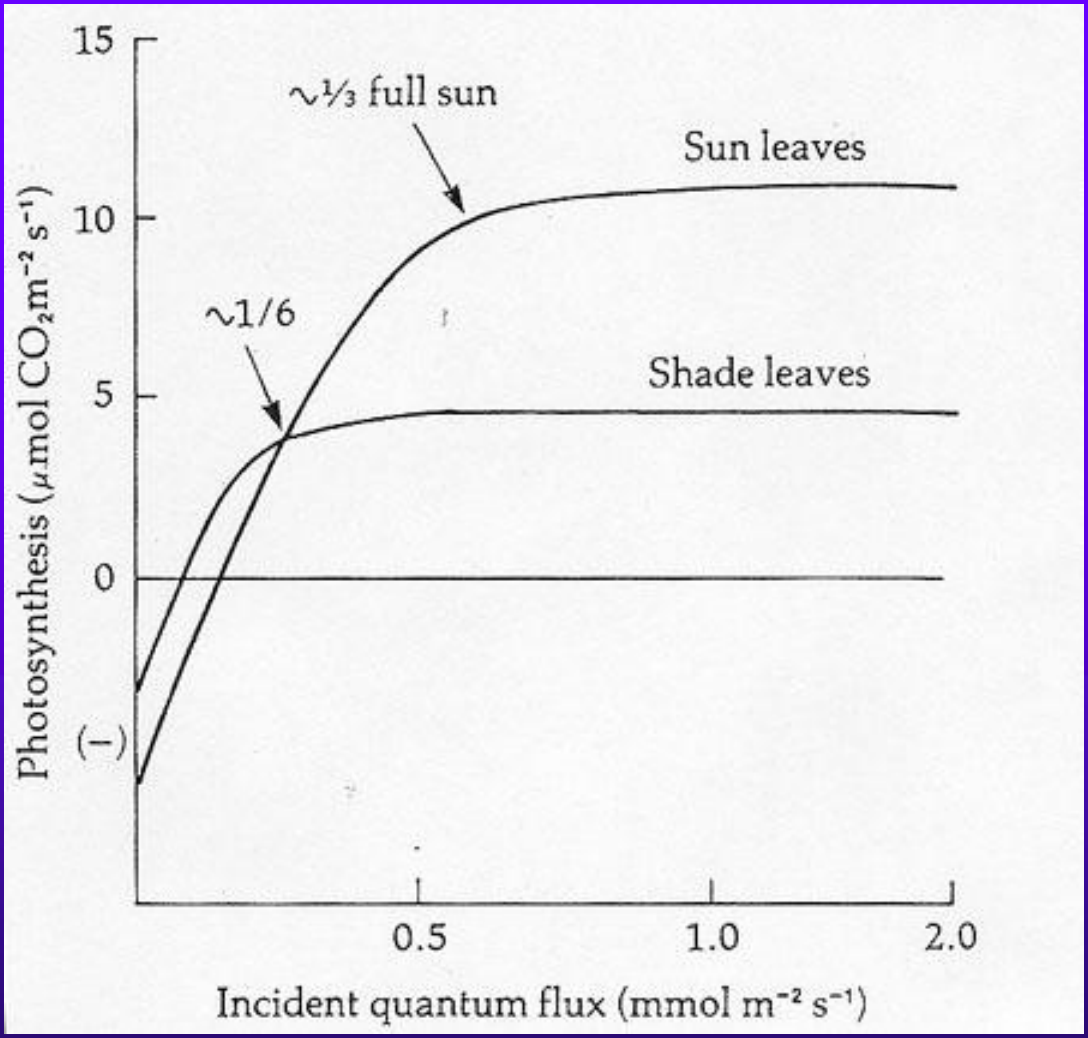

visible
ultraviolet
infrared
energy
6,000°K
5,000°K
4,000°K
3,000°K
0
0
1.0
wavelength, microns
2.0

