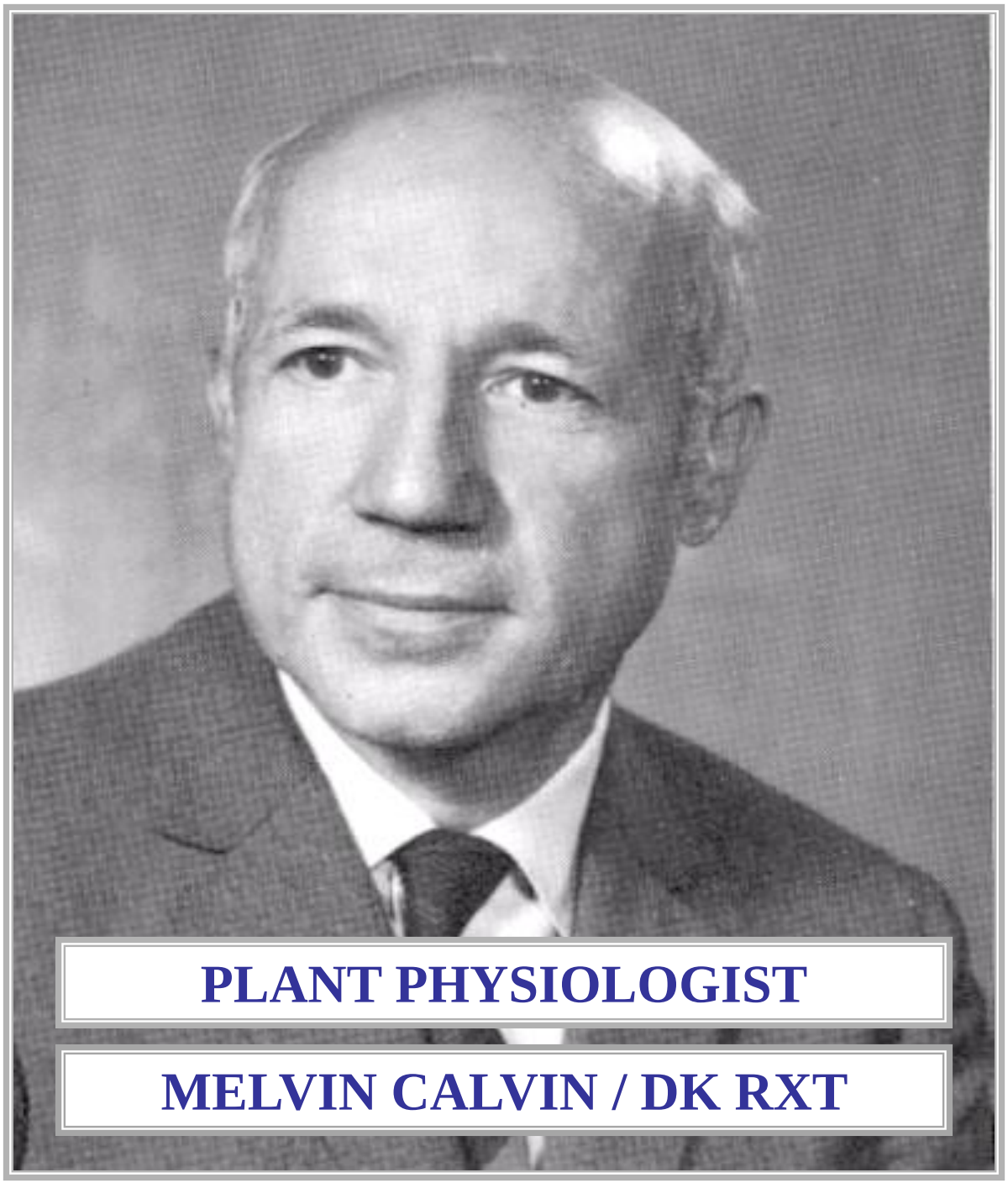
CALVIN CYCLE

SYNONYMOUS

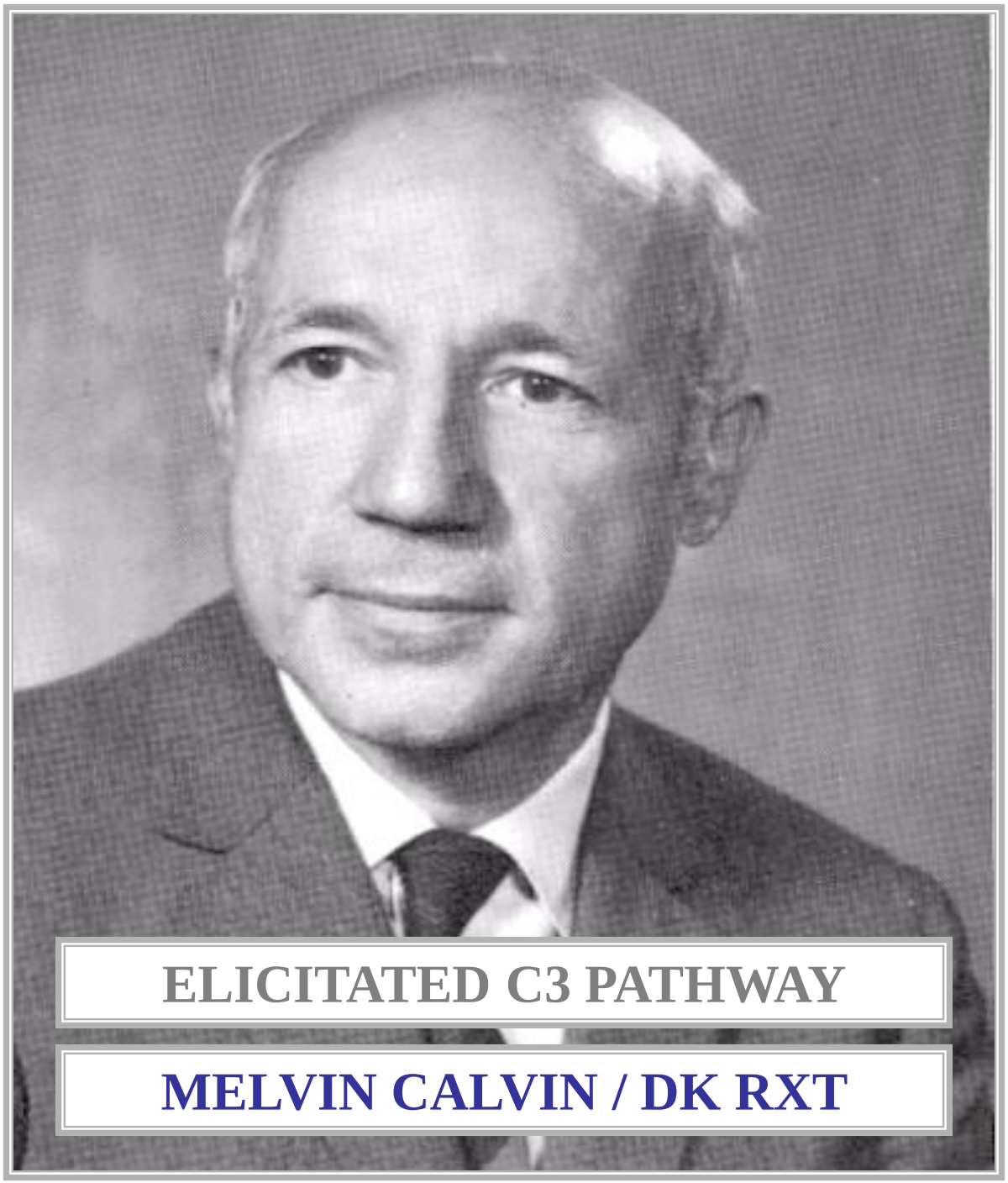
C3 PATHWAY

EL



PLANT PHYSIOLOGIST

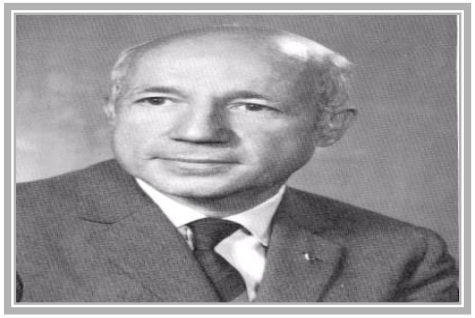
MELVIN CALVIN / DK RXT



ELICITATED C3 PATHWAY

MELVIN CALVIN / DK RXT

CC



CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

FEEDSBACK

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

CHEM EGY INPUT

GLUCOSE ENTERS METABOLISM

ALL RXTS REQUIRE A SPECIFIC ENZYME

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

COMPLEX SERIES CHEMICAL RXTS (CSCR)

ATP

RIBULOSE BISPHOSPHATE / (RUBP)

C3 PATHWAY

CALVIN CYCLE

C3 PATHWAY ACRONYMS

C3 ACRONYMS

RUBP = RIBULOSE BISPHOSPHATE

C3 ACRONYMS

C3 ACRONYMS

RUBP = RIBULOSE BISPHOSPHATE
PGA = PHOSPHOGLYCERATE

C3 ACRONYMS

C3 ACRONYMS

RUBP = RIBULOSE BISPHOSPHATE
PGA = PHOSPHOGLYCERATE
BIPGA = BISPHOSPHOGLYCERATE

C3 ACRONYMS

C3 ACRONYMS

RUBP = RIBULOSE BISPHOSPHATE
PGA = PHOSPHOGLYCERATE
BIPGA = BISPHOSPHOGLYCERATE
PGAL = PHOSPHOGLYCERALDEHYDE

C3 ACRONYMS

C3 ACRONYMS

RUBP = RIBULOSE BISPHOSPHATE
PGA = PHOSPHOGLYCERATE
BIPGA = BISPHOSPHOGLYCERATE
PGAL = PHOSPHOGLYCERALDEHYDE
CSCR = COMPLEX SERIES CHEM-RXTS

C3 ACRONYMS

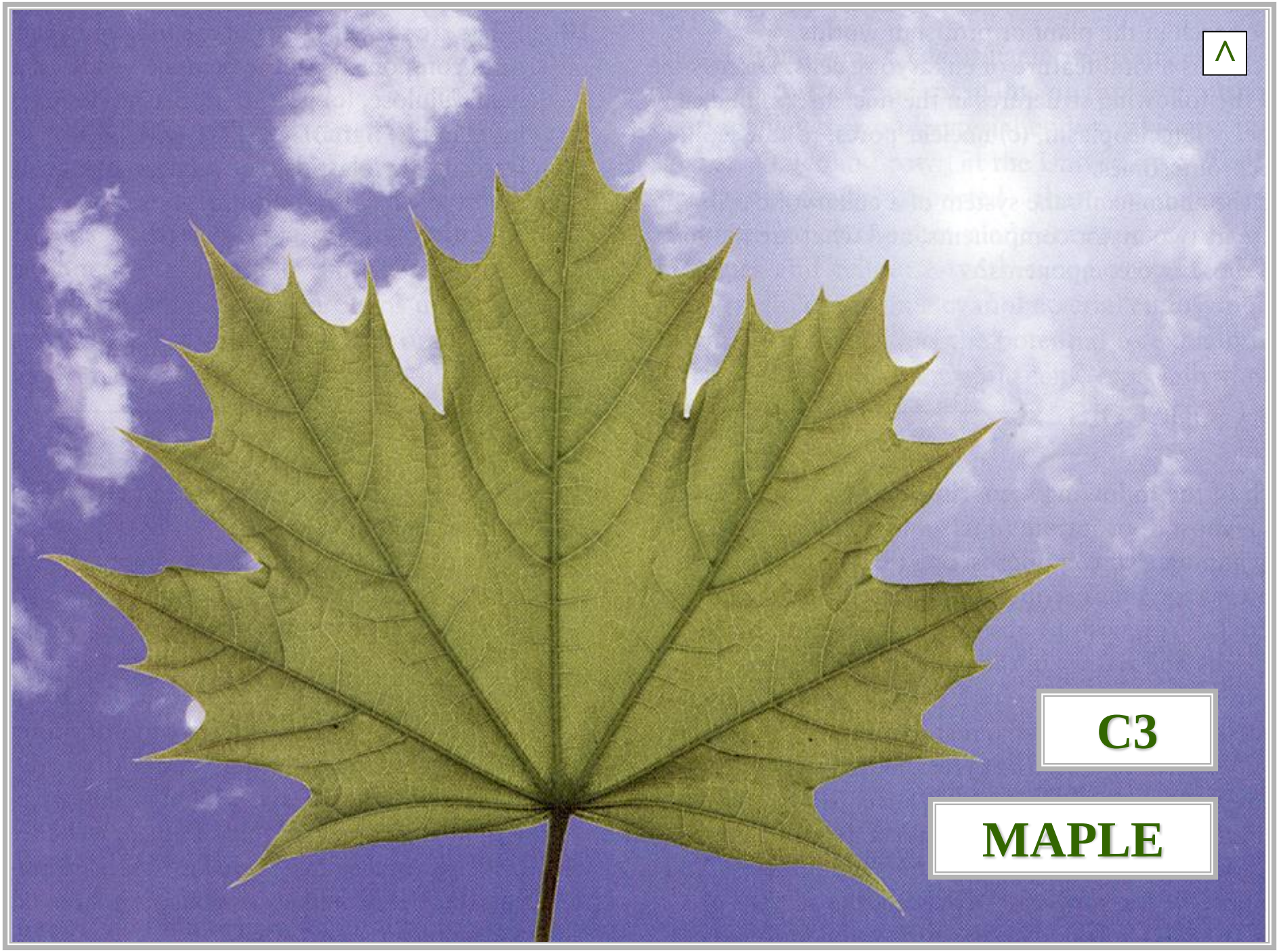
C3 ACRONYMS

RUBP = RIBULOSE BISPHOSPHATE
PGA = PHOSPHOGLYCERATE
BIPGA = BISPHOSPHOGLYCERATE
PGAL = PHOSPHOGLYCERALDEHYDE
CSCR = COMPLEX SERIES CHEM-RXTS
BOX = LOCATION

