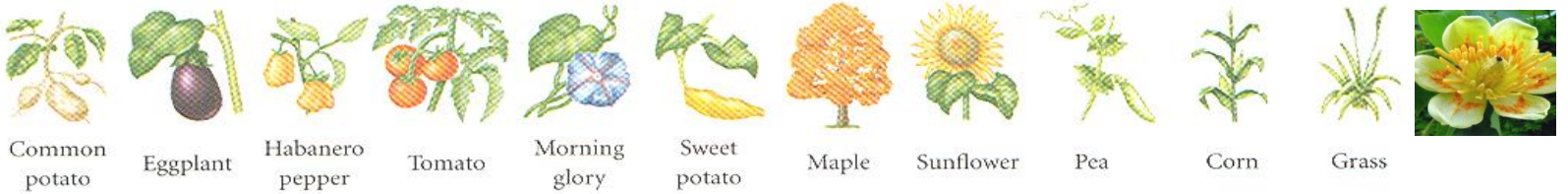
TAXONOMIC RANK

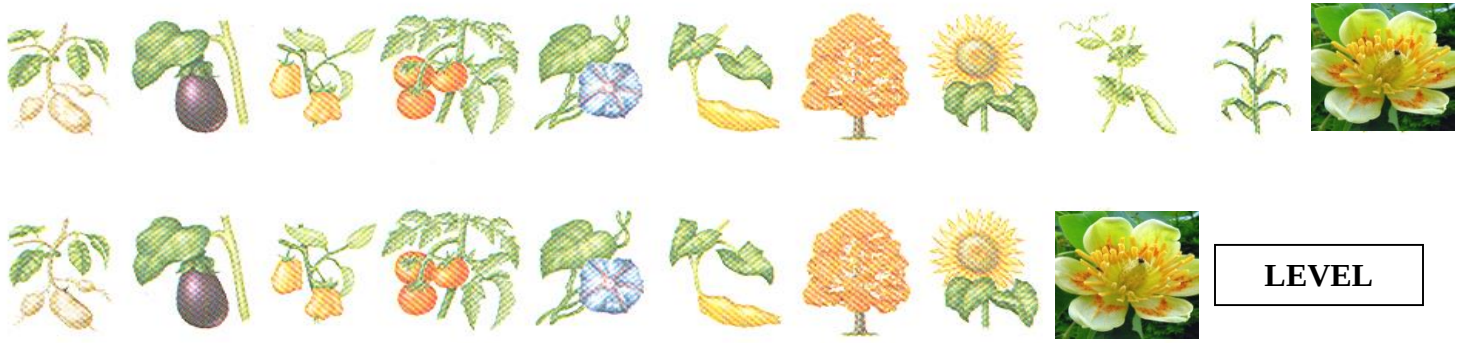
ANY LEVEL TAXONOMIC HIERARCHY

TAXONOMIC RANK



LEVEL

R



LEVEL

LEVEL

LEVEL

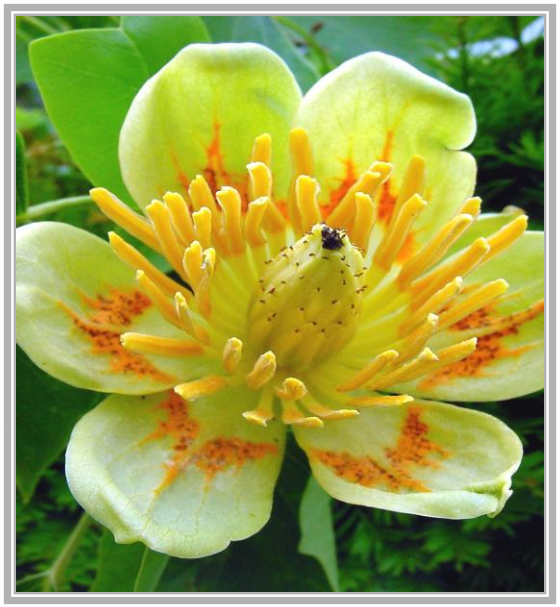
LEVEL

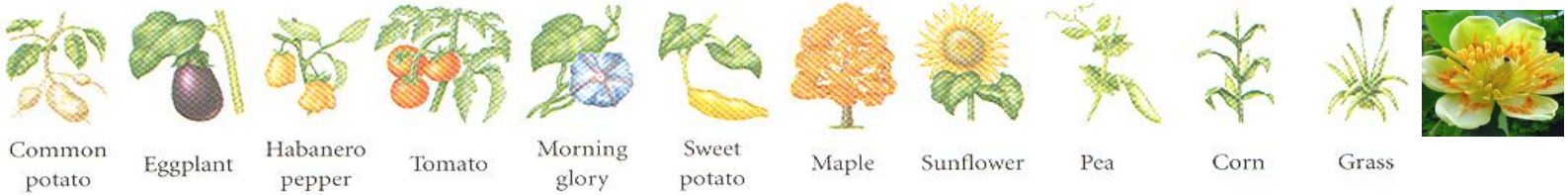
LEVEL

LEVE

RANK ANY LEVEL OF THE TAXONOMIC HIERARCHY

TULIP POPLAR





RANK

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T

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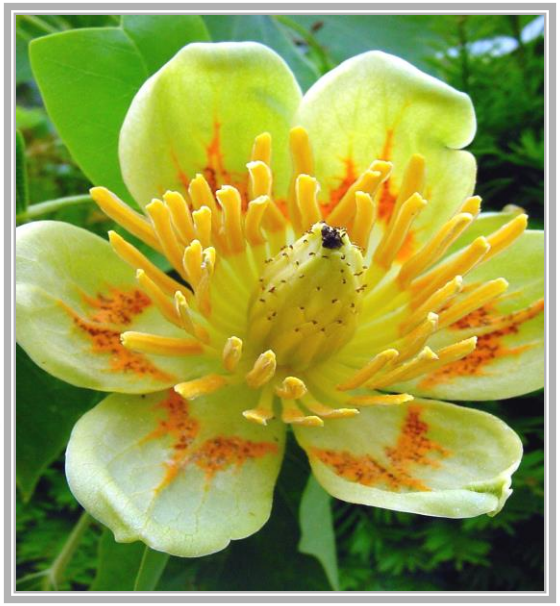
RANK
ANY LEVEL OF THE TAXONOMIC HIERARCHY