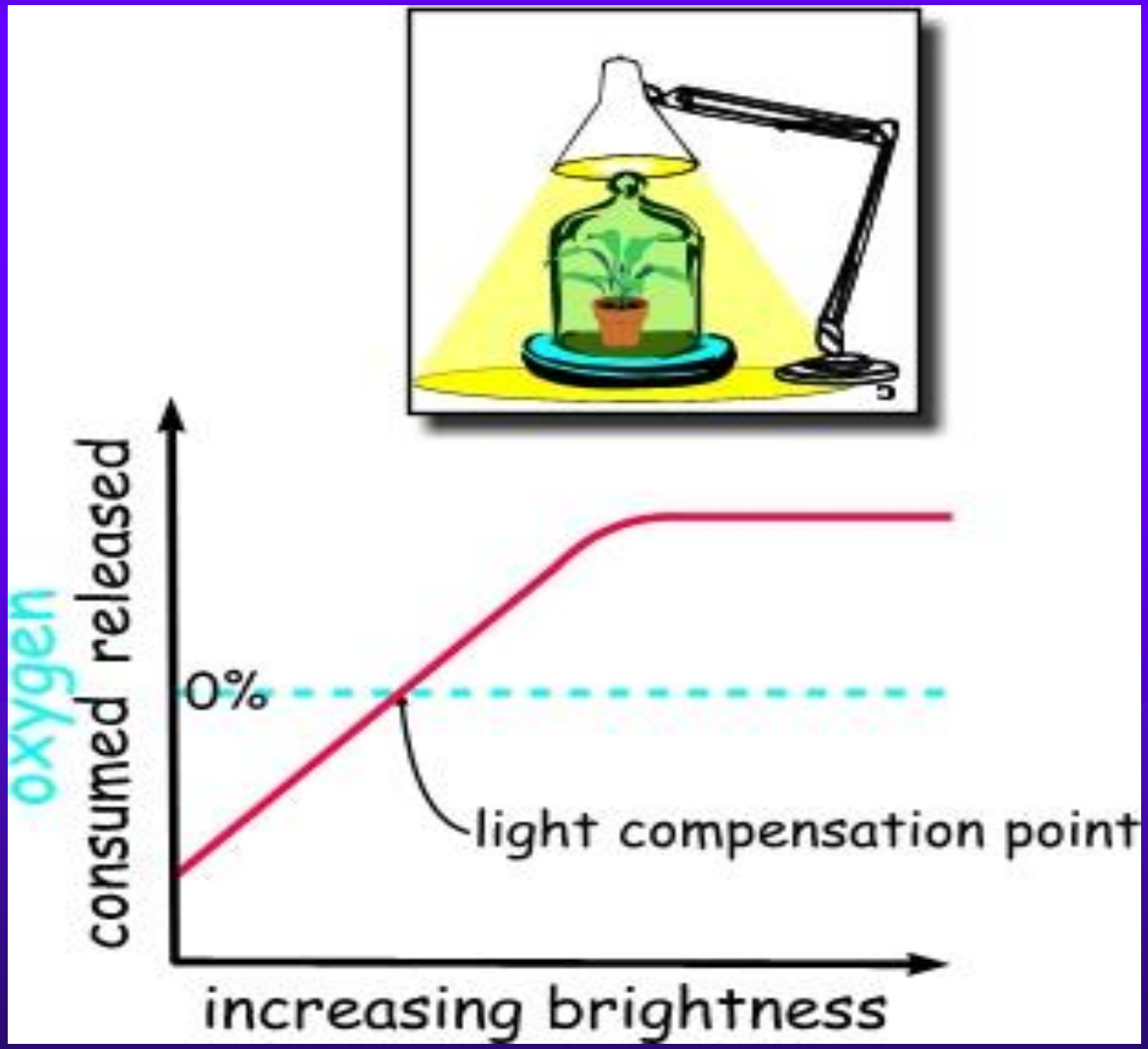
PLANT COVER INTERCEPTS CONSIDERABLE LIGHT

- THE AMOUNT OF LIGHT THAT DOES PENETRATE A STAND OF VEGETATION TO REACH THE GROUND VARIES WITH BOTH QUANTITY AND POSITION OF LEAVES.
- LEAF AREA INDEX (LAI)
- THE LIGHT A PLANT RECEIVES AFFECTS ITS PHOTOSYNTHETIC ACTIVITY