C3 ACRONYMS

C3 PATHWAY SPECIFICS

C3
PATHWAY
MAPLE PLANT

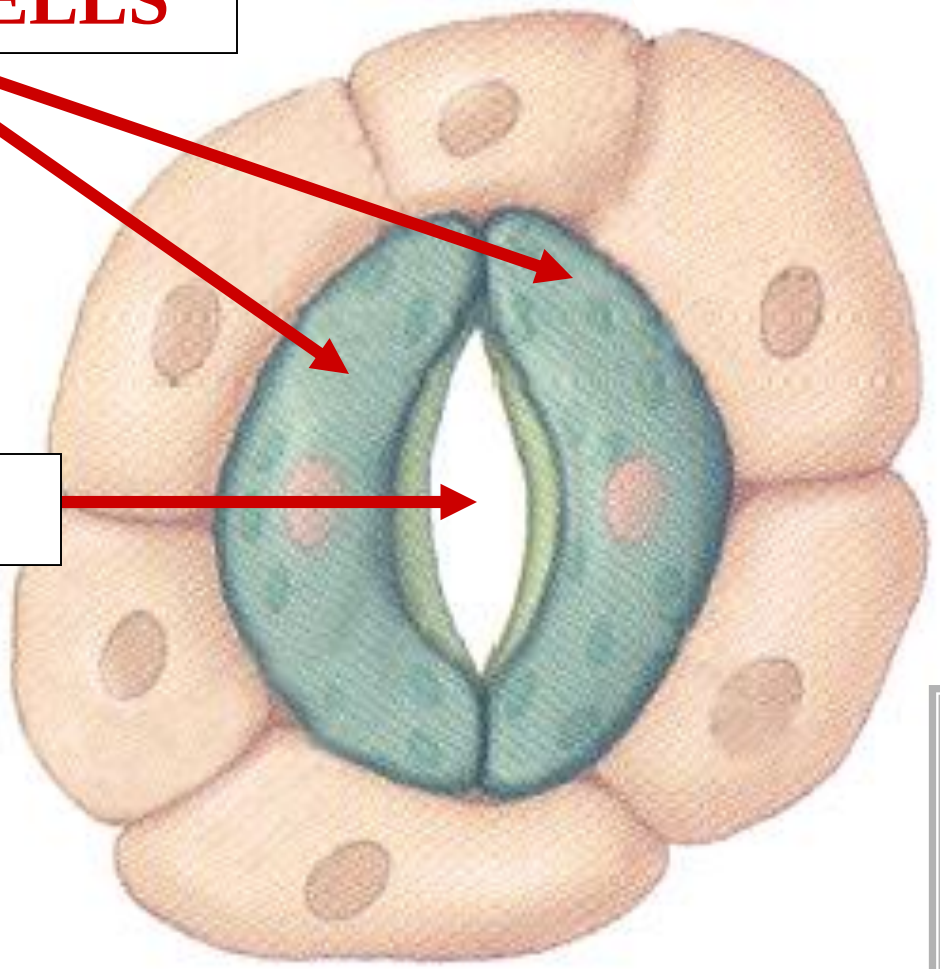

^
C3
MAPLE

LEAF
STOMATE

LEAF
STOMATE

GUARD CELLS

STOMA



C

LEAF
STOMATE

ATMOSPHERE

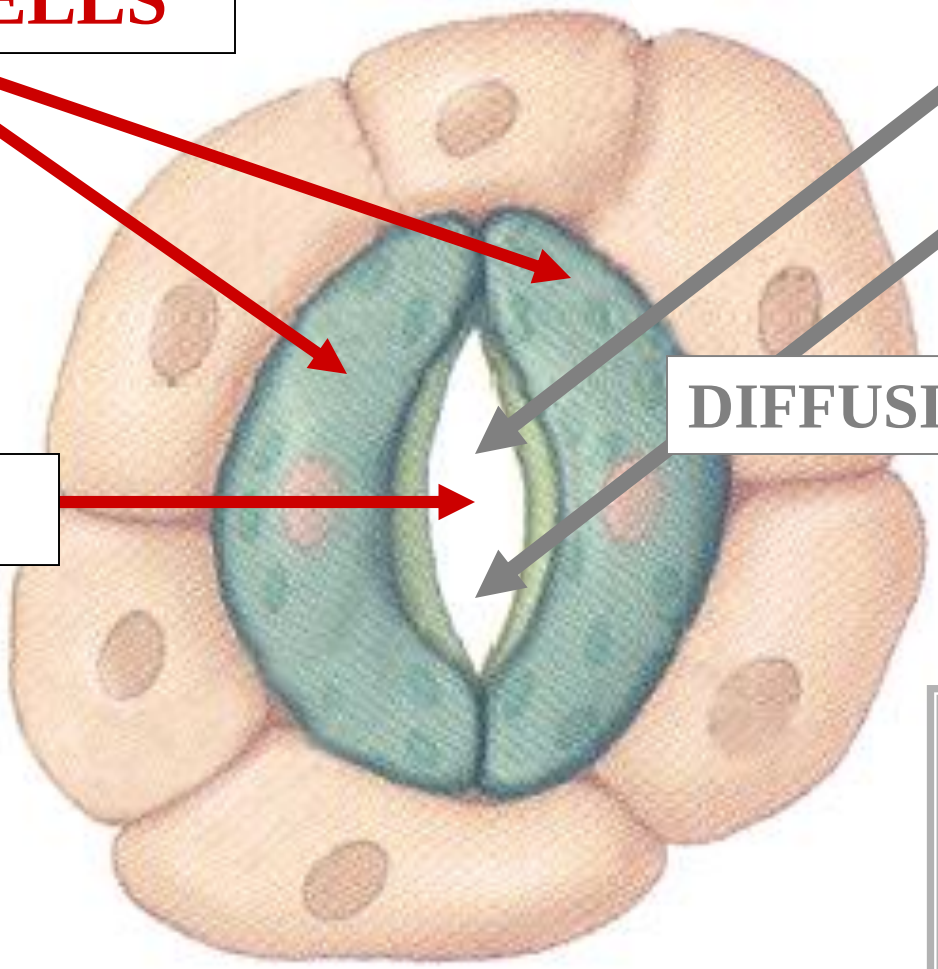
GUARD CELLS

?

?