TULIP POPLAR

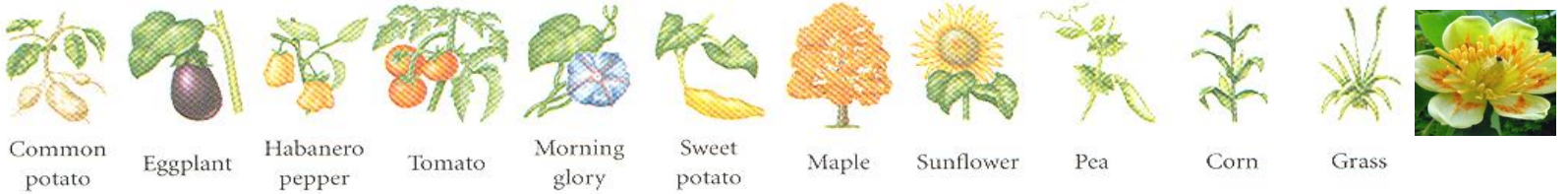


TAXON

TAXONOMIC TAXON

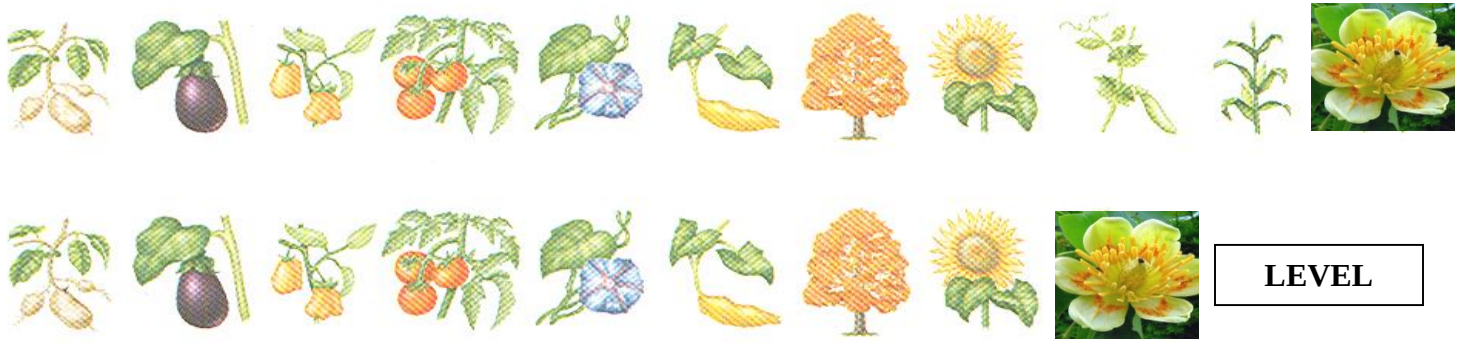
ANY TAXONOMIC ENTITY WITHIN RANK

TAXONOMIC TAXON



LEVEL

R



LEVEL

LEVEL

LEVEL

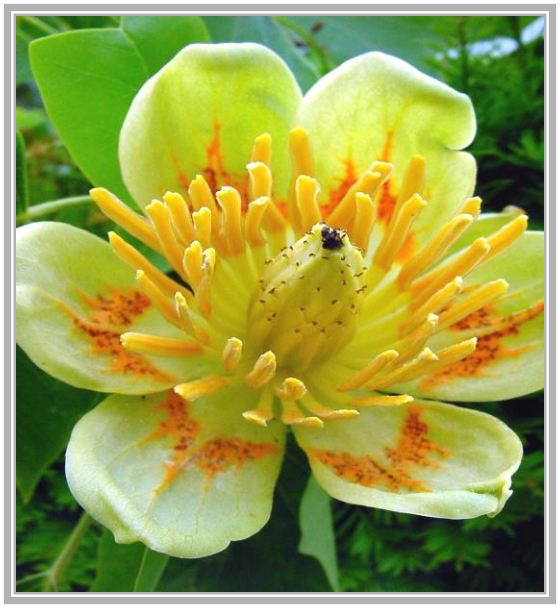
LEVEL

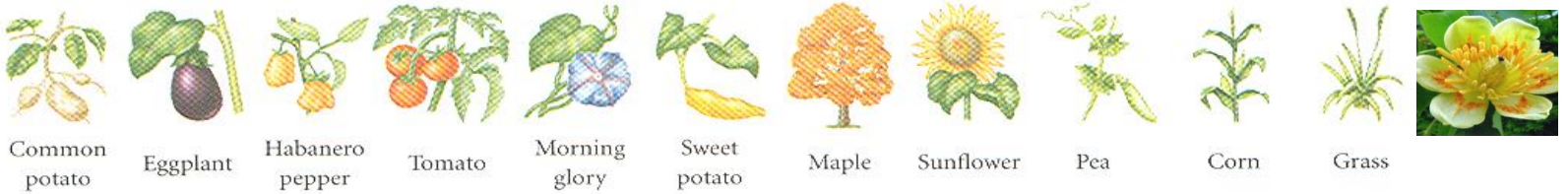
LEVEL

LEVE

RANK ANY LEVEL OF THE TAXONOMIC HIERARCHY

TULIP POPLAR





RANK

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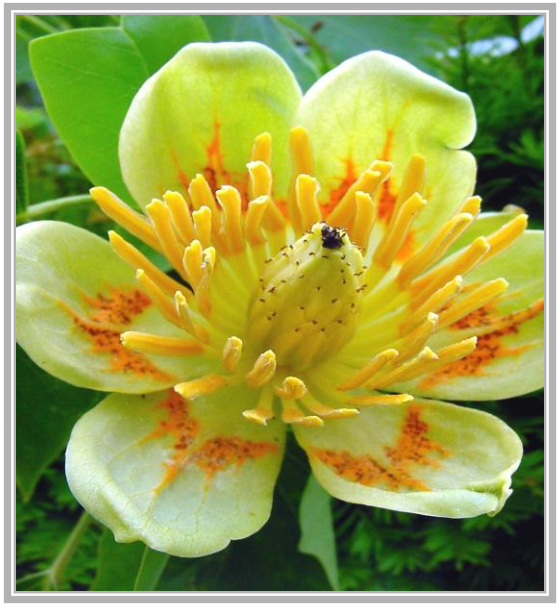
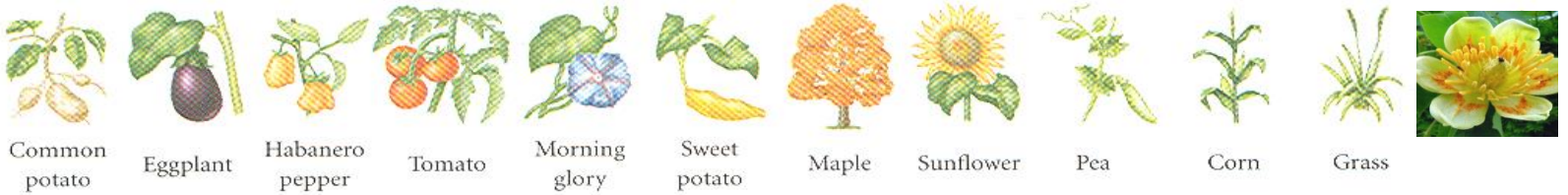
RANK ANY LEVEL OF THE TAXONOMIC HIERARCHY