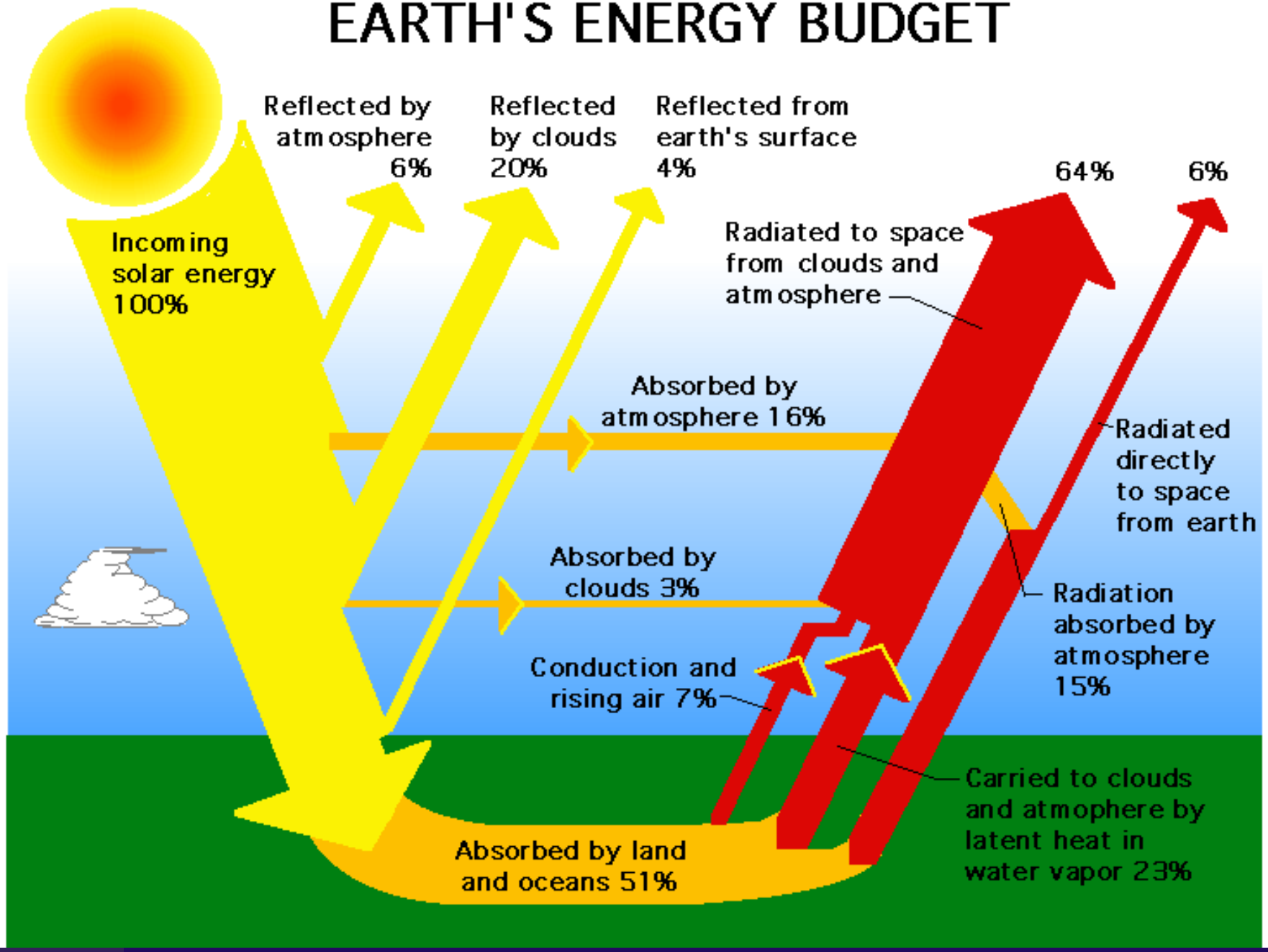
- LIGHT COMPENSATION POINT
- LIGHT SATURATION POINT
- PHOTOINHIBITION

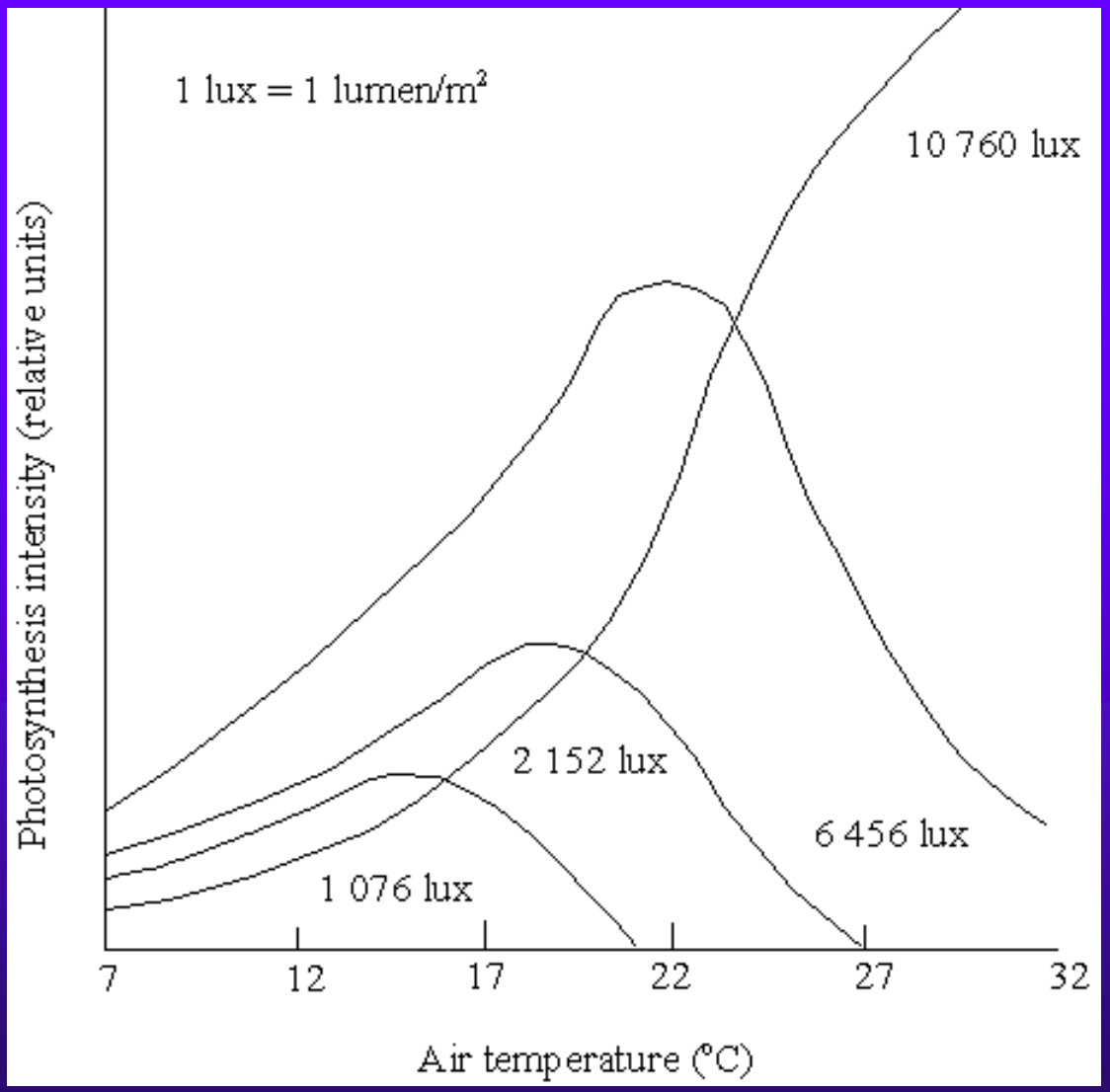

energy from sunlight
O_2
CO_2
ATP
NADPH
CALVIN CYCLE
H_2O
Photosystem II
Electron Transport Chain
Photosystem I
Light-dependent reactions occur in thylakoids.
rubisco
Light-independent reactions (C_3 cycle) occur in stroma.
ADP
H_2O
$NADP^+$
G3P
end product = glucose