DIFFUSION

STOMA



LEAF
STOMATE

GUARD CELLS

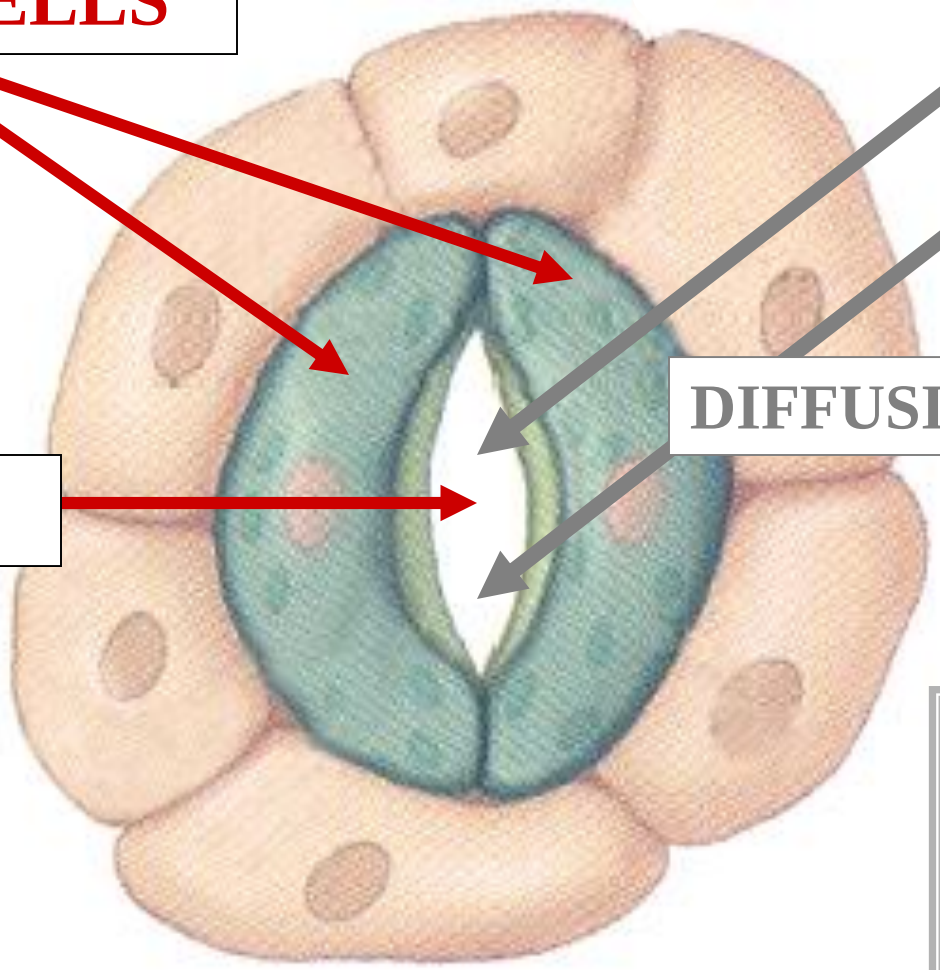
ATMOSPHERE

CO2

CO2

DIFFUSION

STOMA



C3 PATHWAY CO2 DIFFUSION

D

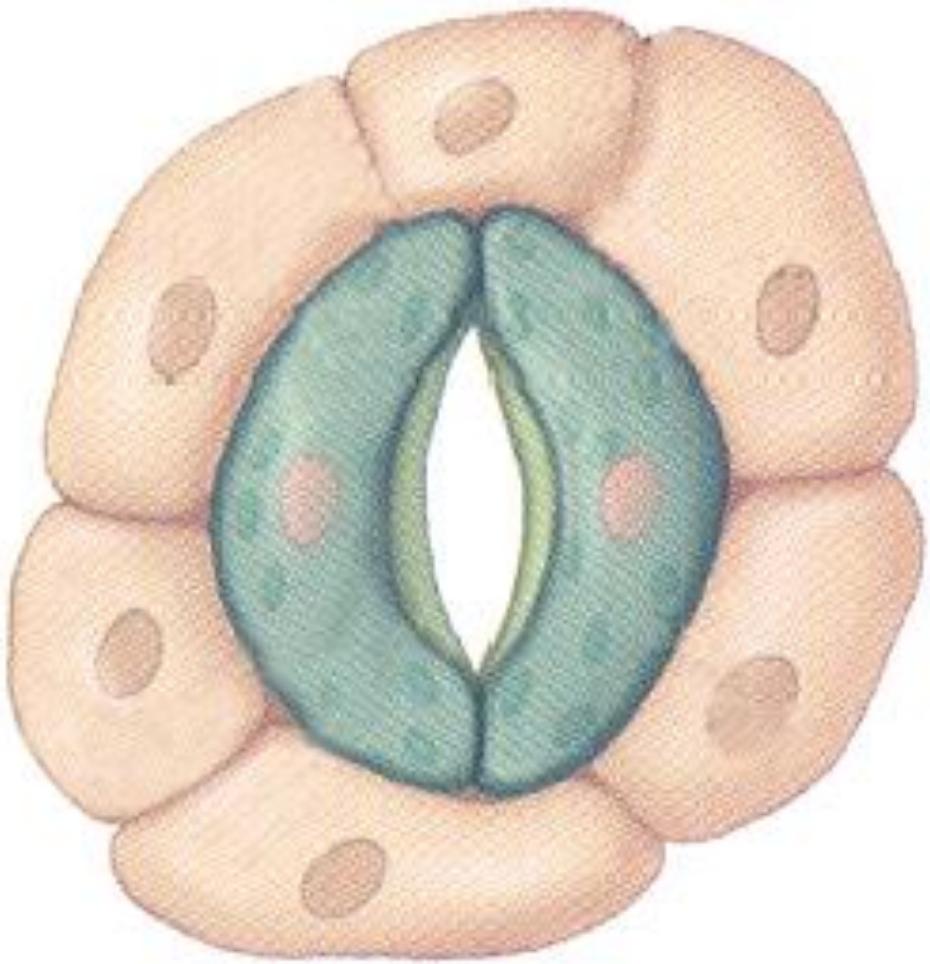
LEAF STOMATE

ATMOSPHERE

ATMOSPHERE

CO2

CO2



CO2

CO2

LEAF STOMATE

ATMOSPHERE

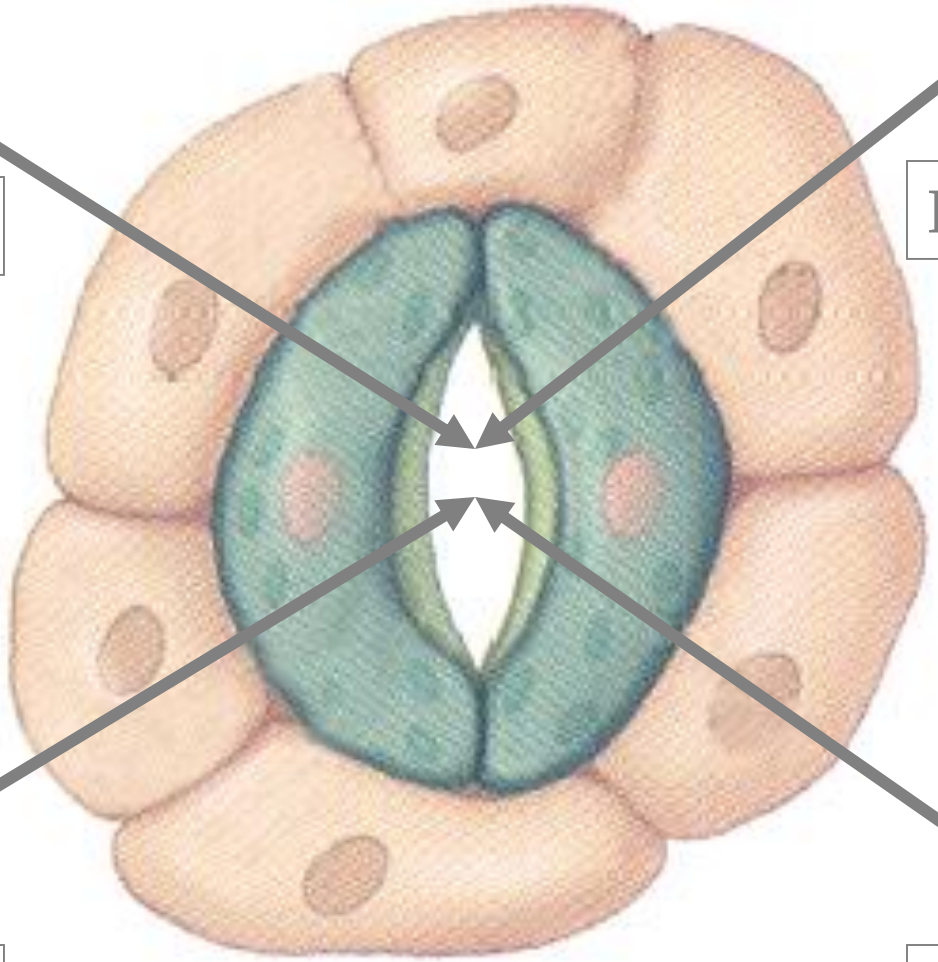
ATMOSPHERE

CO2

DIFFUSION

CO2

DIFFUSION



CO2

DIFFUSION

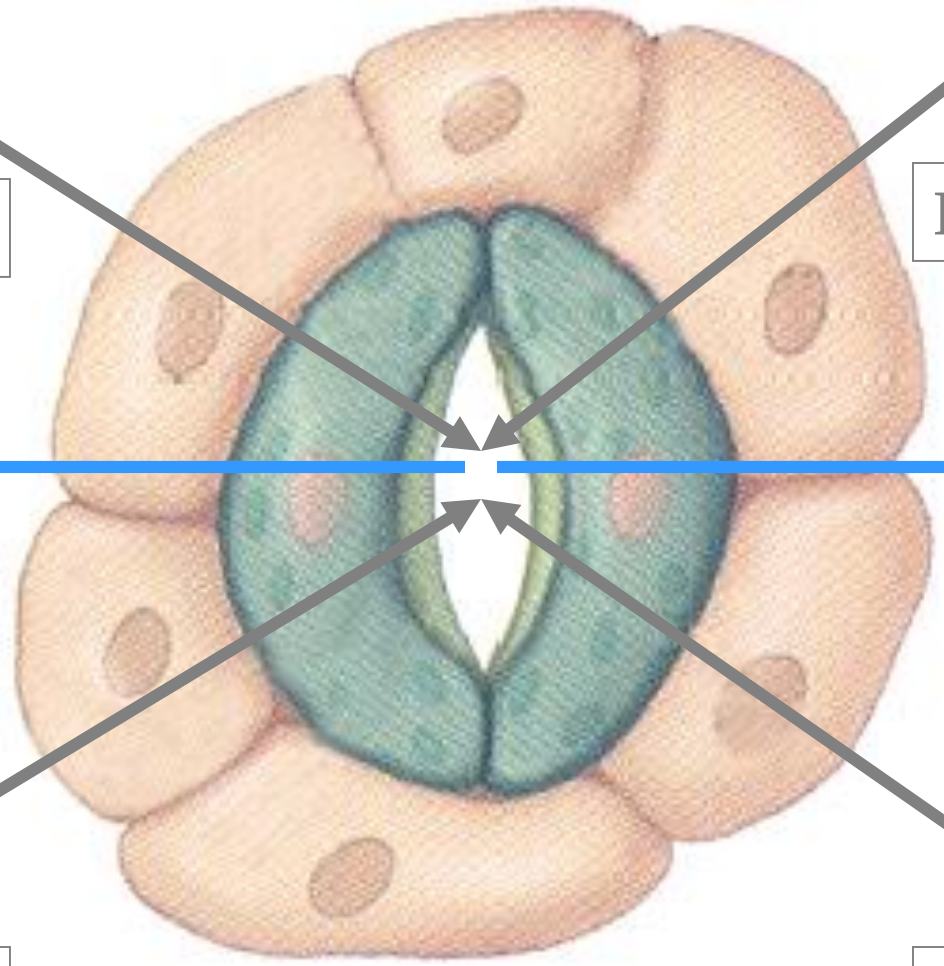
CO2

DIFFUSION

LEAF STOMATE

ATMOSPHERE

ATMOSPHERE



CO2

DIFFUSION

CO2

DIFFUSION

?

DIFFUSION

?

DIFFUSION

CO2

DIFFUSION

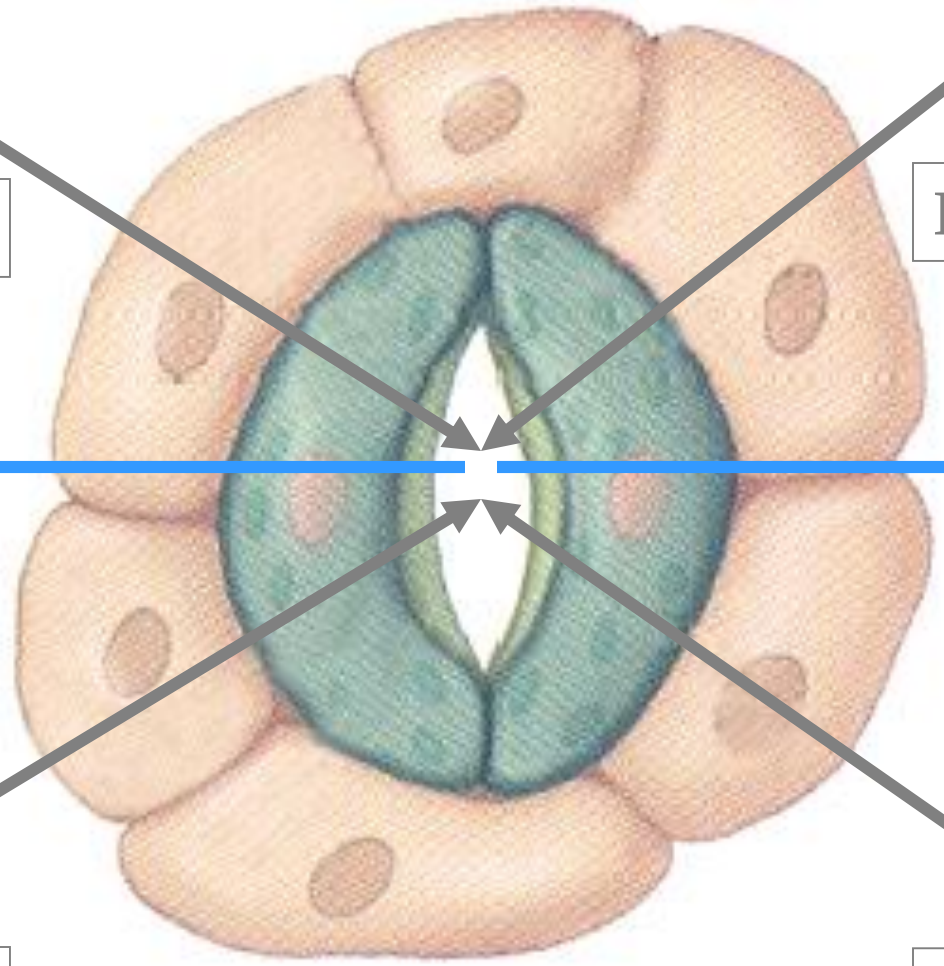
CO2

DIFFUSION

LEAF STOMATE

ATMOSPHERE

ATMOSPHERE



CO2

DIFFUSION

CO2

DIFFUSION

H2O

DIFFUSION

H2O

DIFFUSION

CO2

DIFFUSION

CO2

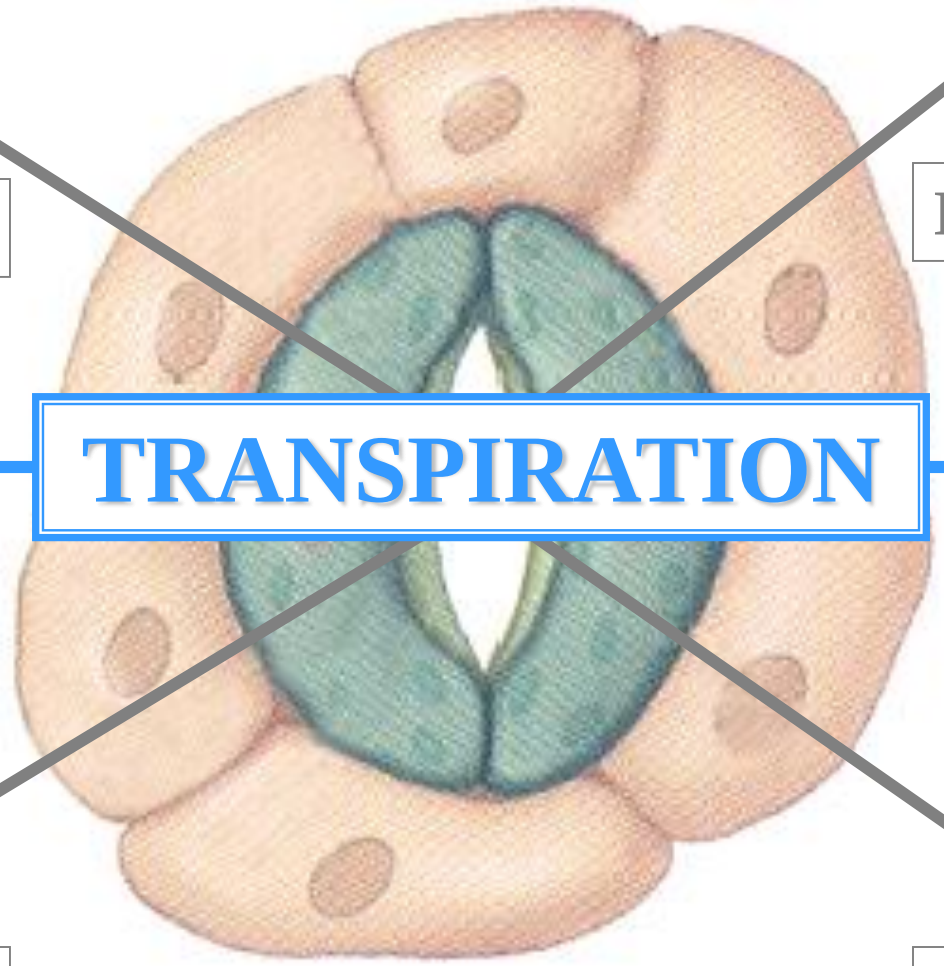
DIFFUSION

T

LEAF STOMATE

ATMOSPHERE

ATMOSPHERE



CO2

DIFFUSION

CO2

DIFFUSION

H2O

TRANSPIRATION

H2O

DIFFUSION

DIFFUSION

CO2

DIFFUSION

CO2

DIFFUSION

TRANSPIRATION

TRANSPIRATION

WATER LOSS VIA STOMATES DURING PHOTOSYNTHESIS

TRANSPIRATION

LEAF
STOMATE

?

ATMOSPHERE

GUARD CELLS

CO2

DIFFUSION

STOMA

TRANSPIRATION

WATER

CATABOLIC METABOLISM & ANABOLIC METABOLISM ?

EXERGONIC REACTIONS & ENDERGONIC REACTIONS ?

REDUCTION REACTIONS & OXIDATION REACTIONS ?

LIGHT REACTION & DARK REACTION ?

LEAF
STOMATE

>
C

ATMOSPHERE

GUARD CELLS

CO2

DIFFUSION

STOMA

TRANSPIRATION

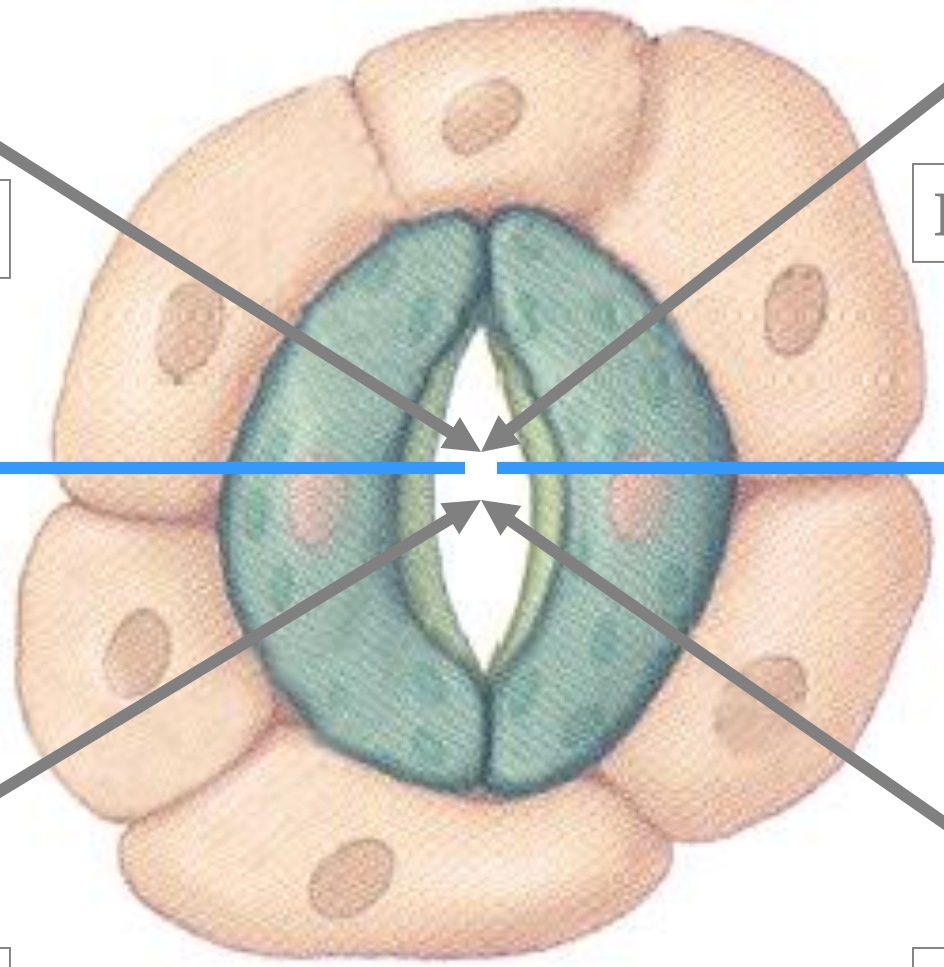
WATER


CO2 DIFFUSION
&
H2O TRANSPIRATION
!!!COUPLED!!!