TULIP POPLAR





PLANTAE

MAGNOLIOPHYTA

MAGNOLIOPSIDA

MAGNOLIALES

MAGNOLIACEAE

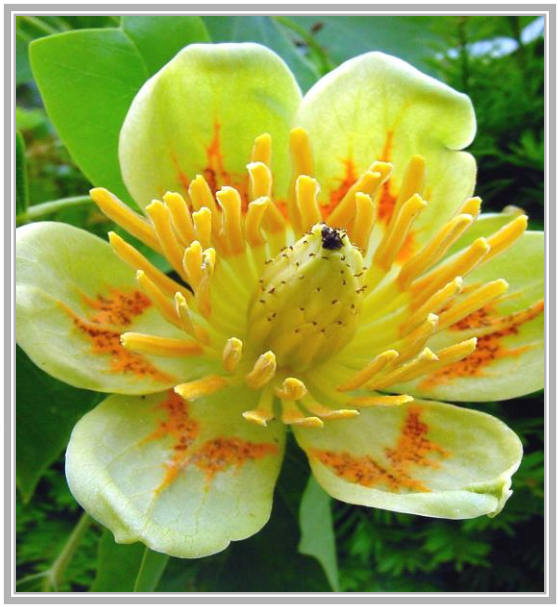
LIRIODENDRON

TULIPIFERA

TAXON
ANY TAXONOMIC ENTITY WITHIN RANK

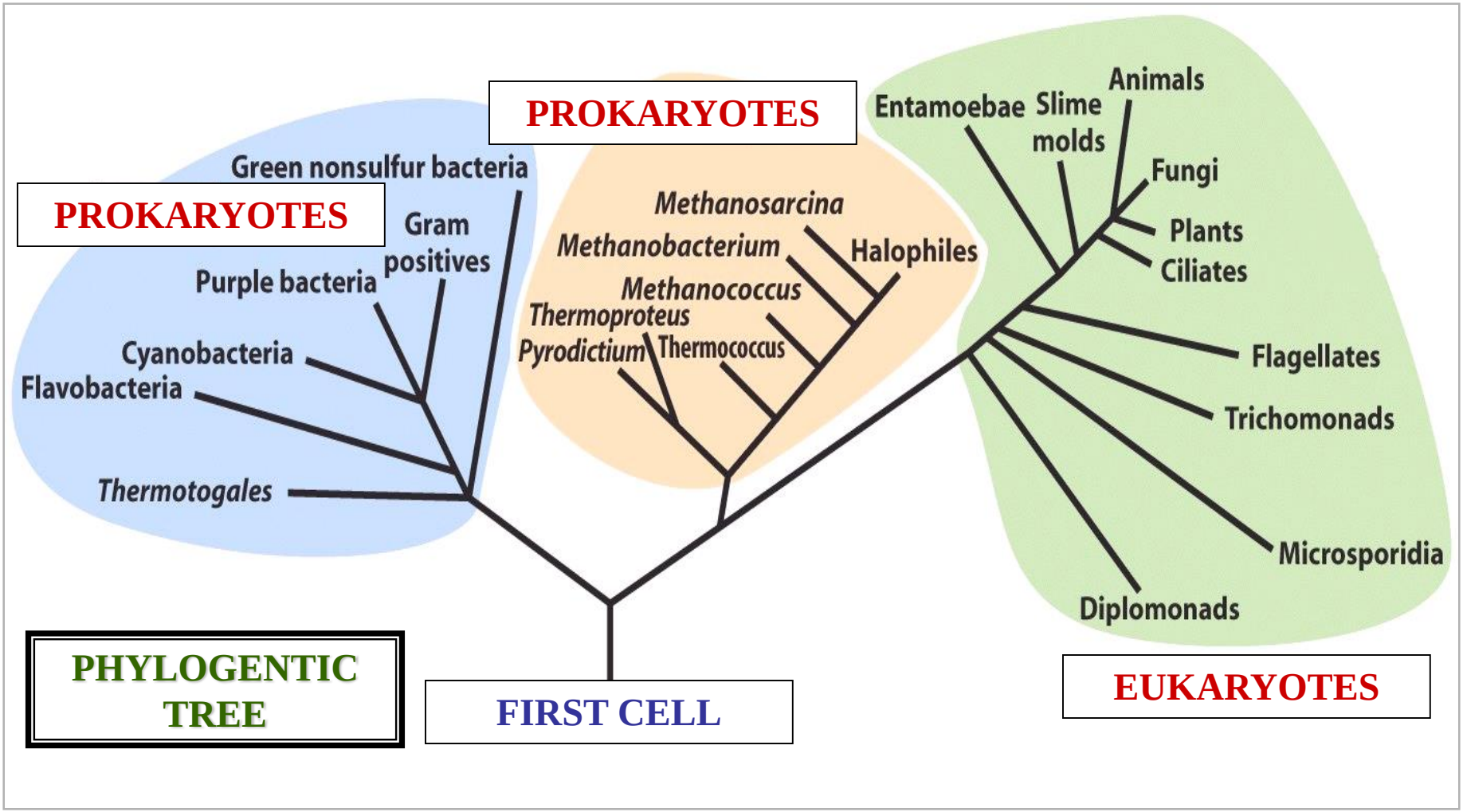
TULIP POPLAR

AP



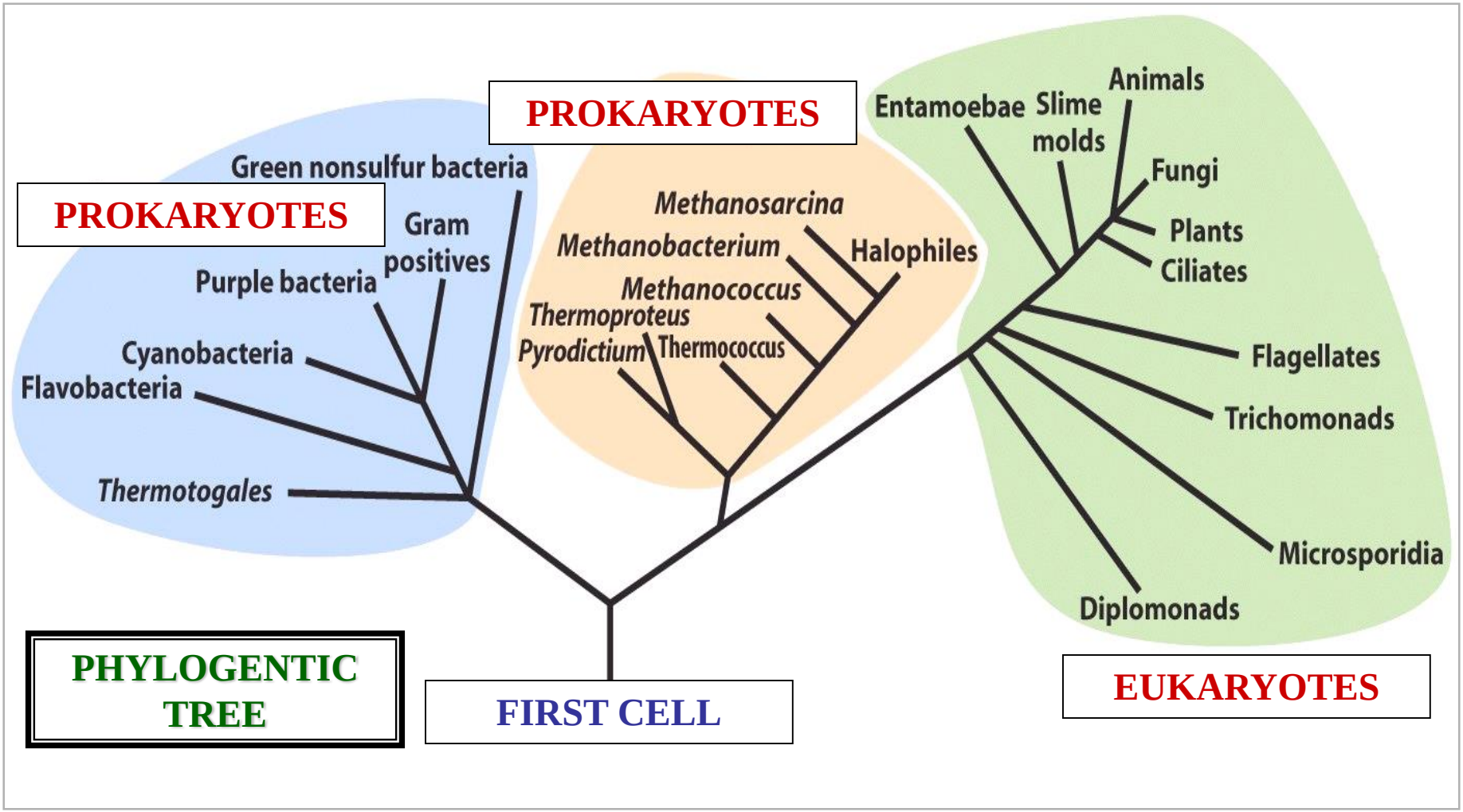
RANK VS TAXON APPLIED

RANK VS TAXON APPLIED



DOMAIN

RANK


PROKARYOTES
PROKARYOTES
EUKARYOTES
Green nonsulfur bacteria
Gram positives
Purple bacteria
Cyanobacteria
Flavobacteria
Thermotogales
Methanosarcina
Methanobacterium
Halophiles
Methanococcus
Thermoproteus
Pyrodictium
Thermococcus
Entamoebae
Slime molds
Animals
Fungi
Plants
Ciliates
Flagellates
Trichomonads
Microsporidia
Diplomonads
PHYLOGENTIC TREE
FIRST CELL