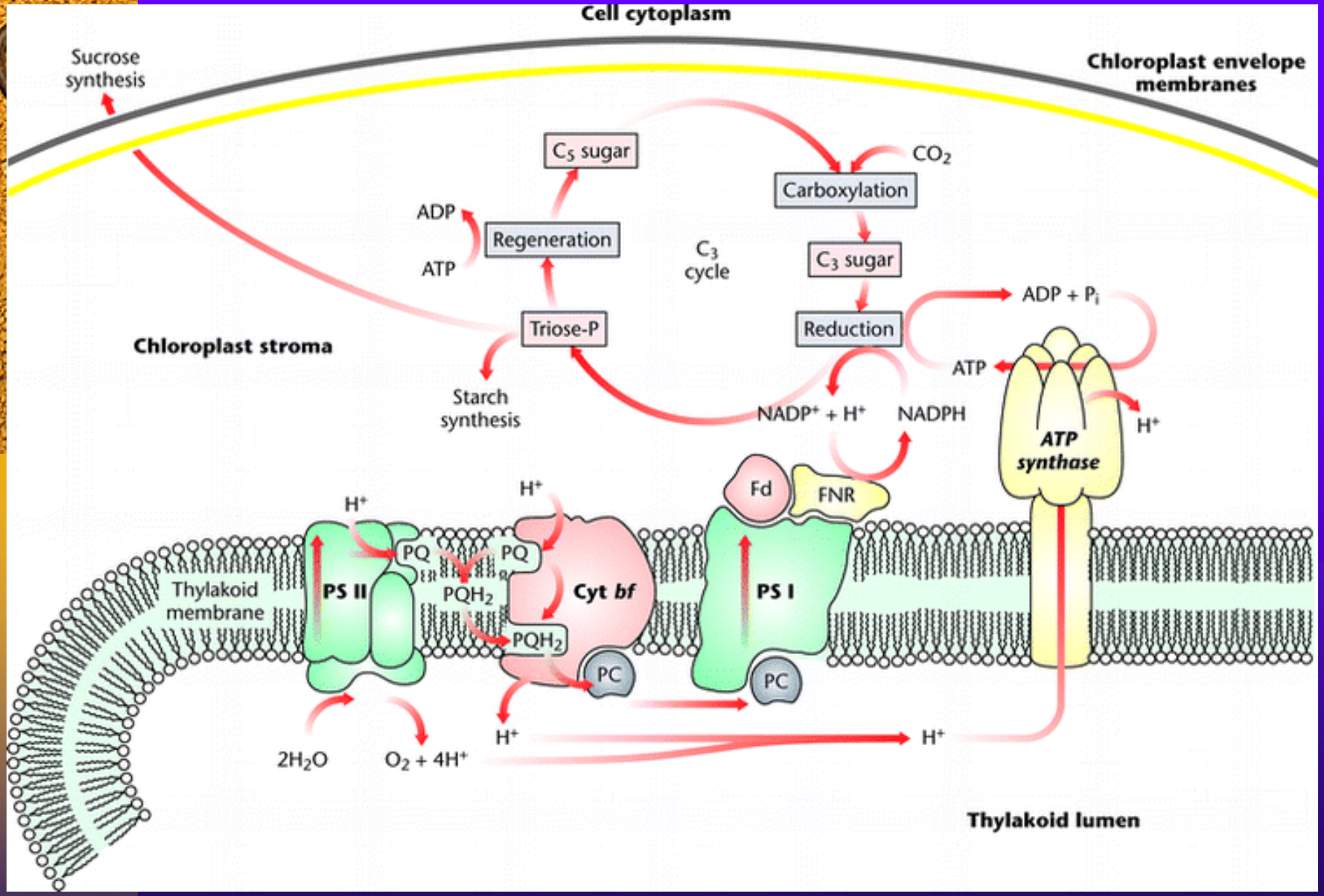

15
10
5
0
(−)
Photosynthesis (μmol CO₂m⁻² s⁻¹)
~⅓ full sun
Sun leaves
~1/6
Shade leaves
0.5
1.0
2.0
Incident quantum flux (mmol m⁻² s⁻¹)