LEAF STOMATE

ATMOSPHERE

ATMOSPHERE



CO2

DIFFUSION

CO2

DIFFUSION

H2O

DIFFUSION

H2O

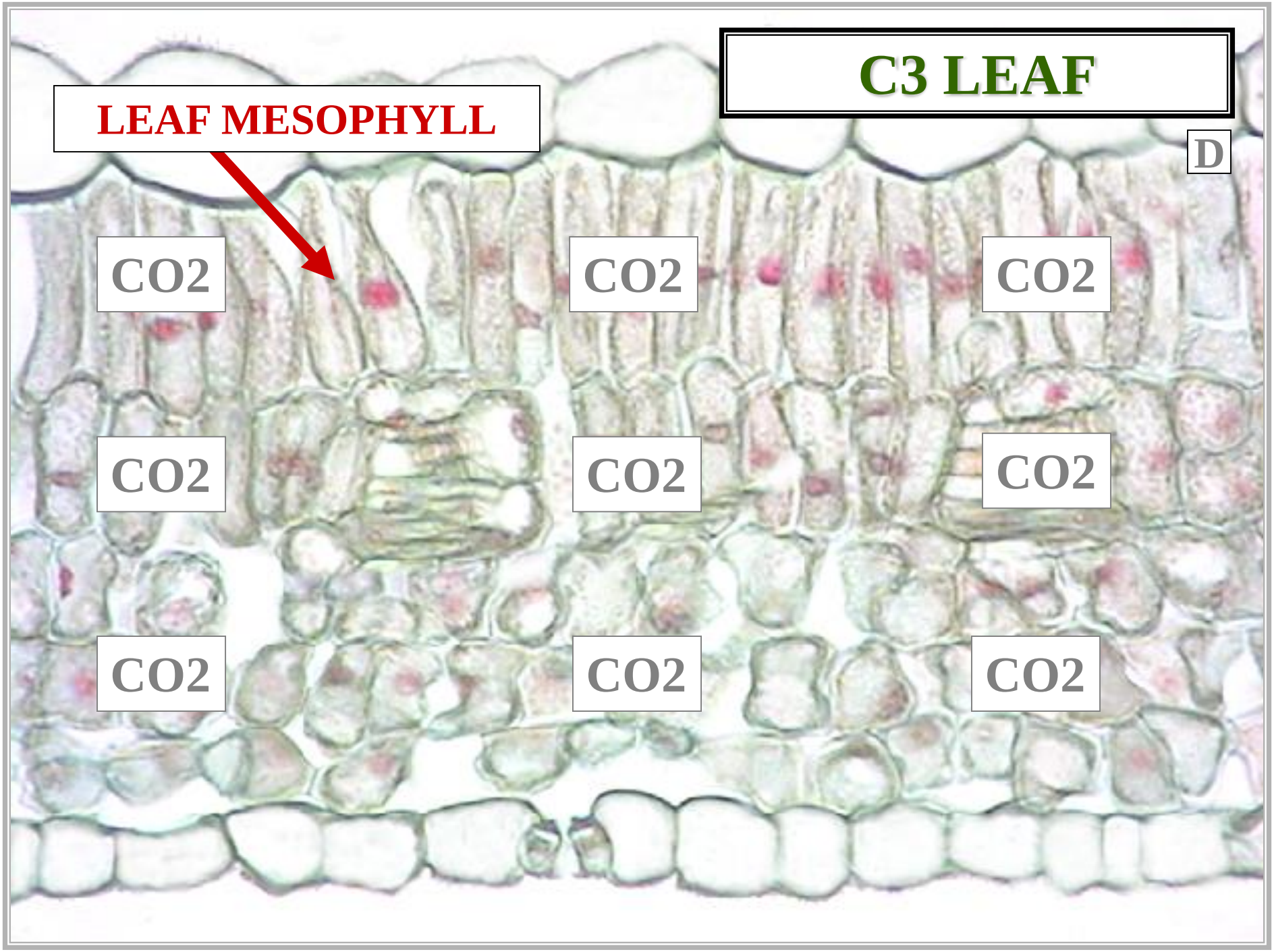
DIFFUSION

CO2

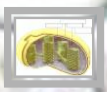
DIFFUSION

CO2

DIFFUSION


C3 LEAF
D
LEAF MESOPHYLL
CO2
CO2
CO2
CO2
CO2
CO2
CO2
CO2
CO2

C3 LEAF



LEAF MESOPHYLL

CO2 CO2 CO2

DIFFUSION DIFFUSION DIFFUSION

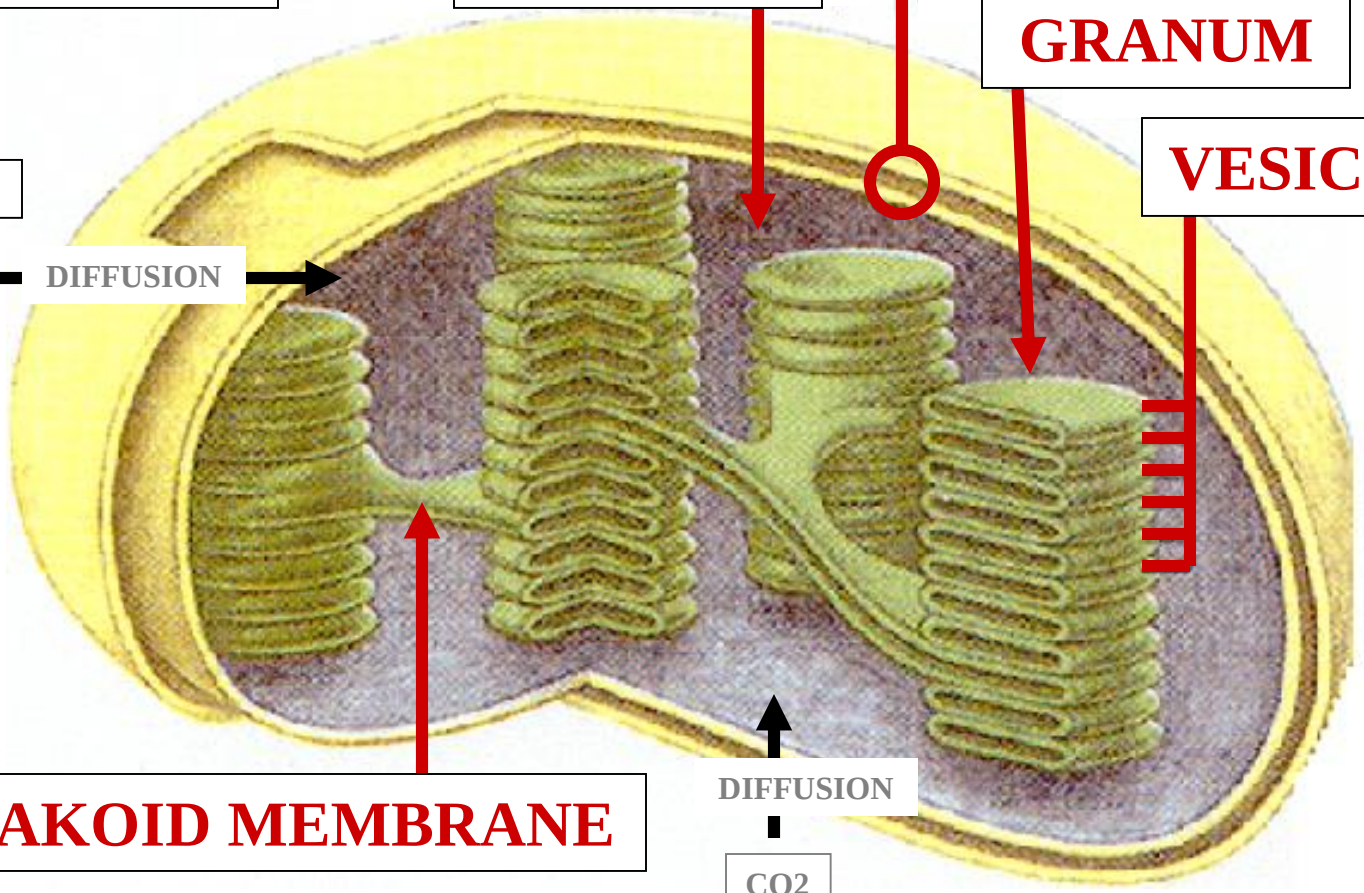
CO2 CO2 CO2

DIFFUSION DIFFUSION DIFFUSION

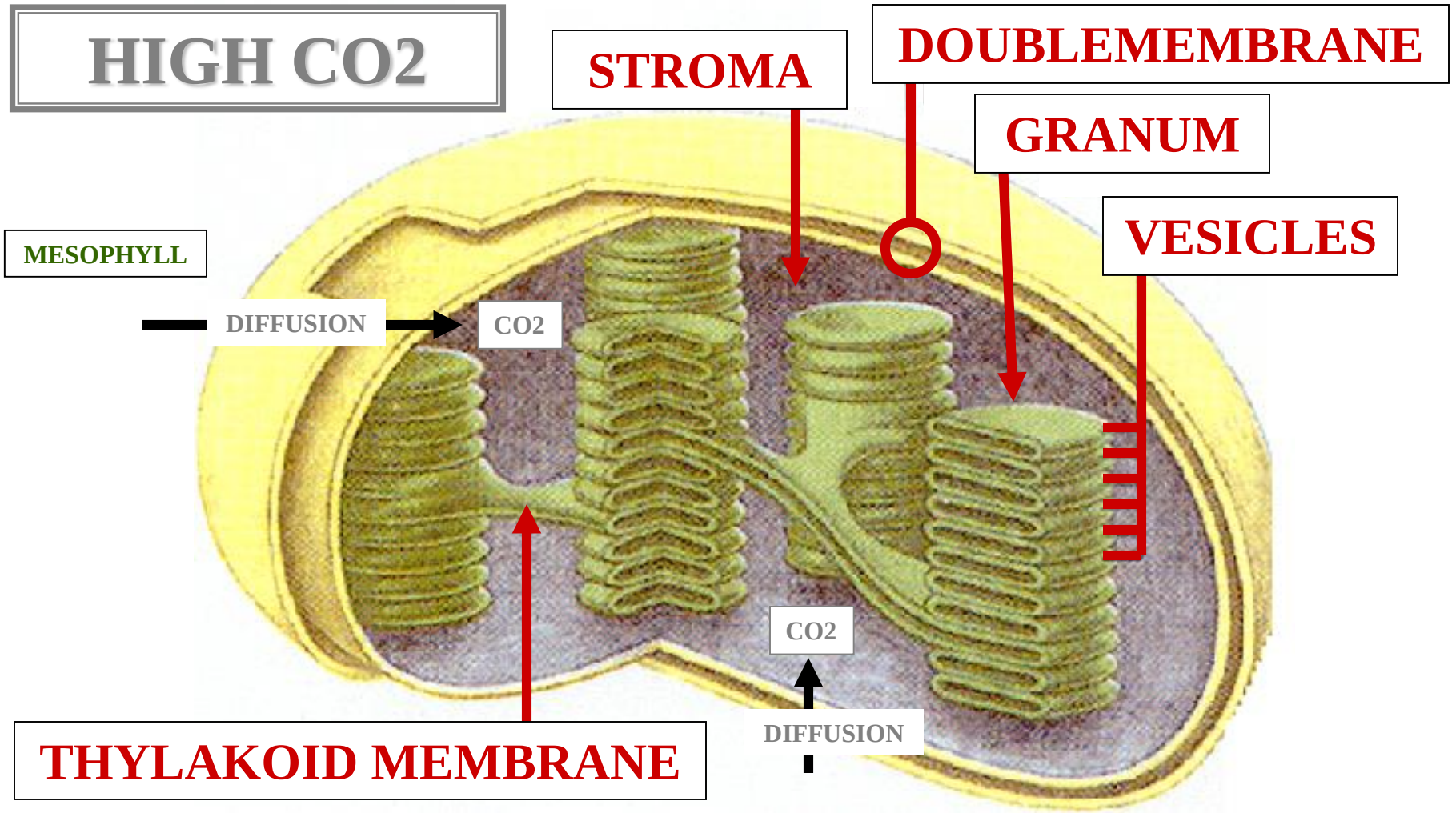
CO2 CO2 CO2

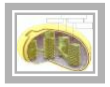
DIFFUSION DIFFUSION DIFFUSION

CHLOROPLAST ULTRASTRUCTURE



CHLOROPLAST ULTRASTRUCTURE

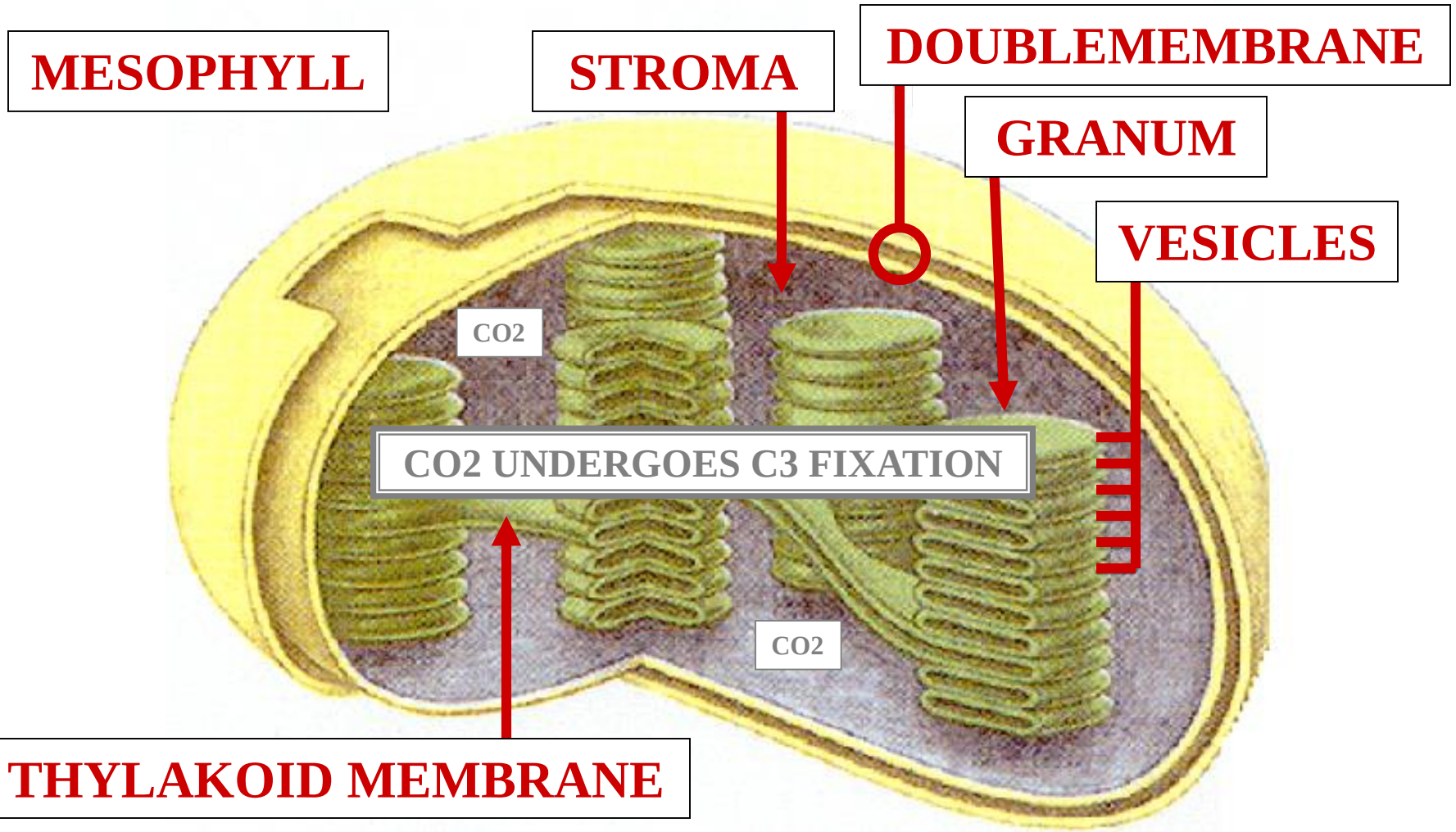




C

CHLOROPLAST STROMA

CHLOROPLAST ULTRASTRUCTURE



F

C3 PATHWAY CO2 FIXATION

FIXATION

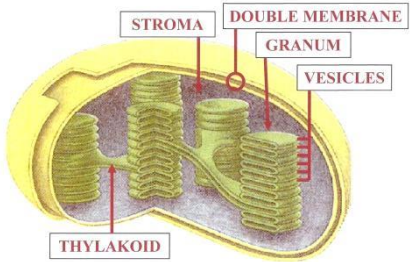
FIXATION

PHOTOSYNTHESIS
CO2
CAPTURE

FIXATION

C3

CO2
ENTERS
STROMA



C R

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

6

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

↓

UNSTABLE 6C COMPOUND

FXR

>

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

↓

C3 CO2 FIXATION RXT

↓

UNSTABLE 6C COMPOUND

EZ

+

CALVIN CYCLE

C3 CO2 FIXATION REACTION

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

↓

ENZYME

↓

UNSTABLE 6C COMPOUND

CALVIN CYCLE

C3 CO2 FIXATION REACTION

C3 PATHWAY
CO2 FIXATION
ENZYME

ENZYME

C
+

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-ASE = RUBISCO)