E

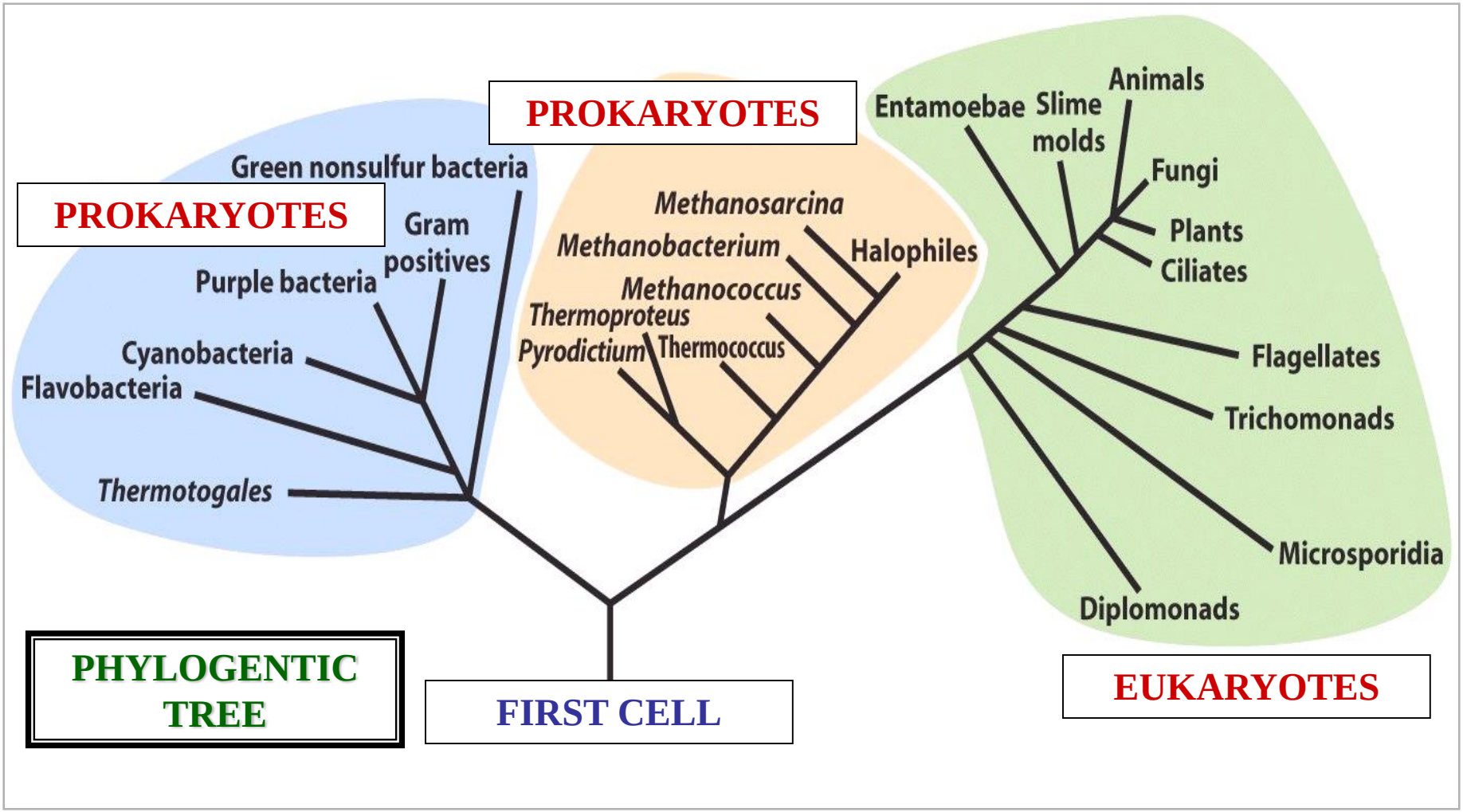
DOMAIN

RANK

DOMAIN

DOMAIN

DOMAIN



A

DOMAIN

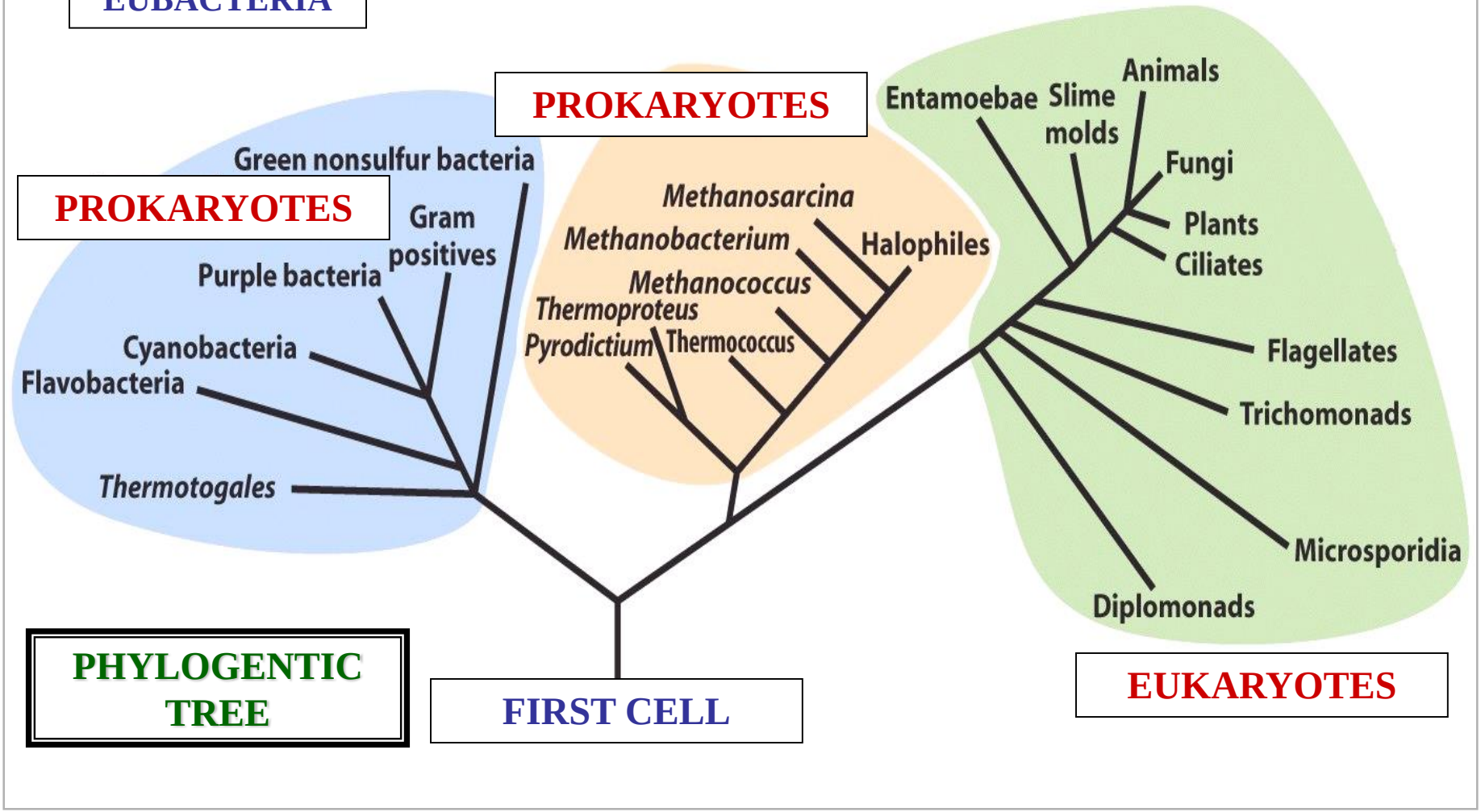
RANK

DOMAIN

DOMAIN

DOMAIN

EUBACTERIA



E

DOMAIN

RANK

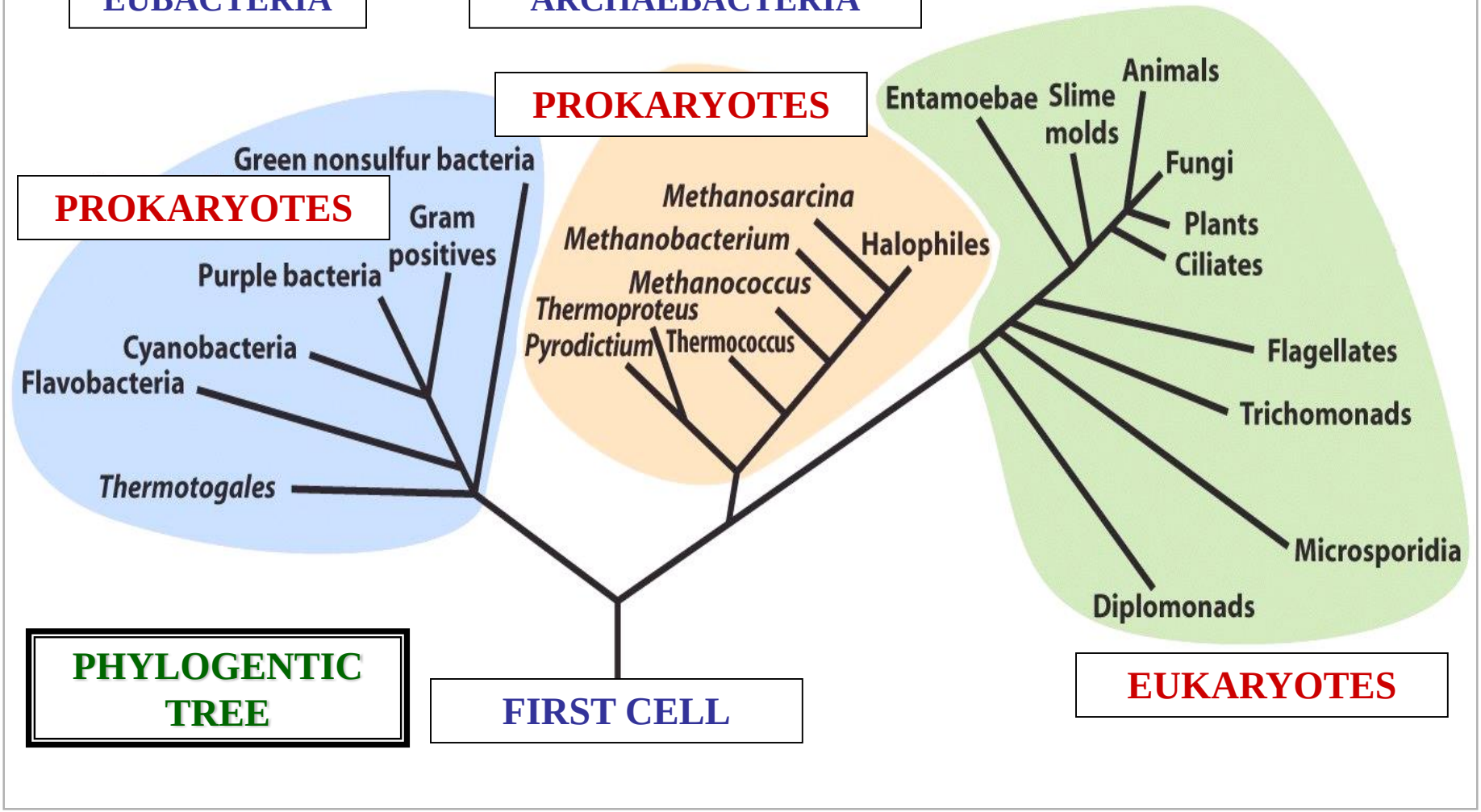
DOMAIN

EUBACTERIA

DOMAIN

ARCHAEBACTERIA

DOMAIN



T

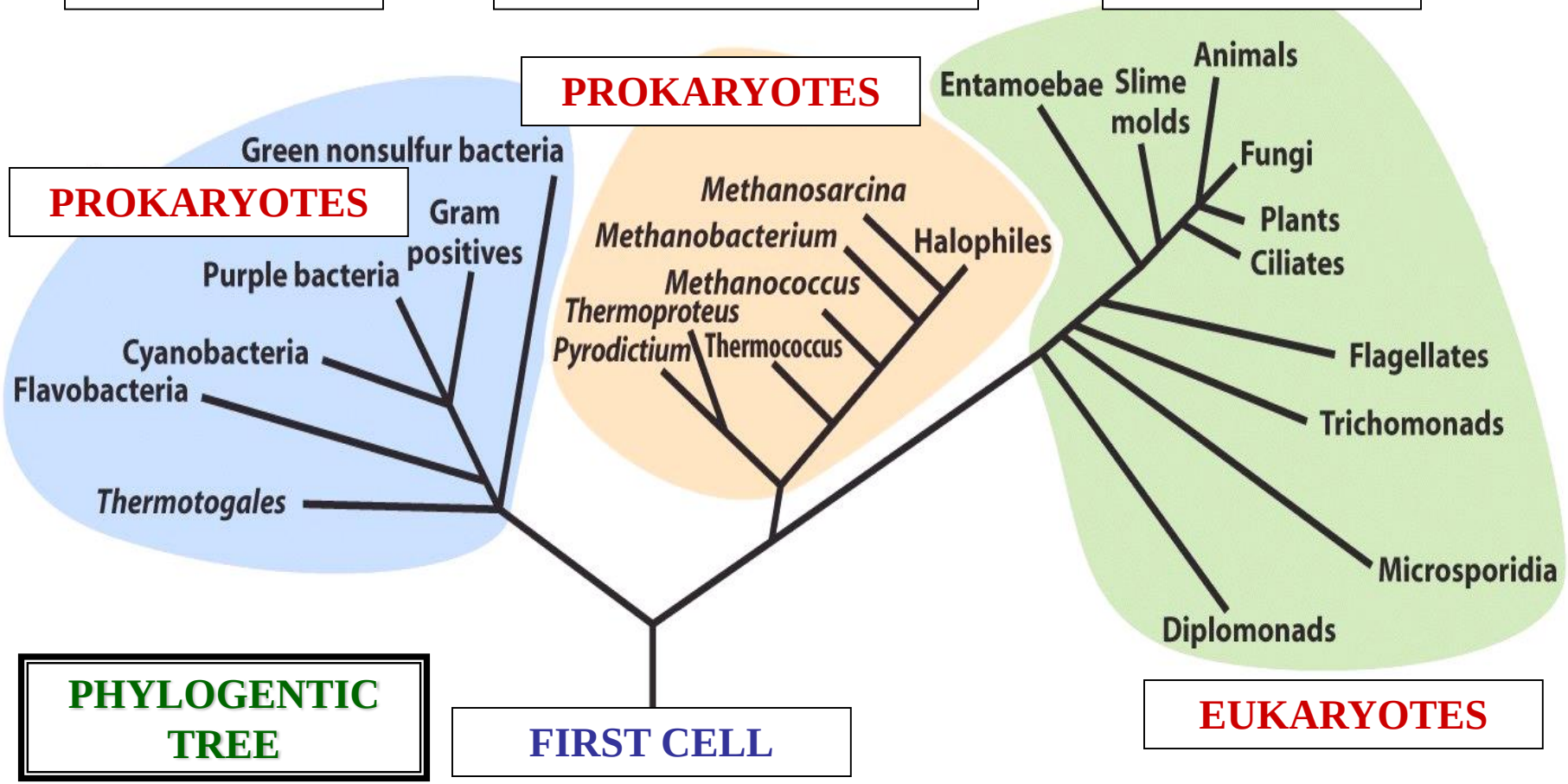
DOMAIN

RANK

DOMAIN
EUBACTERIA

DOMAIN
ARCHAEBACTERIA

DOMAIN
EUKARYA



PHYLOGENTIC TREE

FIRST CELL

DOMAIN

RANK

TAXON