oxygen
consumed released
0%
light compensation point
increasing brightness

EARTH'S ENERGY BUDGET



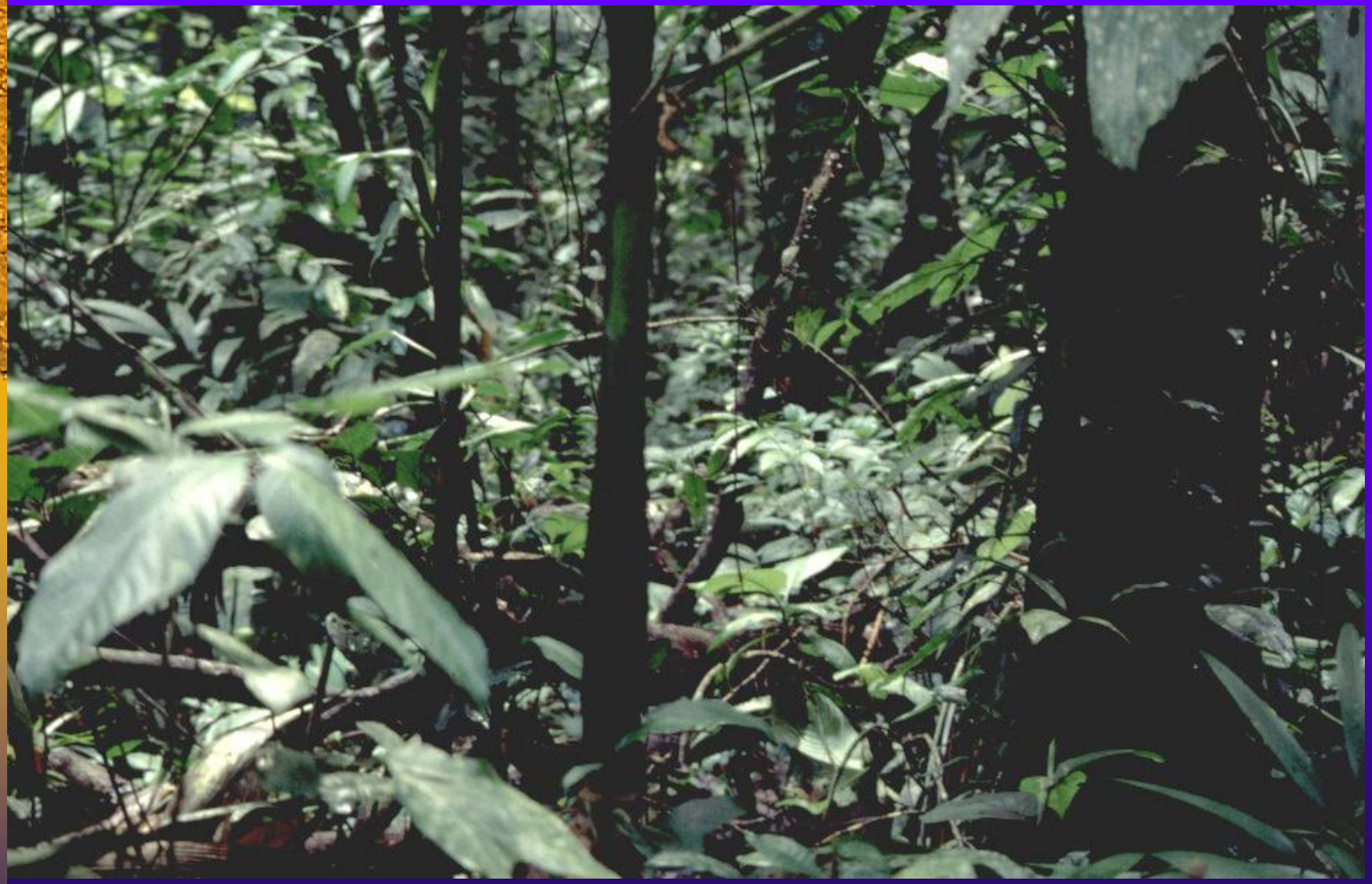

1 lux = 1 lumen/m²
10 760 lux
2 152 lux
6 456 lux
1 076 lux
Photosynthesis intensity (relative units)
7
12
17
22
27
32
Air temperature (°C)


Cell cytoplasm
Sucrose synthesis
Chloroplast envelope membranes
C_5 sugar
CO_2
Carboxylation
ADP
Regeneration
ATP
C_3 cycle
C_3 sugar
ADP + P_i
Triose-P
Reduction
Chloroplast stroma
ATP
Starch synthesis
$NADP^+ + H^+$
NADPH
H^+
ATP synthase
Fd
FNR
H^+
H^+
PQ
PQ
PQH_2
PQH_2
Thylakoid membrane
PS II
Cyt bf
PS I
PC
PC
H^+
H^+
$2H_2O$
$O_2 + 4H^+$
Thylakoid lumen

SPECIES OF PLANTS ARE ADAPTED TO EITHER HIGH OR LOW LIGHT

- ACCLIMATIZATION : CHANGES IN PHYSIOLOGI OR FORM OF AN ORGANISM IN RESPONSE TO CHANGE IN ENVIRONMENTAL CONDITIONS.
- SHADE TOLERANT SPECIES
- SHADE INTOLERANT SPECIES
- AQUATIC PLANTS LIVE IN A SHADED ENVIRONMENT

Shade tolerance



TEMPERATURE

PLANT HAVE METABOLIC ADAPTATIONS TO HEAT AND COLD

ANIMALS MAINTAIN TEMPERATURE DIFFERENTLY.

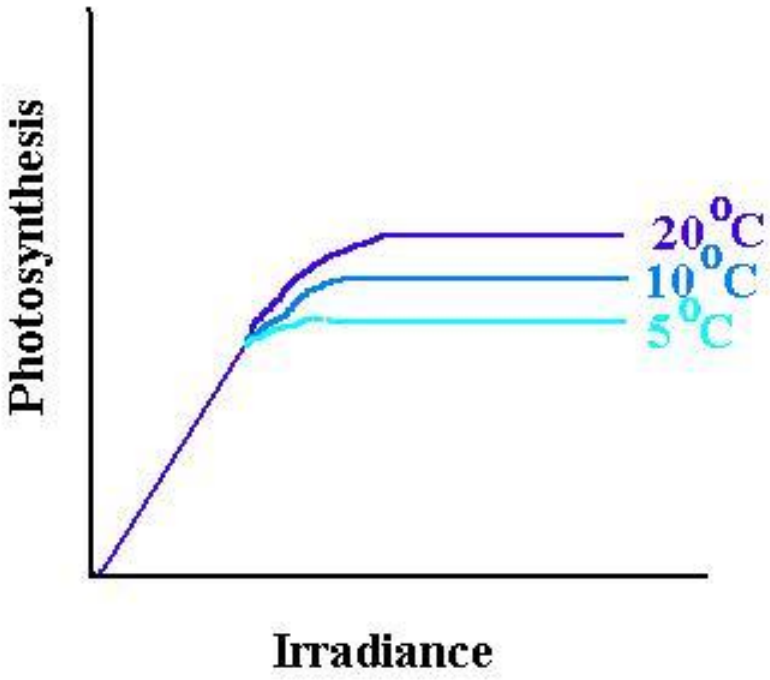
ANIMALS FALL INTO THRE PHYSIOLOGYCAL GROUPS :
HOMEOTHSERM
POIKILOTHERMS
HETEROTHERMS