ENZYME

CARBOXYLASE

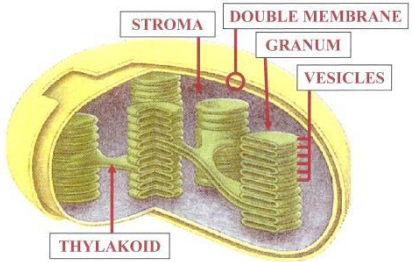
CARBOXYLASE

ENZYME
ADDS CO2 TO SUBSTRATE

CARBOXYLASE

C3

CO2
ENTERS
STROMA



C R

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-ASE)

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

EZ

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-ASE)

C3

CO_2 ENTERS STROMA

↓

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

↓

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

6

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-ASE)

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

↓

UNSTABLE 6C COMPOUND

C3 CO2 FIXATION RXT

FXE

>

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-ASE)

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

↓

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

↓

UNSTABLE 6C COMPOUND

↓

C3 CO2 FIXATION RXT

I

>

RIBULOSE BISPHOSPHATE CARBOXYLASE

C3 CO2 FIXATION ENZYME

C3

CO_2
ENTERS
STROMA

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

INEFFICIENT ENZYME

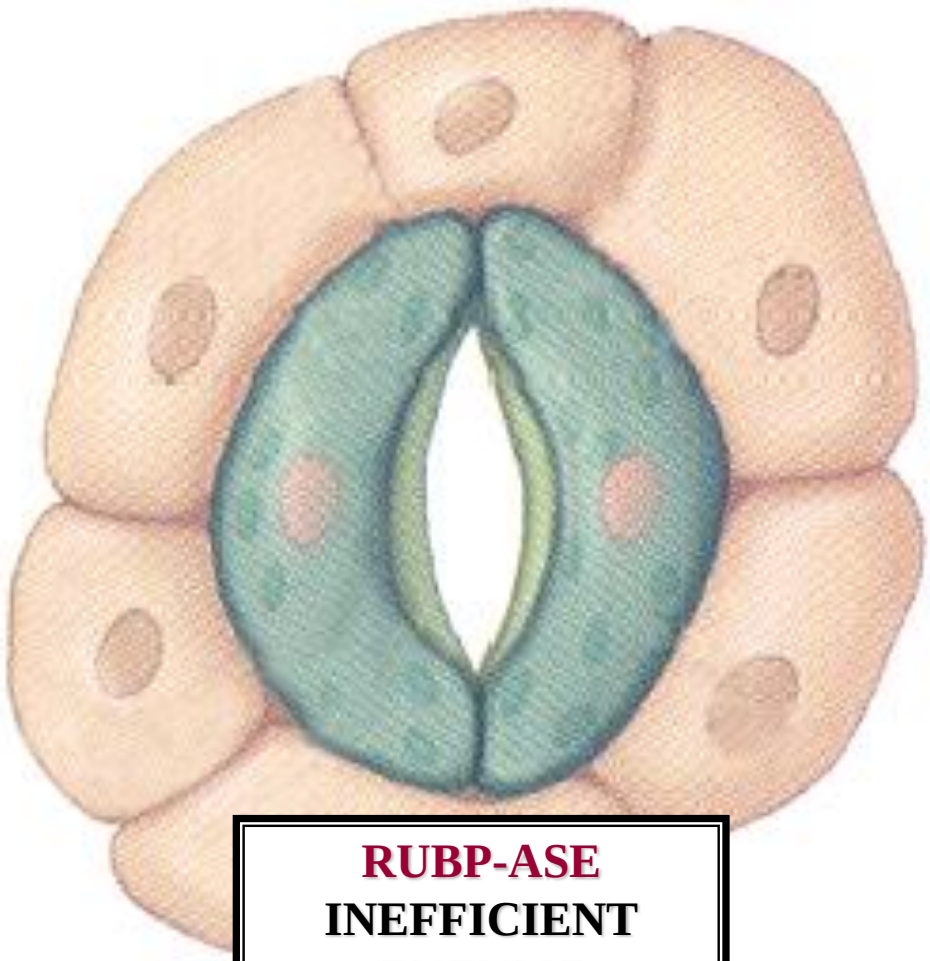
LEAF STOMATE

ATMOSPHERE

ATMOSPHERE

CO2

CO2



CO2

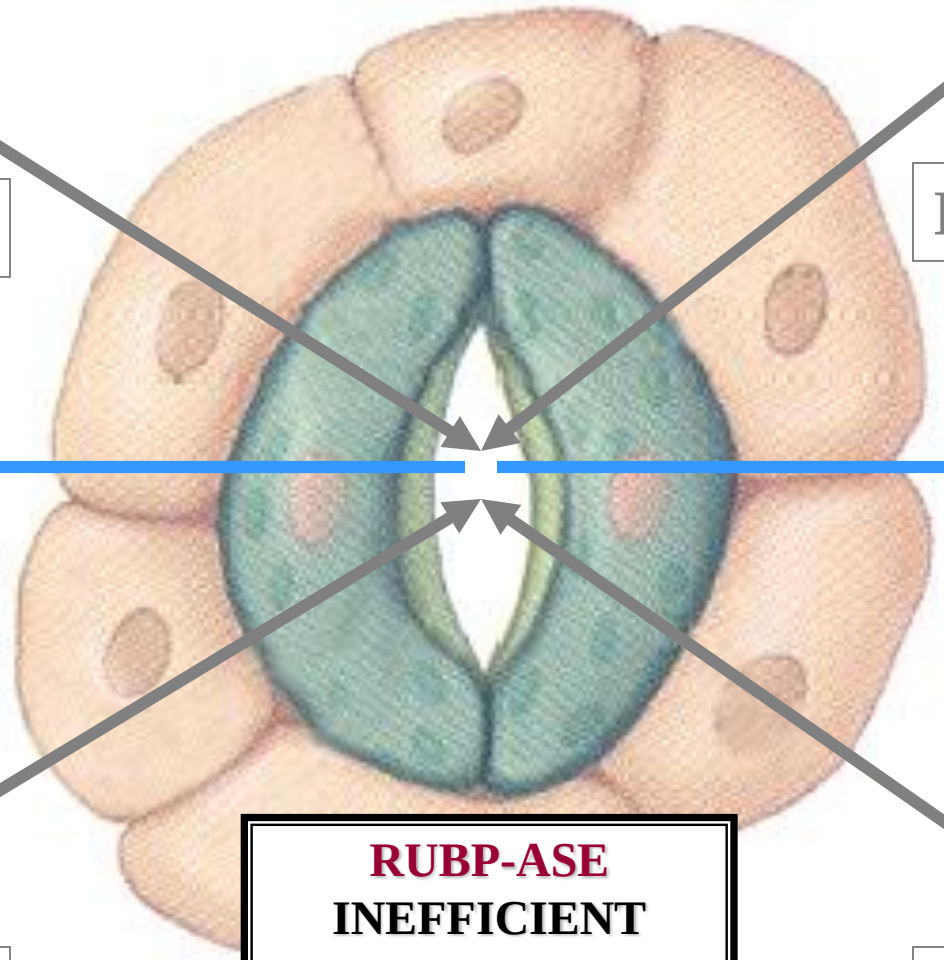
CO2

RUBP-ASE
INEFFICIENT ENZYME

LEAF STOMATE

ATMOSPHERE

ATMOSPHERE



CO2

DIFFUSION

CO2

DIFFUSION

H2O

DIFFUSION

H2O

DIFFUSION

CO2

DIFFUSION

CO2

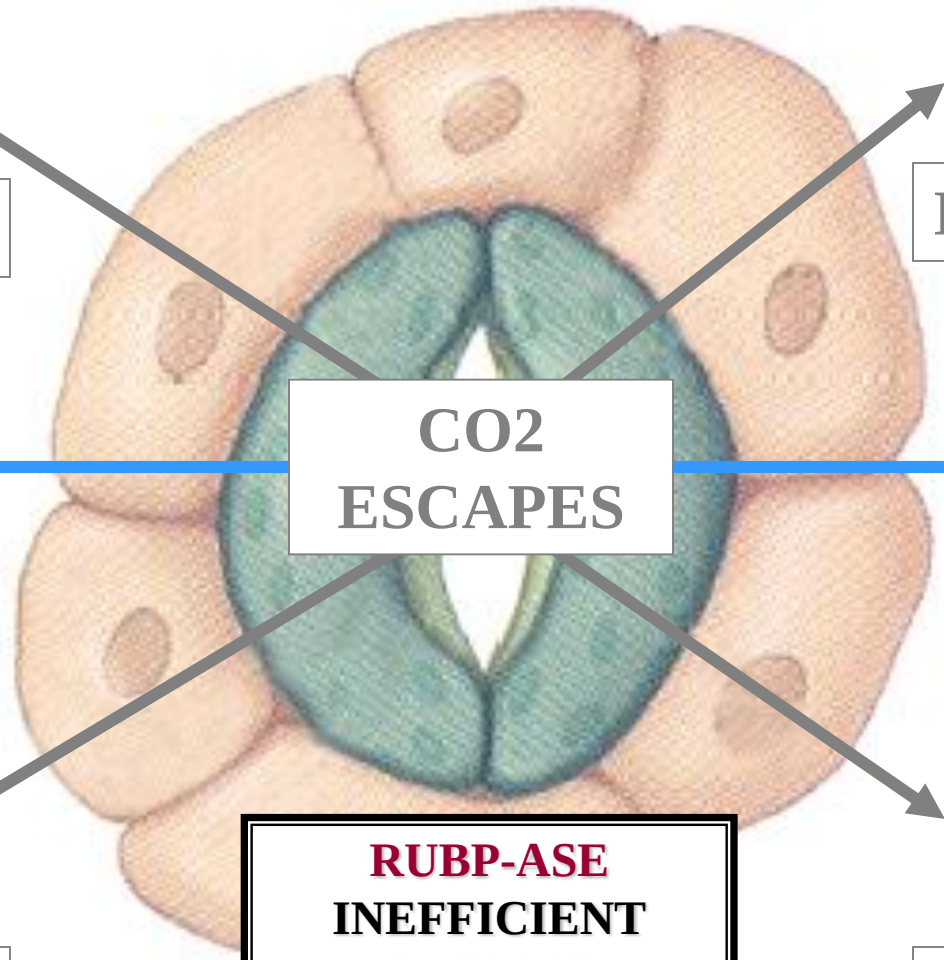
DIFFUSION

RUBP-ASE
INEFFICIENT
ENZYME

LEAF STOMATE

ATMOSPHERE

ATMOSPHERE



CO2

DIFFUSION

CO2

DIFFUSION

H2O

DIFFUSION

CO2 ESCAPES

H2O

DIFFUSION

CO2

DIFFUSION

RUBP-ASE
INEFFICIENT
ENZYME

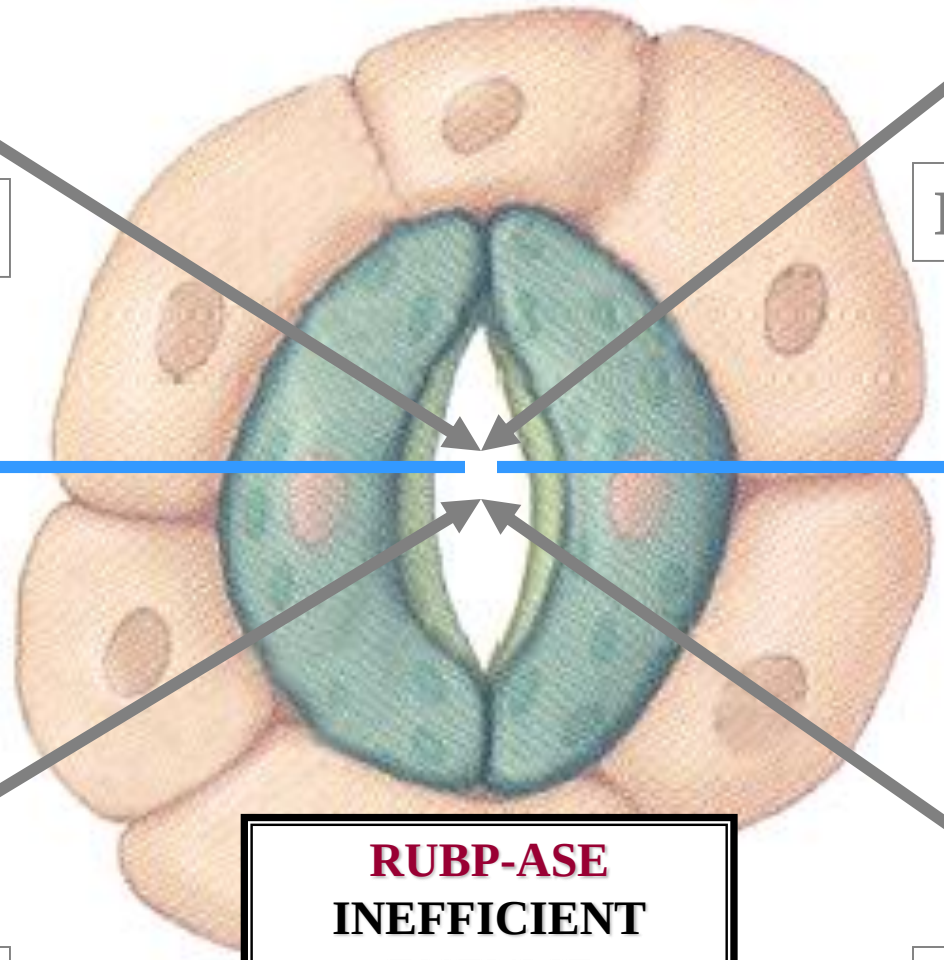
CO2

DIFFUSION

LEAF STOMATE

ATMOSPHERE

ATMOSPHERE



CO2

DIFFUSION

CO2

DIFFUSION

H2O

DIFFUSION

H2O

DIFFUSION

CO2

DIFFUSION

CO2

DIFFUSION

RUBP-ASE
INEFFICIENT
ENZYME

ATMOSPHERE

LEAF STOMATE

ATMOSPHERE

CO2

CO2

OPEN LONG PERIODS

C3

C3

CO2

CO2

RUBP-ASE
INEFFICIENT
ENZYME

LEAF STOMATE

ATMOSPHERE

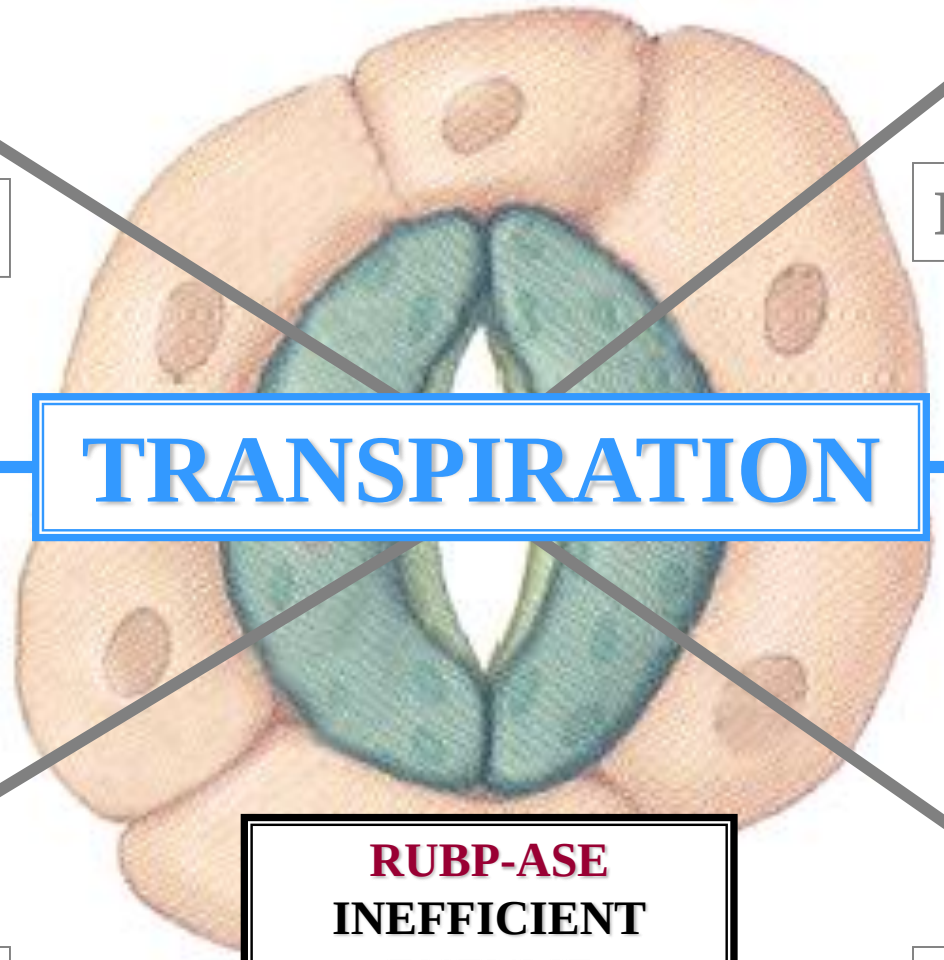
ATMOSPHERE

CO2

DIFFUSION

CO2

DIFFUSION



H2O

DIFFUSION

TRANSPIRATION

H2O

DIFFUSION

CO2

DIFFUSION

RUBP-ASE
INEFFICIENT
ENZYME

CO2

DIFFUSION

ATMOSPHERE

LEAF STOMATE

ATMOSPHERE

CO2

CO2

C3

HIGH

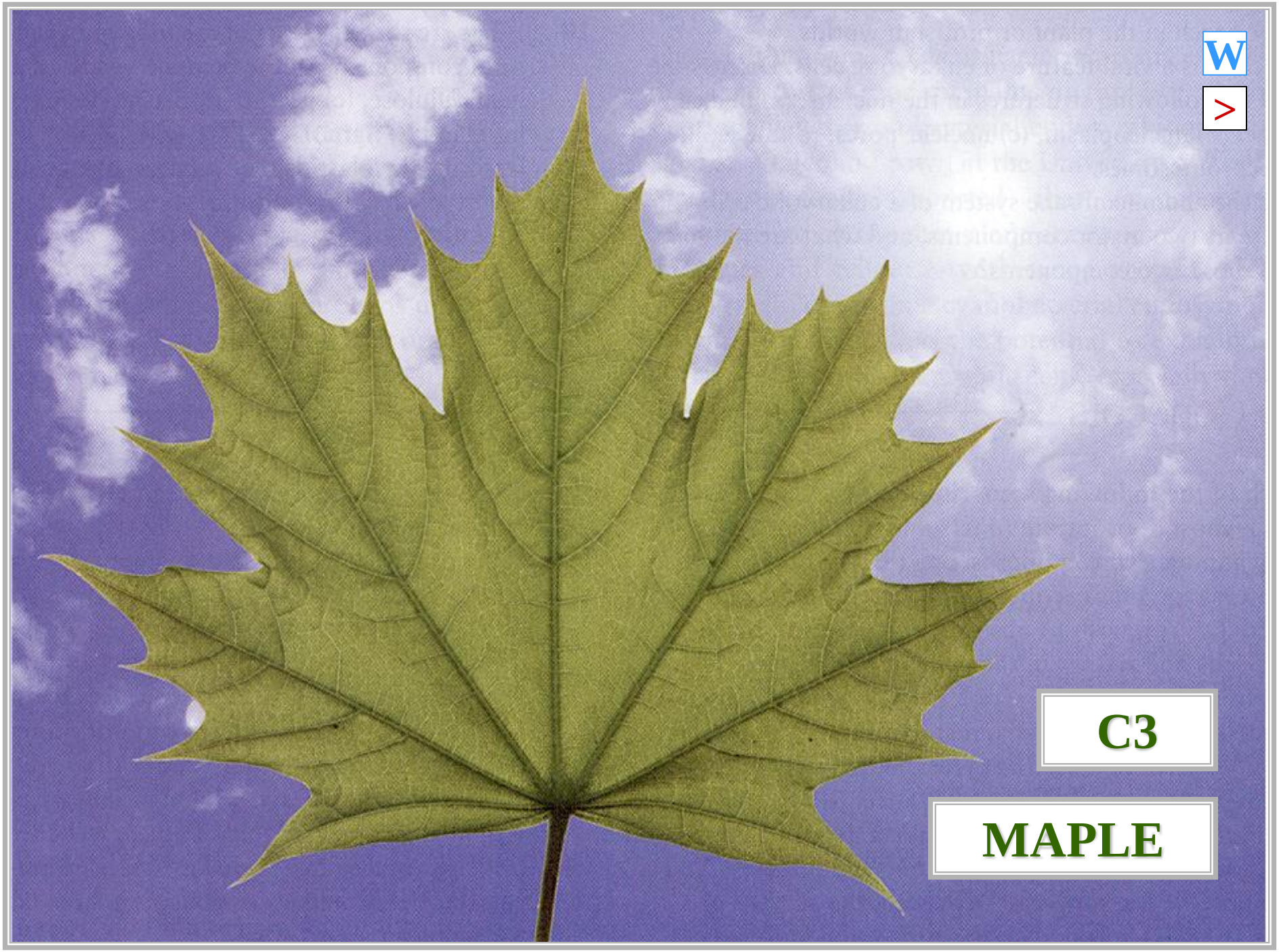
C3

TRANSPIRATION

CO2

CO2

RUBP-ASE
INEFFICIENT
ENZYME


W
>
C3
MAPLE

S

S

C3 PLANTS REQUIRE ADEQUATE WATER

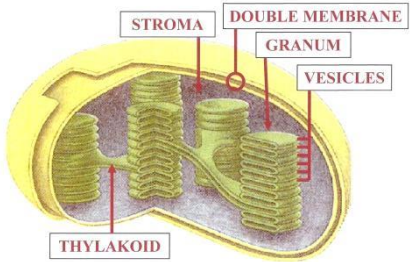
C3

MAPLE

C3
CO2 FIXATION
SUMMARY

C3

CO2
ENTERS
STROMA



C R

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

EZ

CALVIN CYCLE

C3

CO_2
ENTERS
STROMA

↓

CO_2 + **RIBULOSE BISPHOSPHATE / (RUBP)**

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

↓

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

↓

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