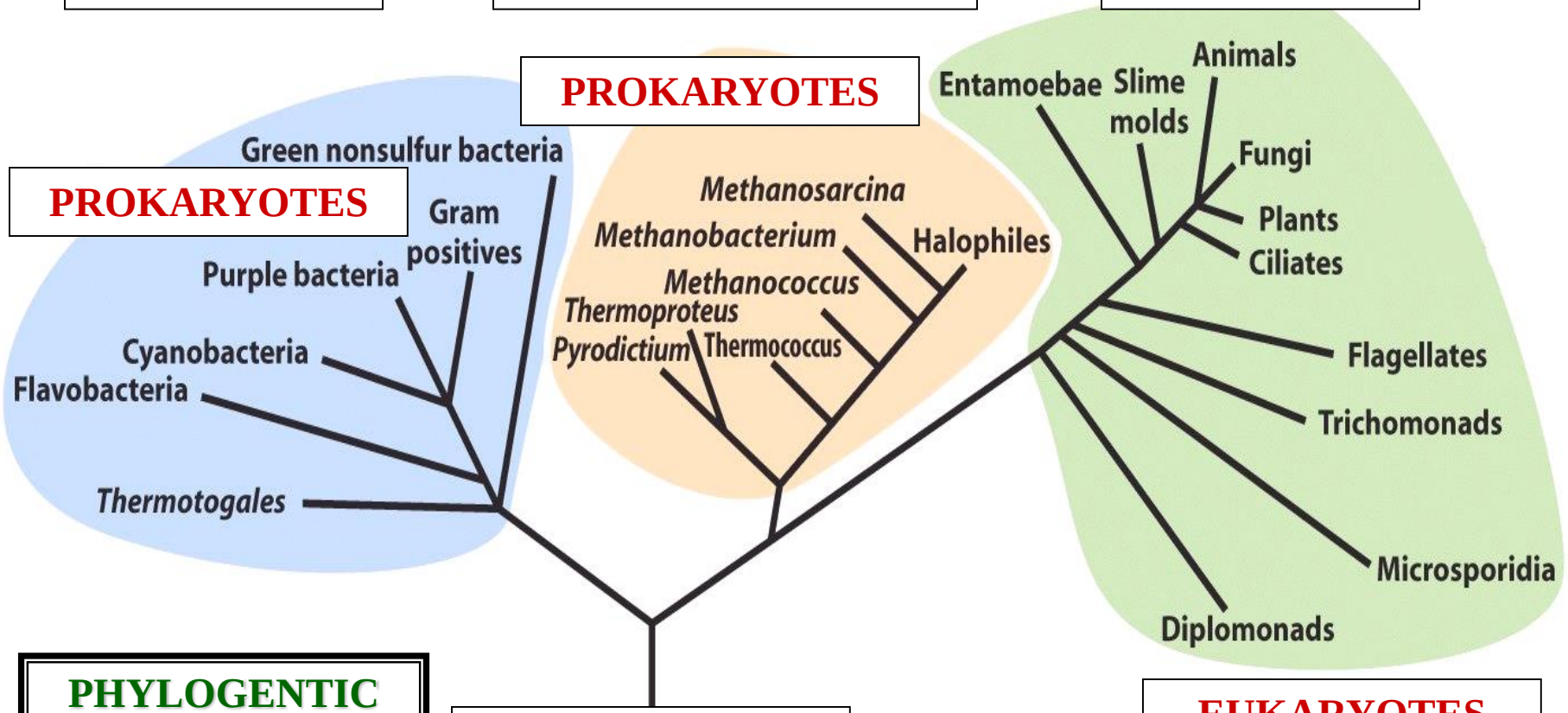
EUBACTERIA

TAXON

ARCHAEBACTERIA

TAXON

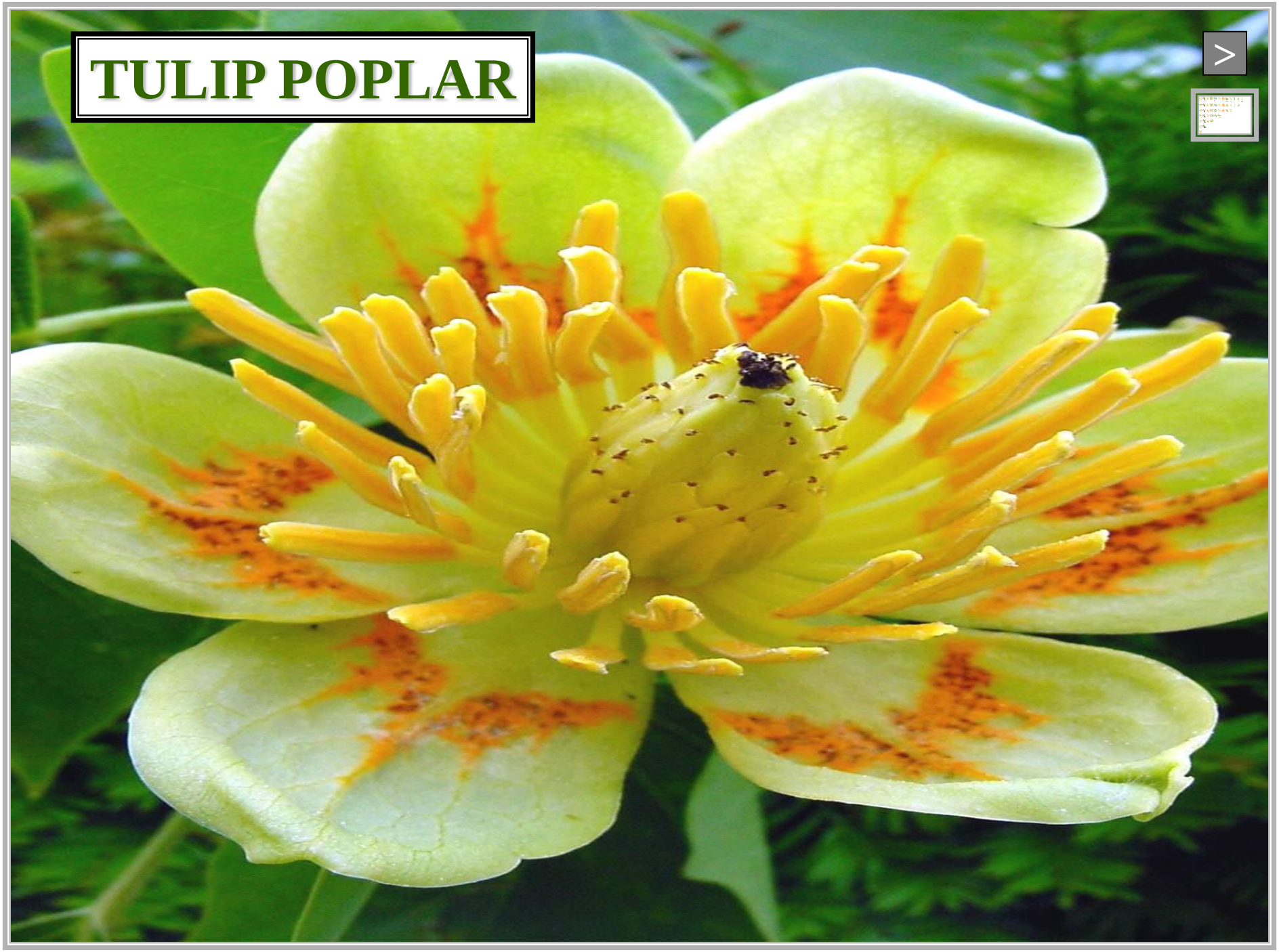
EUKARYA

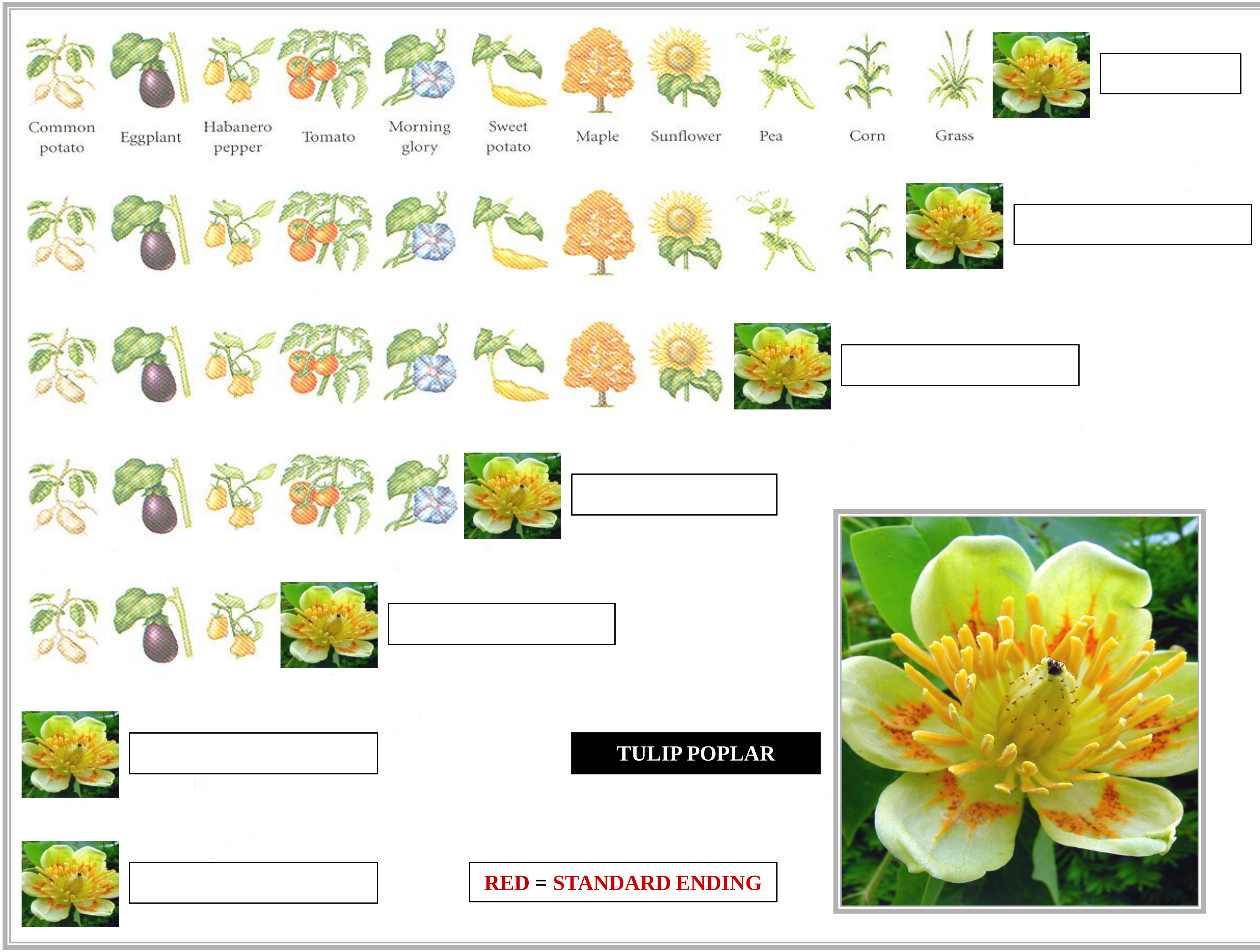


PHYLOGENTIC TREE

TAXONOMIC HIERARCHY APPLIED

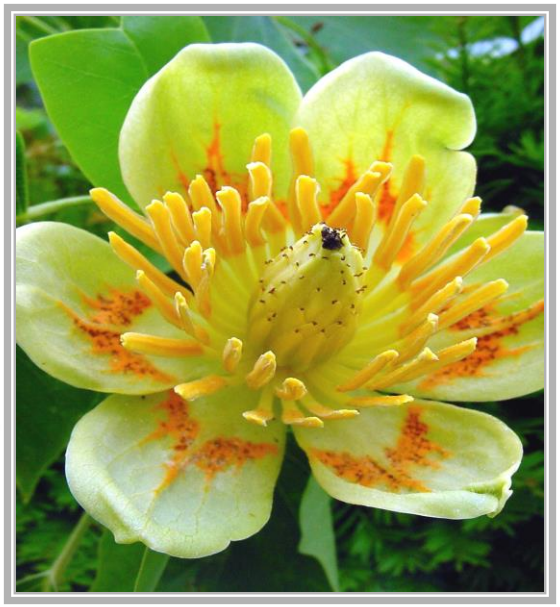
TULIP POPLAR



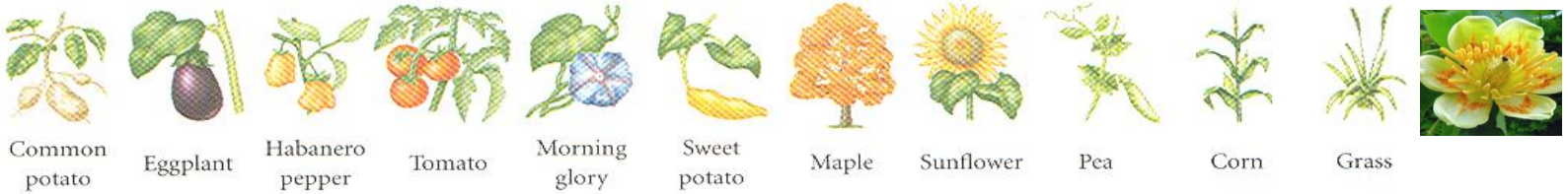

Common potato
Eggplant
Habanero pepper
Tomato
Morning glory
Sweet potato
Maple
Sunflower
Pea
Corn
Grass
TULIP POPLAR
RED = STANDARD ENDING