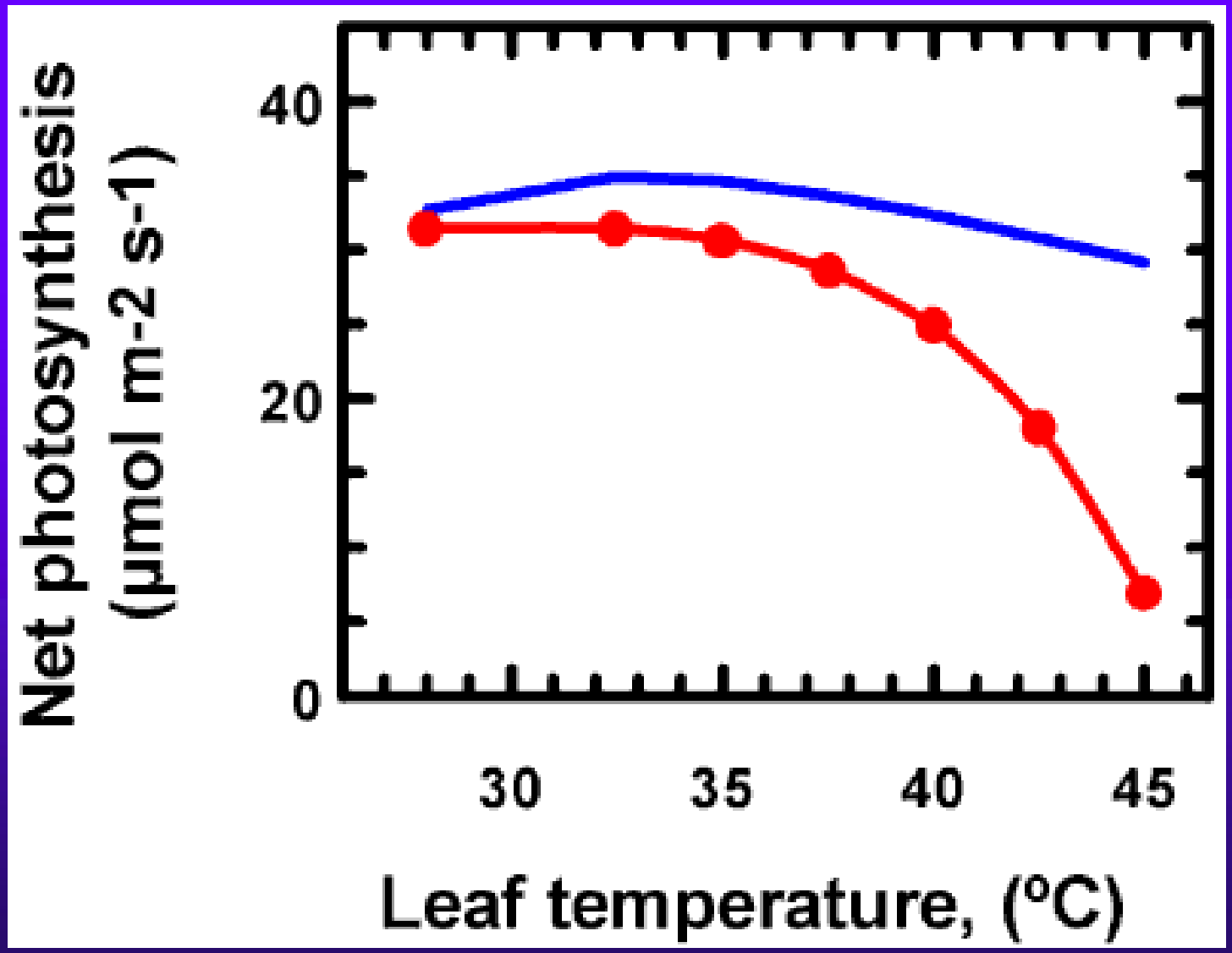
POIKILOTHERMS DEPEND ON ENVIRONMENTAL TEMPERATURE

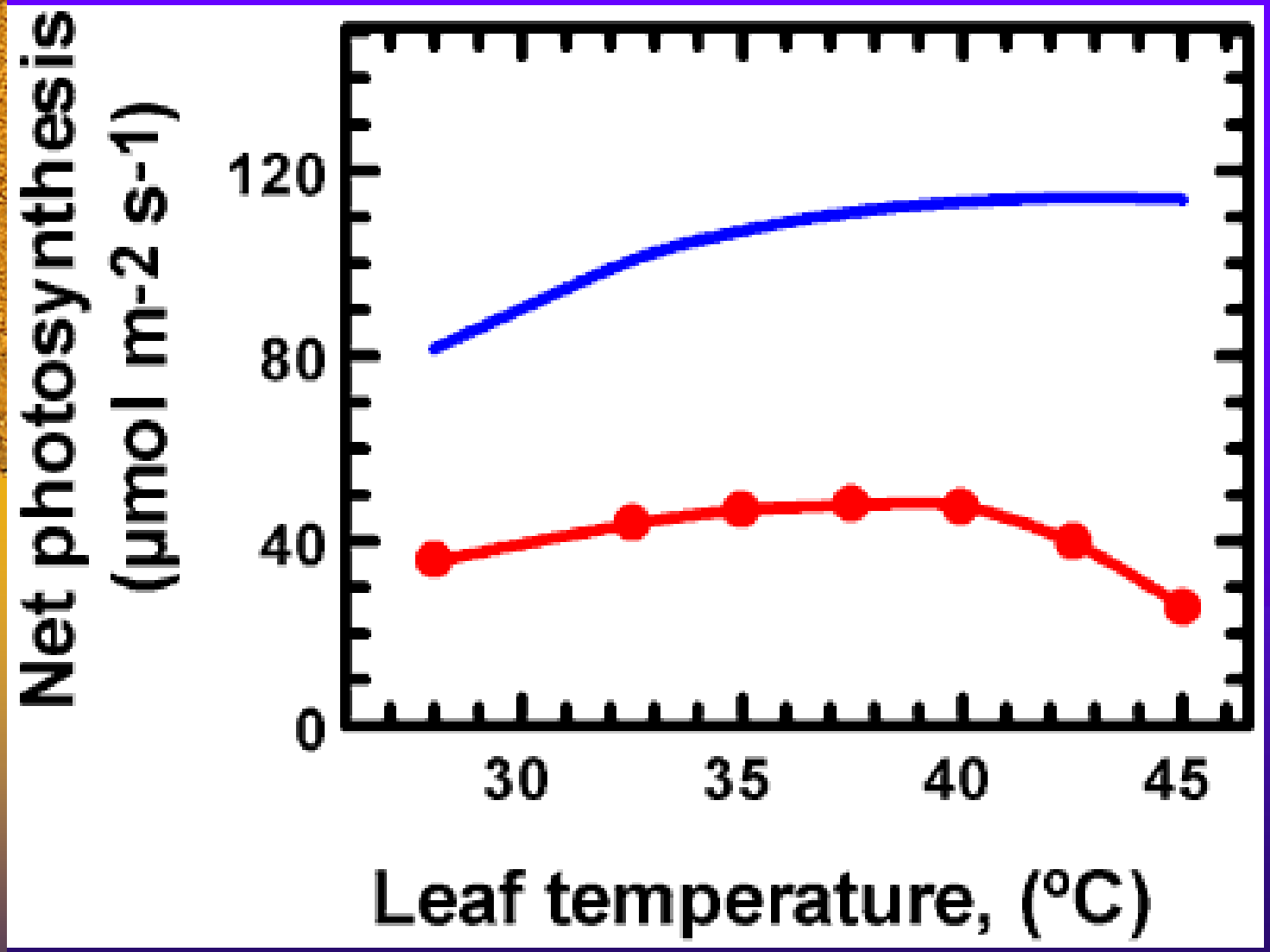
- HOMEOTHERMIC BIRDS AND MAMMALS MEET THE THERMAL CONSSTRAINTS OF THE ENVIRONMENT BY BEING ENDOTHERMIC.
- HAVE A HIGH METABOLIC RATE AND LOW THERMAL CONDUCTANCE

- HETEROTHERMS MAY OR MAY N OT REGULETE BODY TEMPERATURE
- TORPOR HELPS SOME ANIMALS CONSERVE ENERGY

- ANIMALS EXPLOIT MICOCLIMAT TO REGULATE TEMPERATURE
- INSULATION REDUCE HEAT EXCHANGE
- EVAPORATIVE COOLING IN ANIMALS IS IMPORTANT
- SOME ANIMALS USE UNIQUE PHYSIOLOGICAL MEANS FOR THERMAL BALANCE
- COUNTERCURRENT CIRCULATION CONSERVES OR REDUCES BODY HEAT


Photosynthesis
Irradiance
20 °C
10 °C
5 °C


Net photosynthesis
(µmol m-2 s-1)
40
20
0
30
35
40
45
Leaf temperature, (°C)


Net photosynthesis
(µmol m-2 s-1)
120
80
40
0
30
35
40
45
Leaf temperature, (°C)

EFEK SUHU RENDAH

- REDUKSI ABSORBSI
- DEHIDRASI PADA TAJUK

EFEK SUHU TINGGI

- TERBAKARNYA DAUN DAN BUAH
- GUGURNYA DAUN
- MEMBATASI PERTUMBUHAN
- KERUSAKAN MEMBRAN AKIBAT DENATURASI PROTEIN
- TRANSPIRASI BERLEBIHAN

ADAPTASI

- DIBENTUKNYA SHOCK PROTEIN
- KUTIKULA
- STOMA
- FISIOLOGI : FOTOSINTESIS
- SUKULENSI