↓

UNSTABLE 6C COMPOUND

2

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

PHOSPHOGLYCERATE / (PGA)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

H2O

PE

PGA = 1ST STABLE CMP

PGA = 1ST STABLE CMP

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

PHOSPHOGLYCERATE / (PGA)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

H2O

PGA = 1ST STABLE CMP

PGA = 1ST STABLE CMP

C

CALVIN CYCLE

PHOTOSYNTHESIS EQUATION

$$6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$$

C3

CO2
ENTERS
STROMA

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

PHOSPHOGLYCERATE / (PGA)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

PGA = 1ST STABLE CMP

PGA = 1ST STABLE CMP

H2O

H

CALVIN CYCLE

PHOTOSYNTHESIS EQUATION

$$6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$$

C3

CO_2 ENTERS STROMA

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

PHOSPHOGLYCERATE / (PGA)

PGA = 1ST STABLE CMP

PGA = 1ST STABLE CMP

H_2O

¿

C

CALVIN CYCLE

PHOTOSYNTHESIS EQUATION

$$6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$$

C3

CO2
ENTERS
STROMA

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

PHOSPHOGLYCERATE / (PGA)

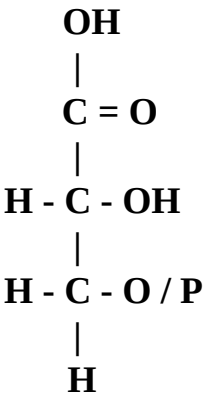
PGA = 1ST STABLE CMP

PGA = 1ST STABLE CMP

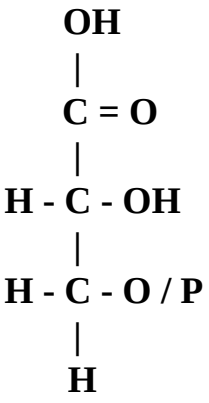
3

#

CALVIN CYCLE



PHOSPHOGLYCERATE / (PGA)



PHOSPHOGLYCERATE / (PGA)

C3

CO2
ENTERS
STROMA

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

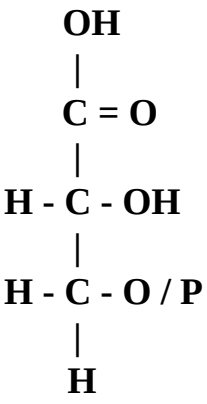
PHOSPHOGLYCERATE / (PGA) ← UNSTABLE 6C COMPOUND → PHOSPHOGLYCERATE / (PGA)

PGA = 1ST STABLE CMP

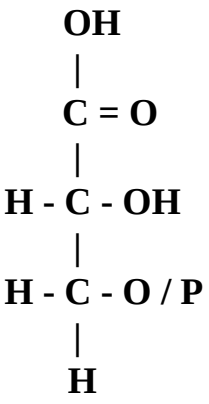
PGA = 1ST STABLE CMP

C3

CALVIN CYCLE



3 CARBON CMP



3 CARBON CMP

C3

CO2
ENTERS
STROMA

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

\+

2

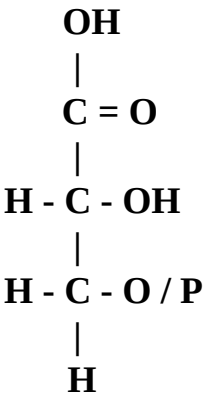
PHOSPHOGLYCERATE / (PGA)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

PGA = 1ST STABLE CMP

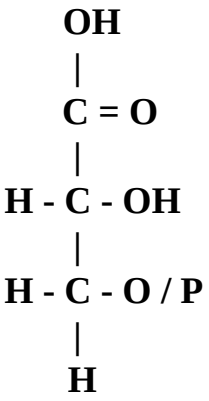
PGA = 1ST STABLE CMP



3 CARBON CMP

CALVIN CYCLE

C3 PATHWAY



3 CARBON CMP

C3

CO_2 ENTERS STROMA

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

PHOSPHOGLYCERATE / (PGA)

2

ALL RXTS REQUIRE A SPECIFIC ENZYME

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

A

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

PHOSPHOGLYCERATE / (PGA)

BISPHOSPHOGLYCERATE / (BIPGA)

BISPHOSPHOGLYCERATE / (BIPGA)

ALL RXTS
REQUIRE
A SPECIFIC
ENZYME

CALVIN CYCLE

C3

CO2
ENTERS
STROMA

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE
CARBOXYLASE
(RUBP-CARBOXYLASE)

LR

PHOSPHOGLYCERATE / (PGA)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

ATP

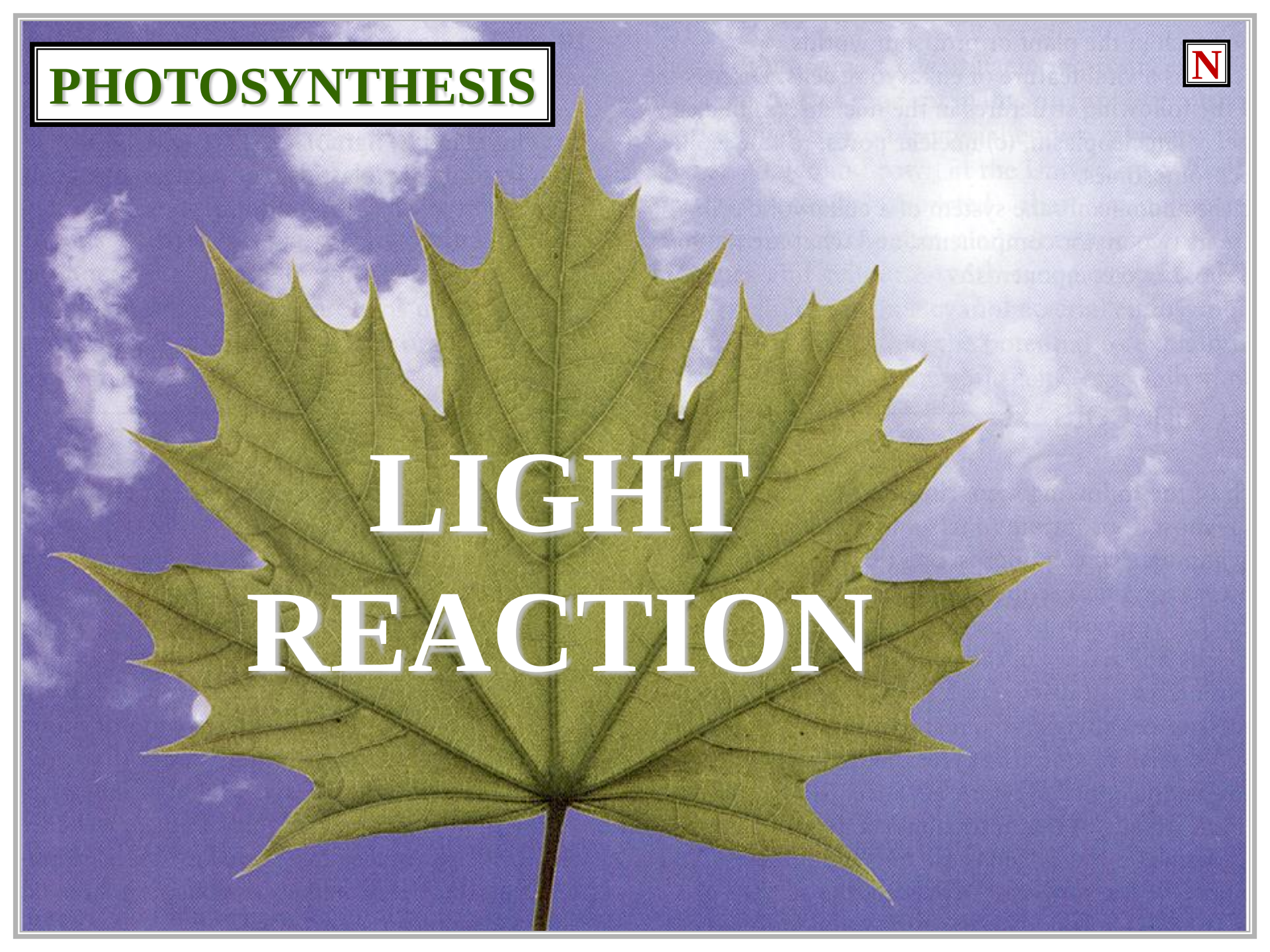
BISPHOSPHOGLYCERATE / (BIPGA)