DOMAIN

TULIP POPLAR



RED = STANDARD ENDING



EUKARYA

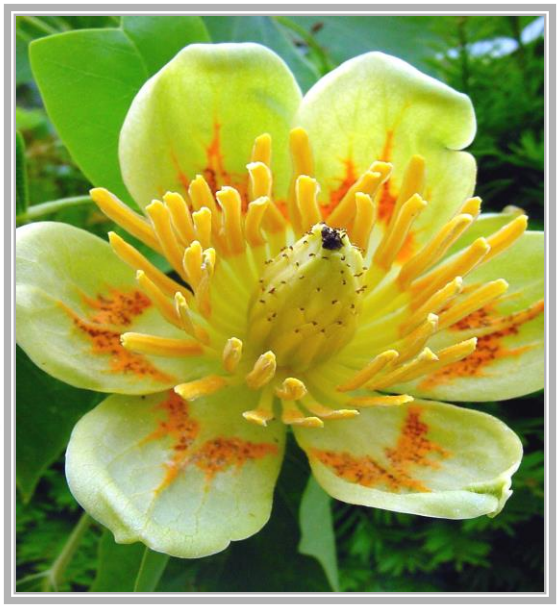
TULIP POPLAR

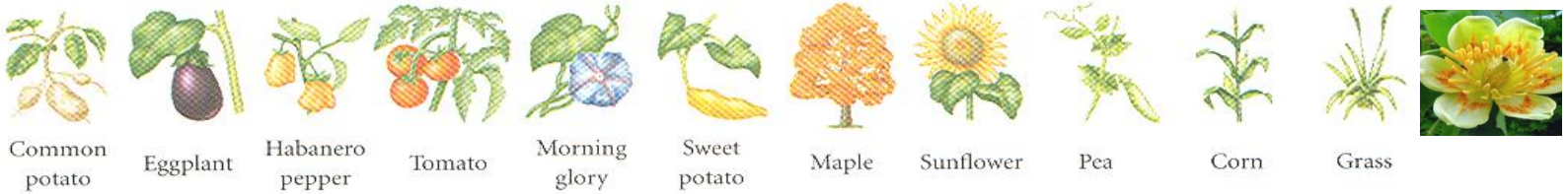
RED = STANDARD ENDING

KINGDOM

TULIP POPLAR

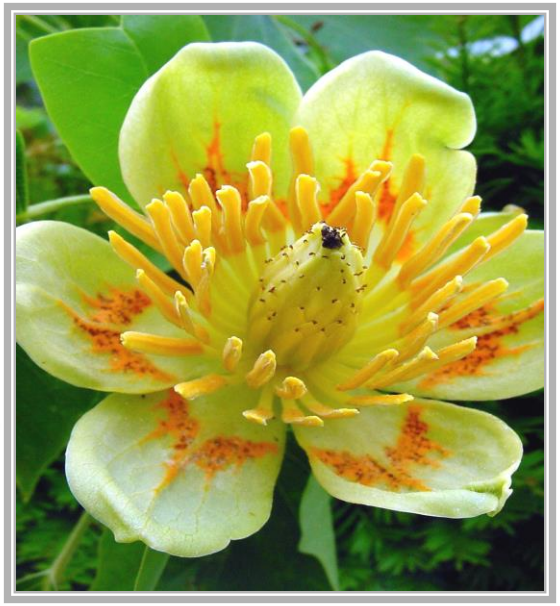
RED = STANDARD ENDING



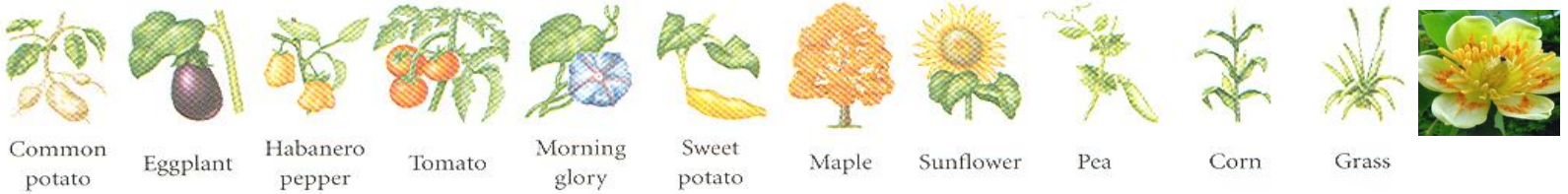


PLANTAE

TULIP POPLAR



RED = STANDARD ENDING

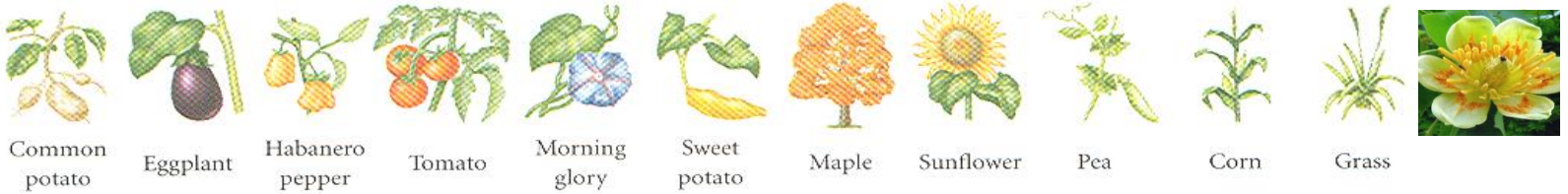


PLANTAE

PHYLUM

TULIP POPLAR

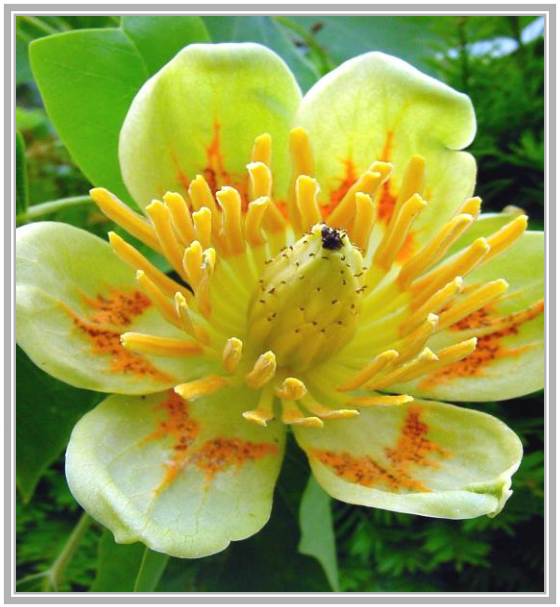
RED = STANDARD ENDING



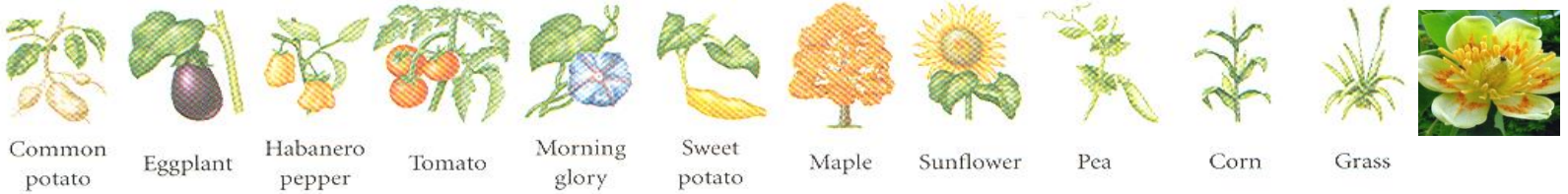
PLANTAE

MAGNOLIOPHYTA

TULIP POPLAR



RED = STANDARD ENDING



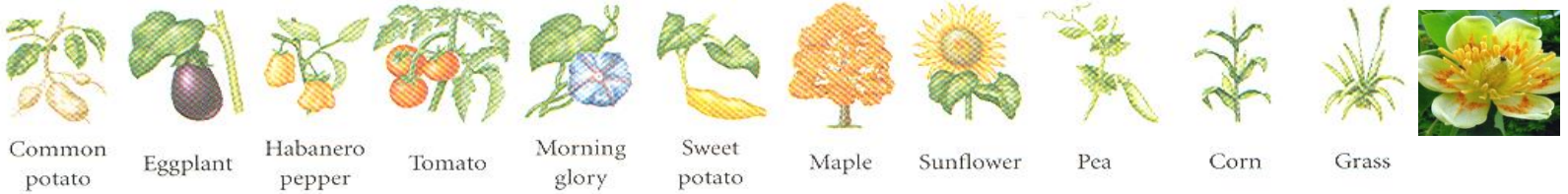
PLANTAE

MAGNOLIOPHYTA

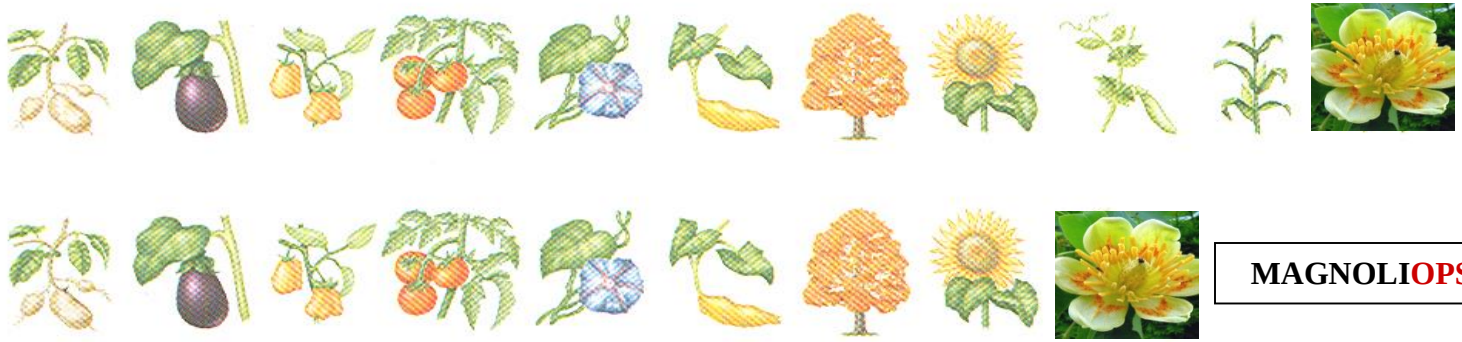
CLASS

TULIP POPLAR

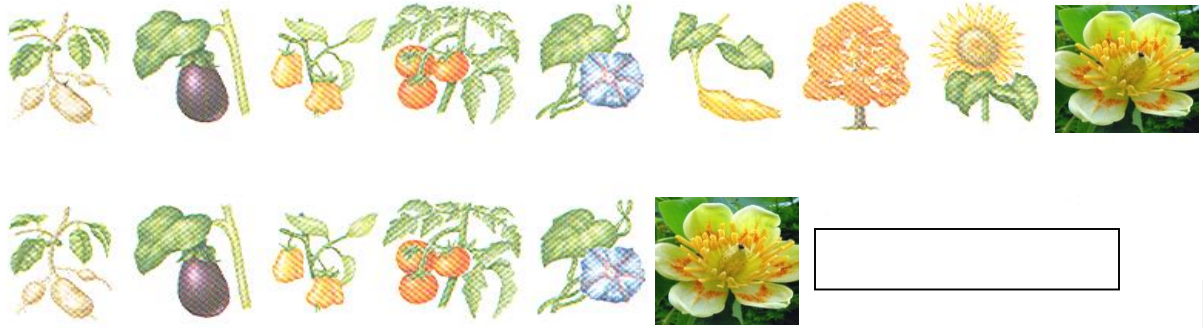
RED = STANDARD ENDING



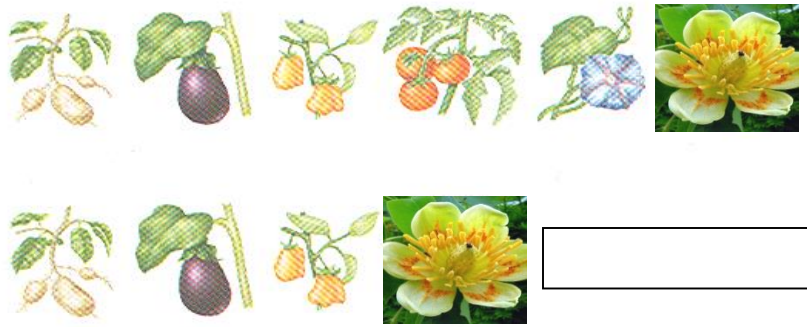
PLANTAE



MAGNOLIOPHYTA

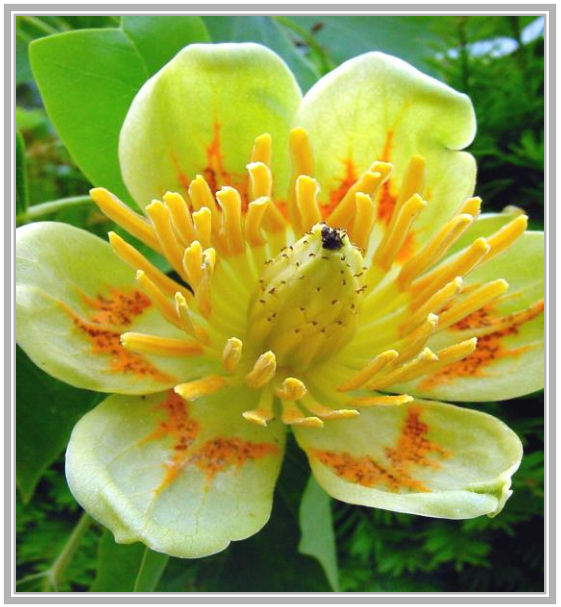


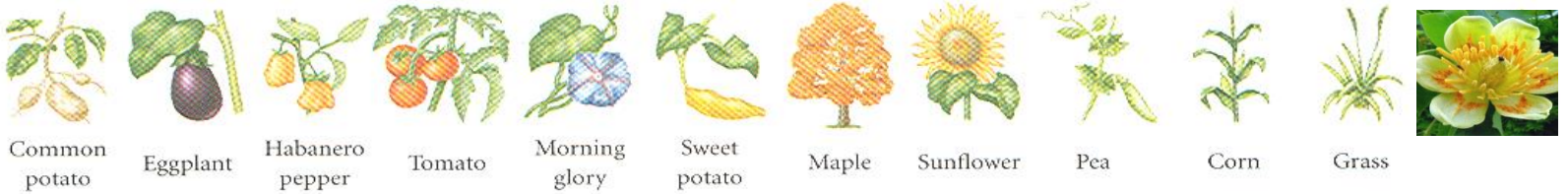
MAGNOLIOPSIDA



TULIP POPLAR

RED = STANDARD ENDING





PLANTAE

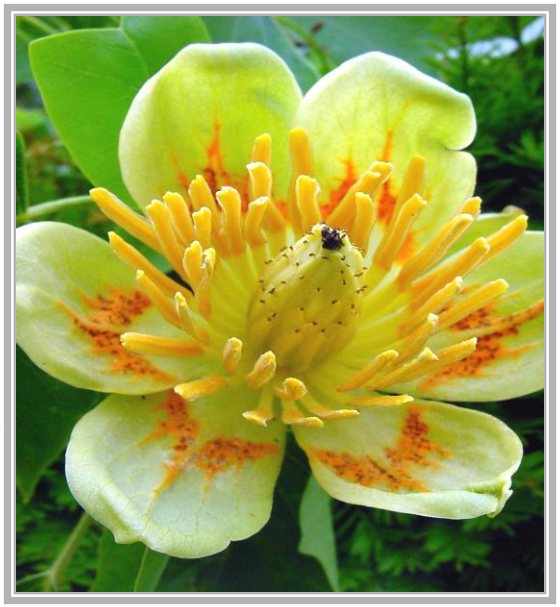
MAGNOLIOPHYTA

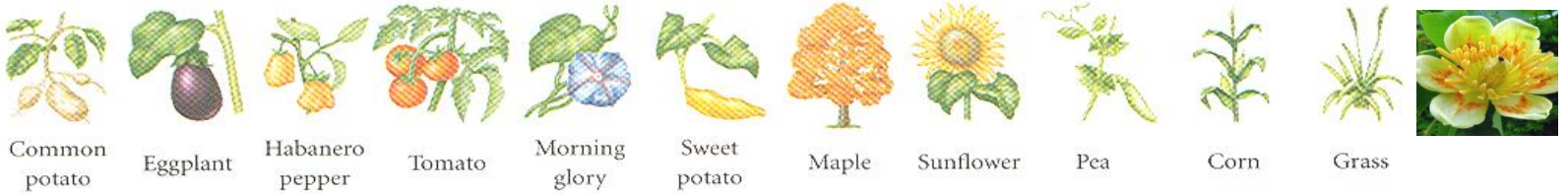
MAGNOLIOPSIDA

ORDER

TULIP POPLAR

RED = STANDARD ENDING





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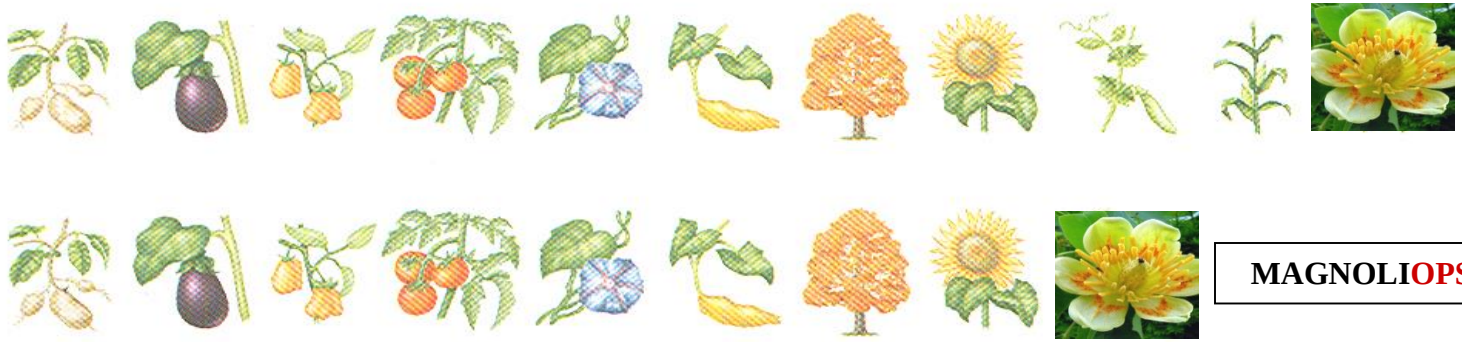
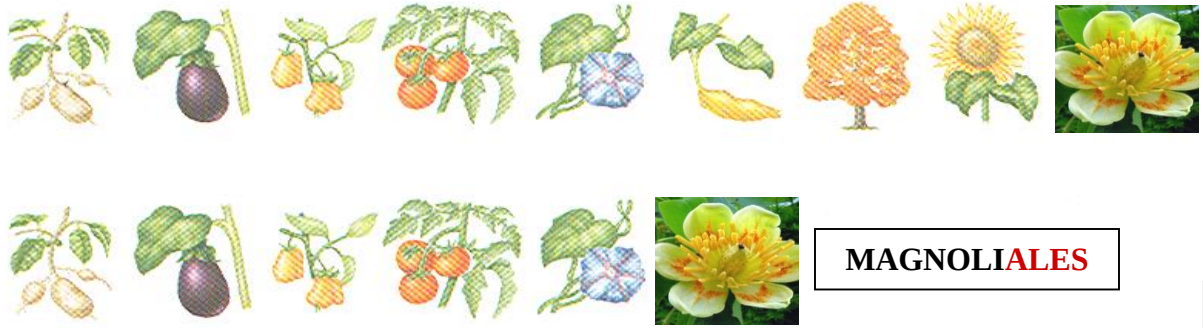