ALL RXTS
REQUIRE
A SPECIFIC
ENZYME

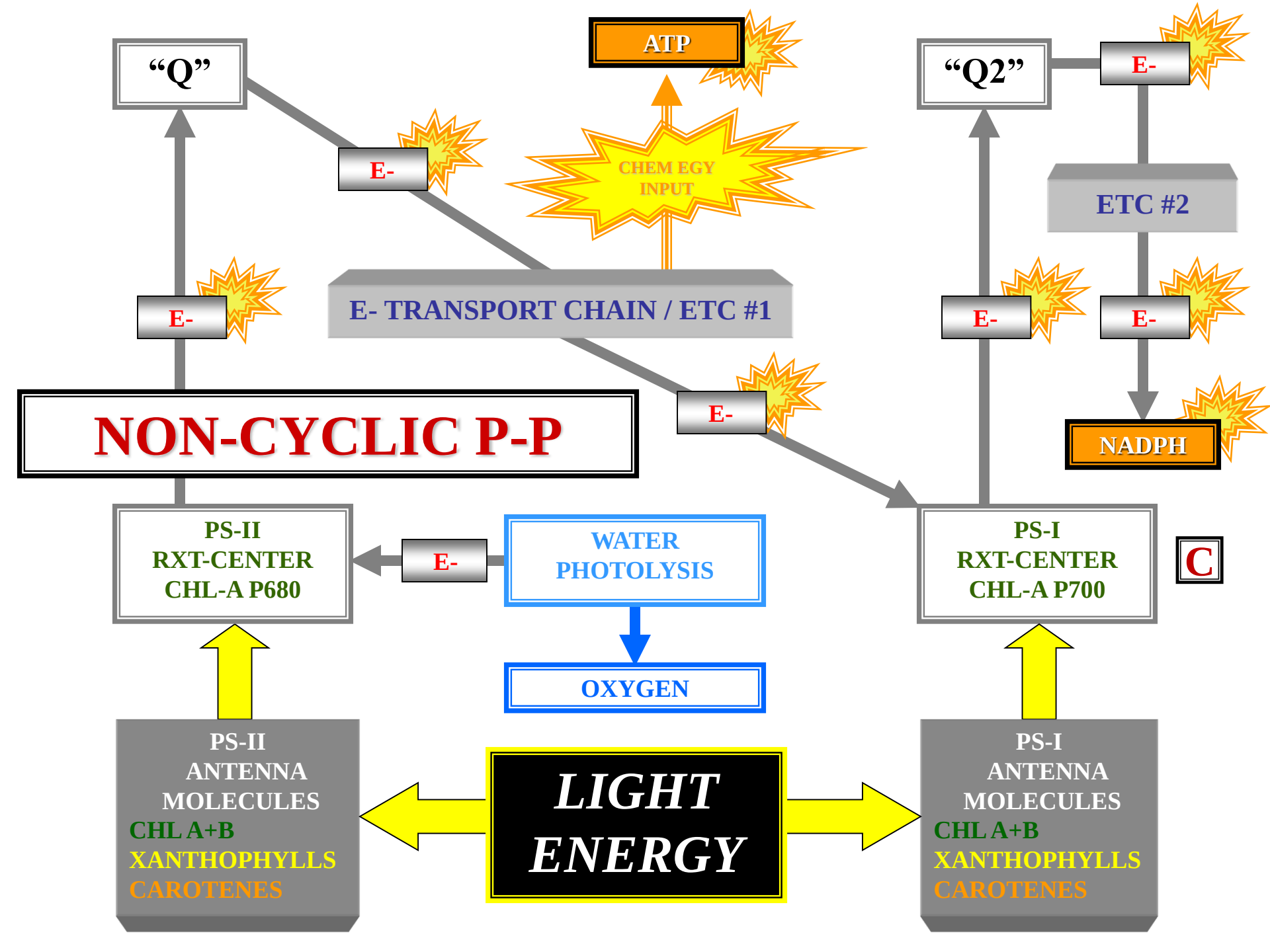
BISPHOSPHOGLYCERATE / (BIPGA)

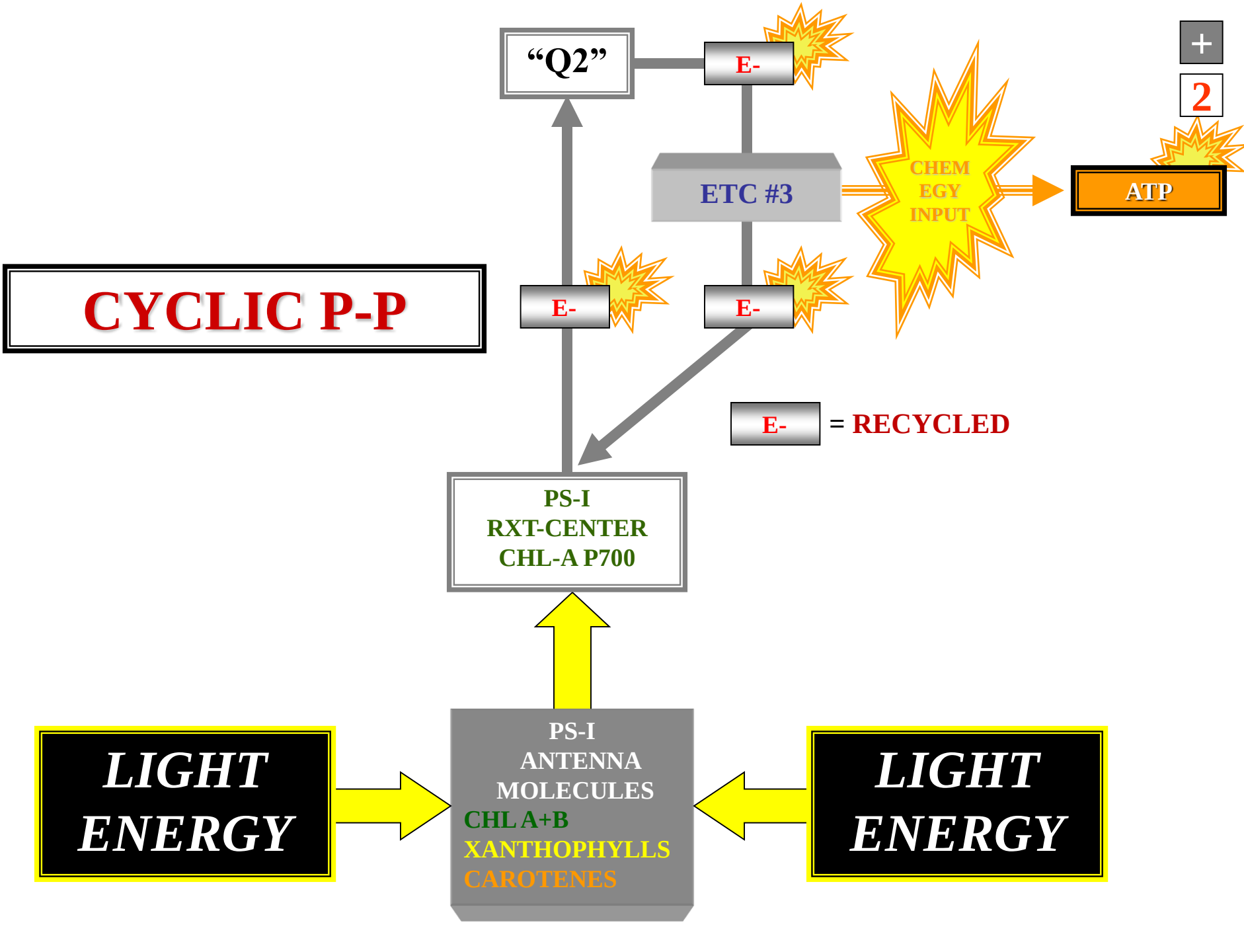
CALVIN CYCLE

PHOTOSYNTHESIS



LIGHT REACTION


"Q"
ATP
"Q2"
E-
CHEM EGY INPUT
ETC #2
E- TRANSPORT CHAIN / ETC #1
NON-CYCLIC P-P
NADPH
PS-II RXT-CENTER CHL-A P680
WATER PHOTOLYSIS
PS-I RXT-CENTER CHL-A P700
C
OXYGEN
PS-II ANTENNA MOLECULES
CHL A+B
XANTHOPHYLLS
CAROTENES
LIGHT ENERGY
PS-I ANTENNA MOLECULES
CHL A+B
XANTHOPHYLLS
CAROTENES


"Q2"
E-
+
2
ETC #3
CHEM
EGY
INPUT
ATP
CYCLIC P-P
E-
E-
E- = RECYCLED
PS-I
RXT-CENTER
CHL-A P700
PS-I
ANTENNA
MOLECULES
CHL A+B
XANTHOPHYLLS
CAROTENES
LIGHT
ENERGY
LIGHT
ENERGY

C3

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

2

ALL RXTS REQUIRE A SPECIFIC ENZYME

C3 PATHWAY

CALVIN CYCLE

C3

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

PHOSPHOGLYCERALDEHYDE / (PGAL)

ALL RXTS REQUIRE A SPECIFIC ENZYME

PHOSPHOGLYCERATE / (PGA)

ATP

N

BISPHOSPHOGLYCERATE / (BIPGA)

PHOSPHOGLYCERALDEHYDE / (PGAL)

C3 PATHWAY

CALVIN CYCLE

C3

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

ALL RXTS REQUIRE A SPECIFIC ENZYME

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

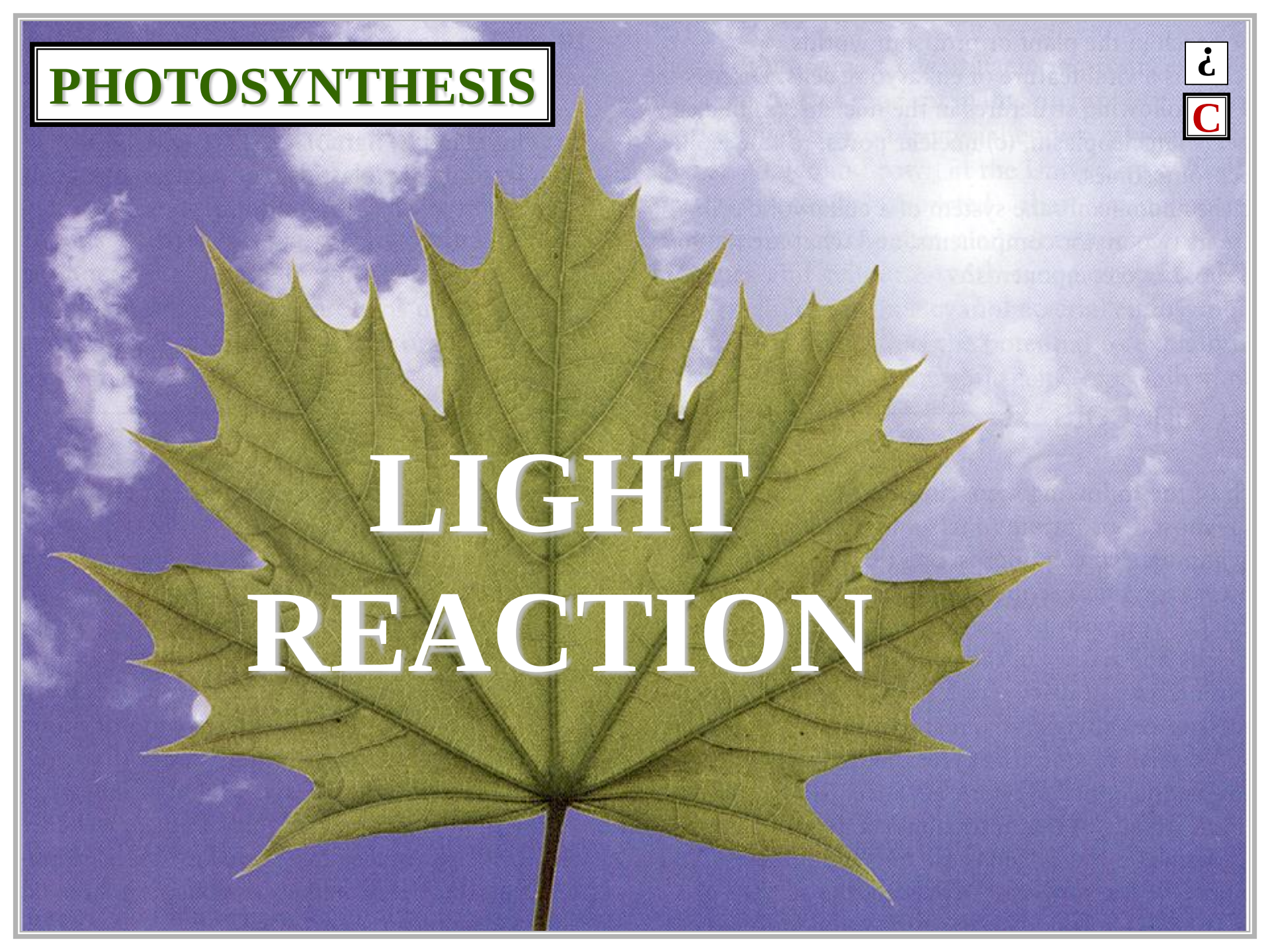
NADPH

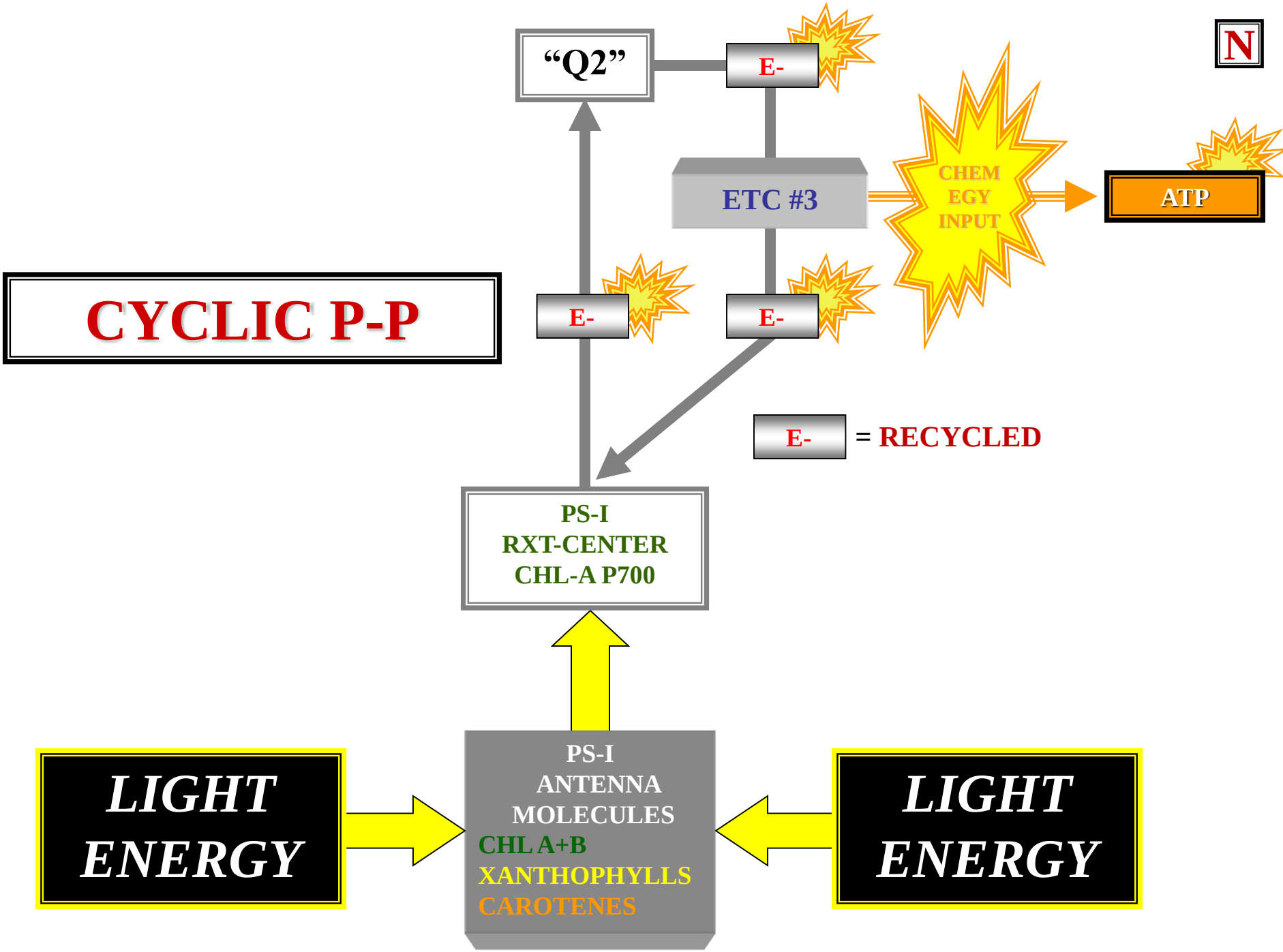
PHOSPHOGLYCERALDEHYDE / (PGAL)

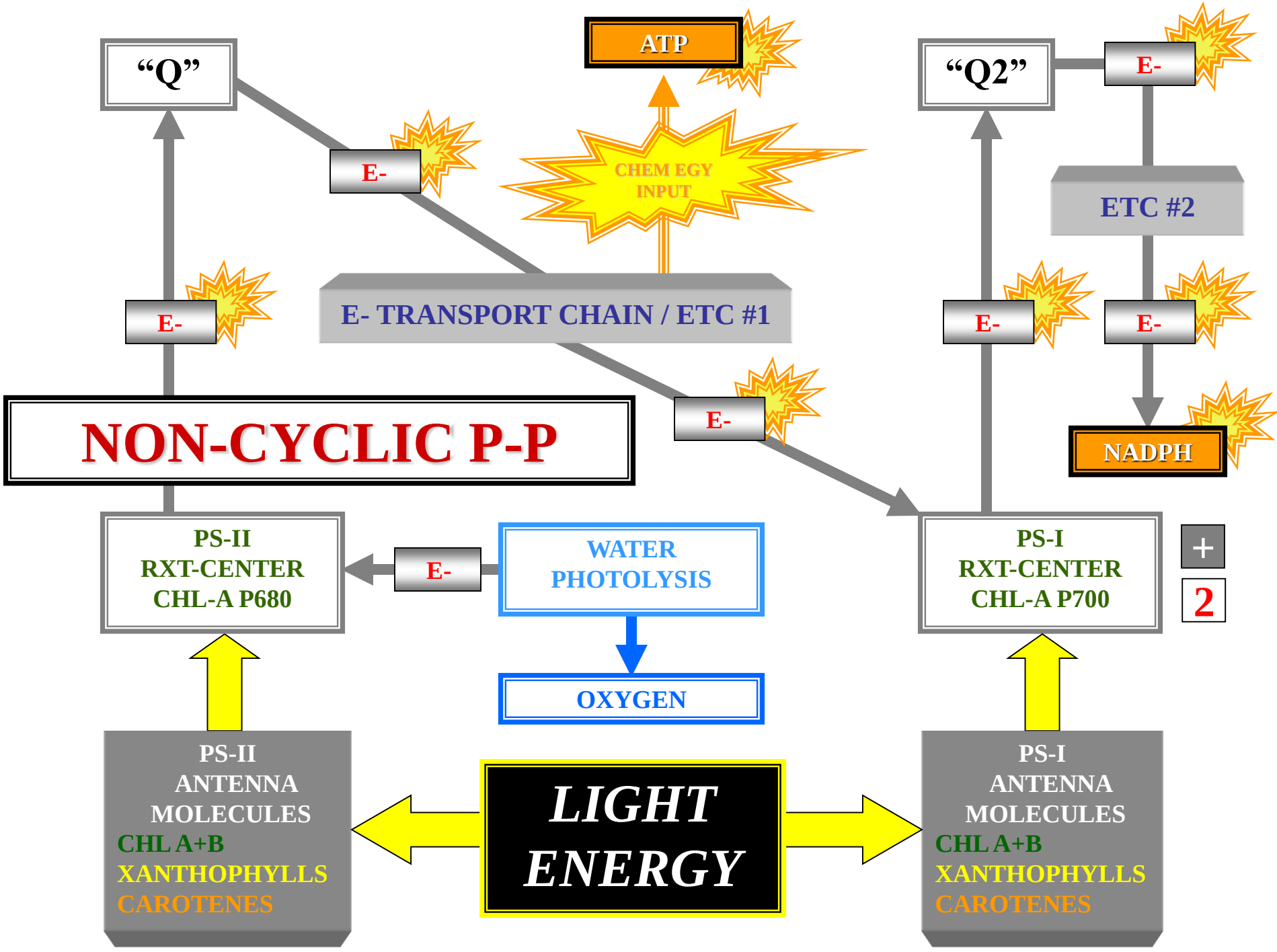
LR

C3 PATHWAY

CALVIN CYCLE


PHOTOSYNTHESIS
¿
C
LIGHT
REACTION


N
"Q2"
E-
ETC #3
CHEM
EGY
INPUT
ATP
CYCLIC P-P
E-
E-
E- = RECYCLED
PS-I
RXT-CENTER
CHL-A P700
PS-I
ANTENNA
MOLECULES
CHL A+B
XANTHOPHYLLS
CAROTENES
LIGHT
ENERGY
LIGHT
ENERGY


"Q"
ATP
"Q2"
E-
CHEM EGY INPUT
ETC #2
E- TRANSPORT CHAIN / ETC #1
NON-CYCLIC P-P
NADPH
PS-II RXT-CENTER CHL-A P680
WATER PHOTOLYSIS
PS-I RXT-CENTER CHL-A P700
+
2
OXYGEN
PS-II ANTENNA MOLECULES
CHL A+B
XANTHOPHYLLS
CAROTENES
LIGHT ENERGY
PS-I ANTENNA MOLECULES
CHL A+B
XANTHOPHYLLS
CAROTENES

C3

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

ALL RXTS REQUIRE A SPECIFIC ENZYME

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

E 2

C3 PATHWAY

CALVIN CYCLE

C3

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

ENTERS INDEPENDENT ROUTE

ALL RXTS REQUIRE A SPECIFIC ENZYME

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

ENTERS INDEPENDENT ROUTE

?

G

C3 PATHWAY

CALVIN CYCLE

C3

CO2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

COMPLEX SERIES CHEMICAL RXTS (CSCR)

?

ALL RXTS REQUIRE A SPECIFIC ENZYME

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

G

PE

C3 PATHWAY

CALVIN CYCLE

C3

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

ALL RXTS REQUIRE A SPECIFIC ENZYME

CHEM EGY INPUT

GLUCOSE

PHOTOSYNTHESIS EQUATION

$$6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$$

C3

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

M

ALL RXTS REQUIRE A SPECIFIC ENZYME

CHEM EGY INPUT

GLUCOSE

PHOTOSYNTHESIS EQUATION

$$6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$$

C3

CO_2 + RIBULOSE BISPHOSPHATE / (RUBP)

RIBULOSE BISPHOSPHATE CARBOXYLASE (RUBP-CARBOXYLASE)

UNSTABLE 6C COMPOUND

PHOSPHOGLYCERATE / (PGA)

ATP

BISPHOSPHOGLYCERATE / (BIPGA)

NADPH

PHOSPHOGLYCERALDEHYDE / (PGAL)

CHEM EGY INPUT

GLUCOSE ENTERS METABOLISM

ALL RXTS REQUIRE A SPECIFIC ENZYME

PHOSPHOGLYCERATE / (PGA)

ATP

+

G

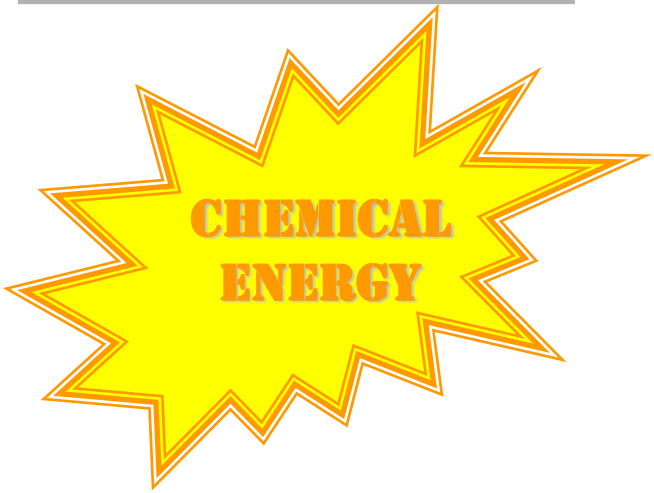
BISPHOSPHOGLYCERATE / (BIPGA)

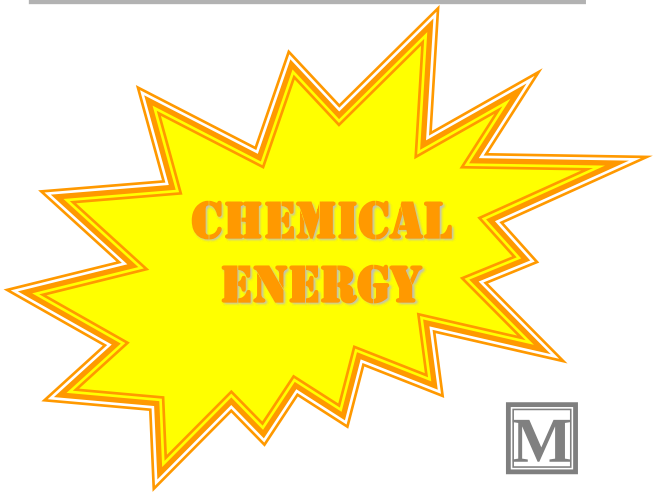
NADPH

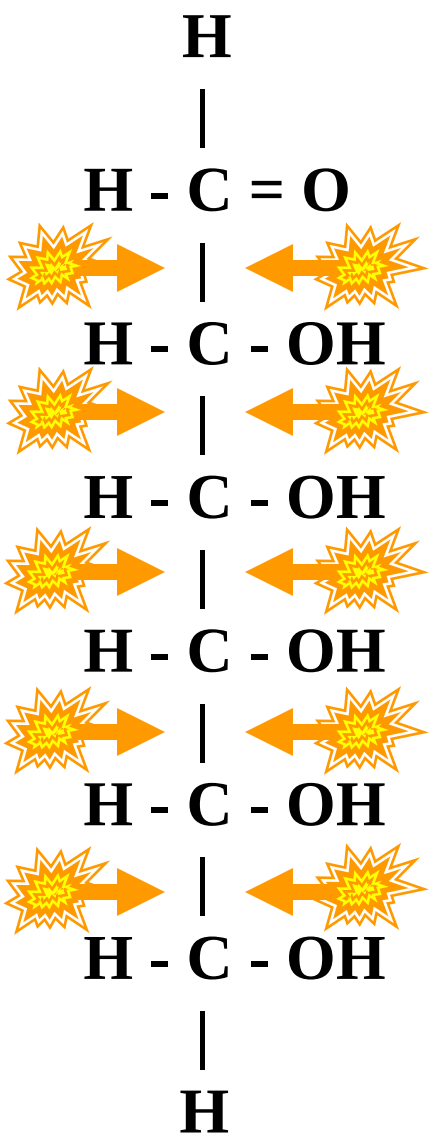
PHOSPHOGLYCERALDEHYDE / (PGAL)

ENTERS METABOLISM

GLUCOSE


CHEMICAL
ENERGY

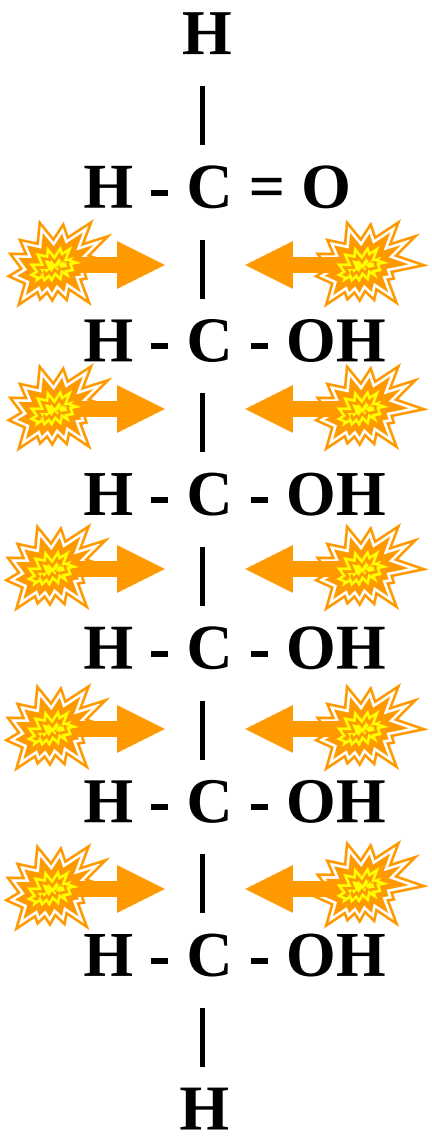

CHEMICAL
ENERGY


H
H - C = O
H - C - OH
H - C - OH
H - C - OH
H - C - OH
H - C - OH
H

GLUCOSE

ENTERS METABOLISM

ENTERS METABOLISM



CELL METABOLISM

CHEMICAL ENERGY

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EN

CMP-A + CMP-B → CMP-C

BIOCHEMICAL REACTION