MAGNOLIOPHYTA



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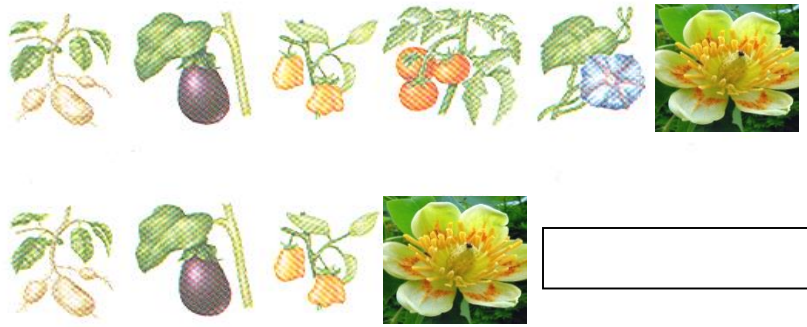
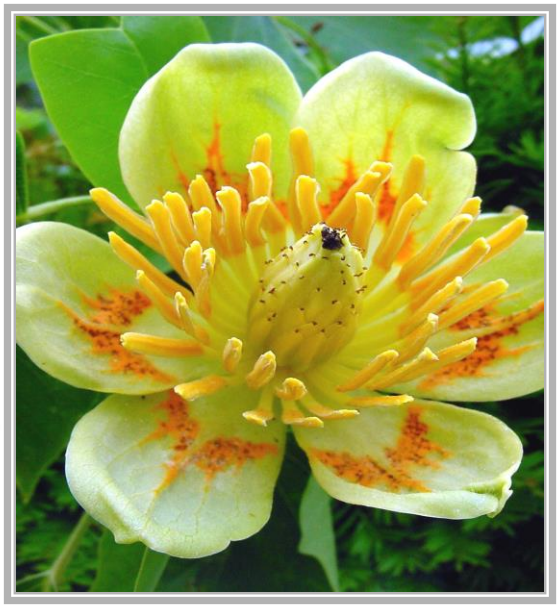
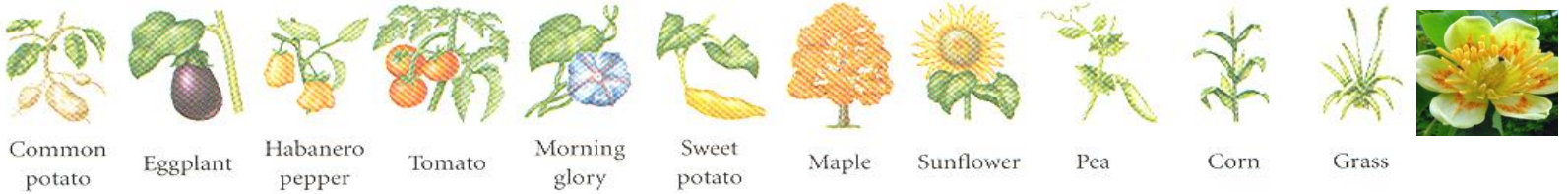


MAGNOLIALES

TULIP POPLAR

RED = STANDARD ENDING





PLANTAE

MAGNOLIOPHYTA

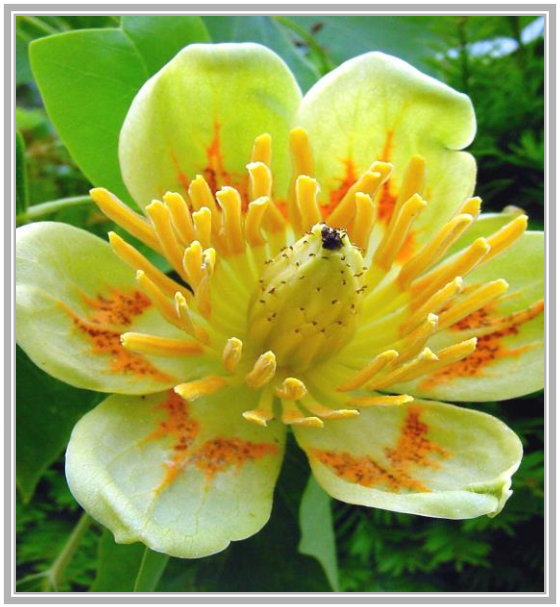
MAGNOLIOPSIDA

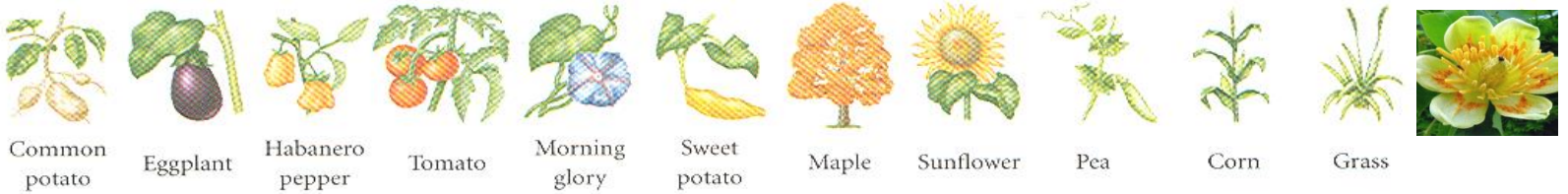
MAGNOLIALES

FAMILY

TULIP POPLAR

RED = STANDARD ENDING





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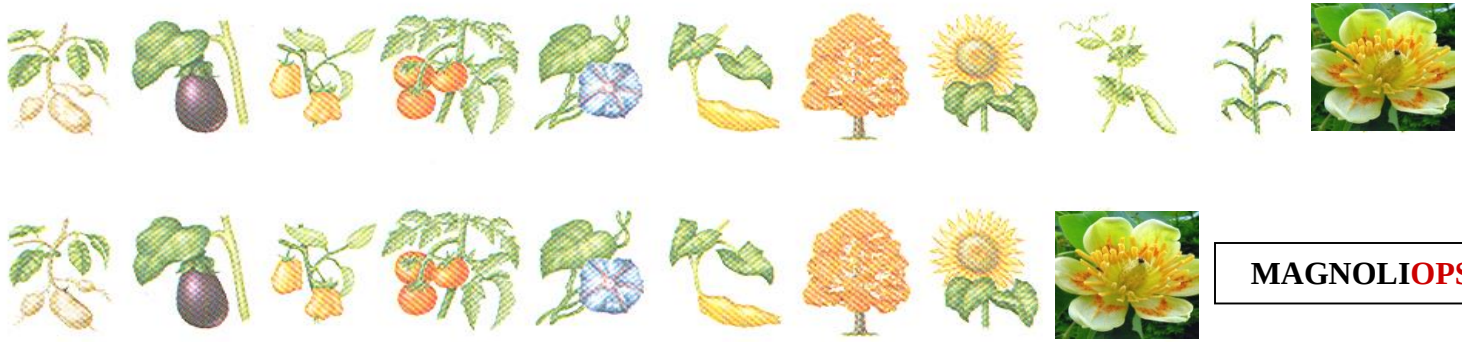


MAGNOLIOPHYTA

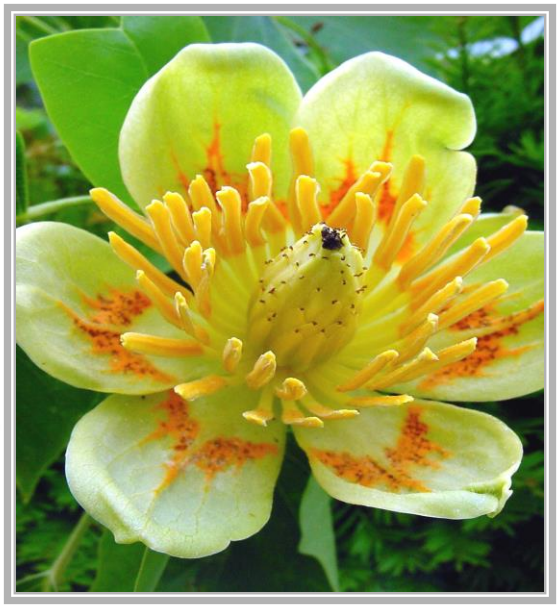
MAGNOLIOPSIDA

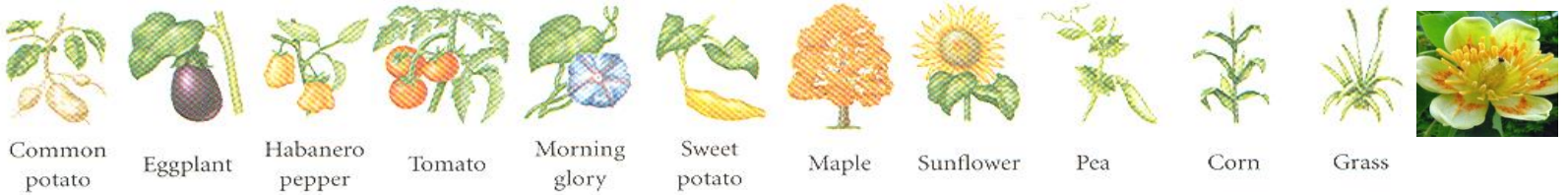
MAGNOLIALES

MAGNOLIACEAE

TULIP POPLAR

RED = STANDARD ENDING





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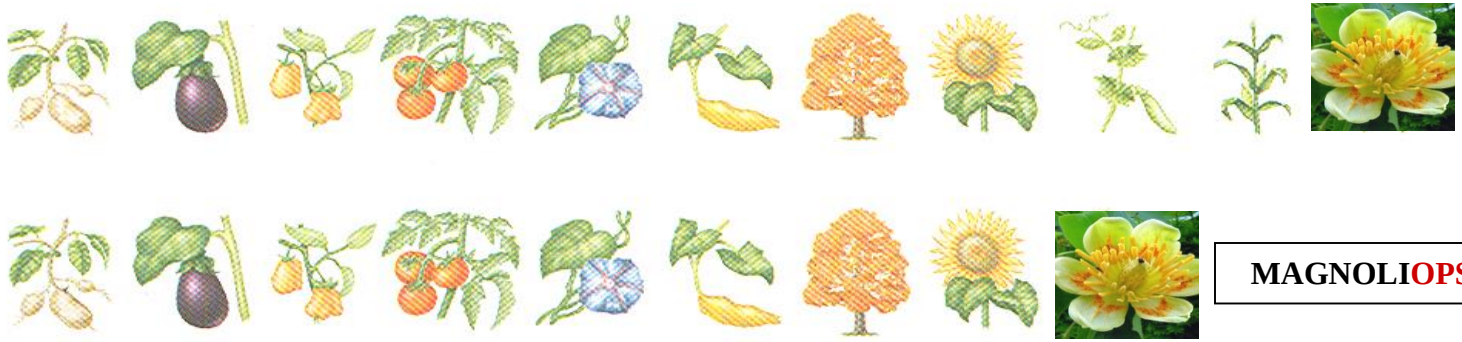


MAGNOLIOPHYTA

MAGNOLIOPSIDA

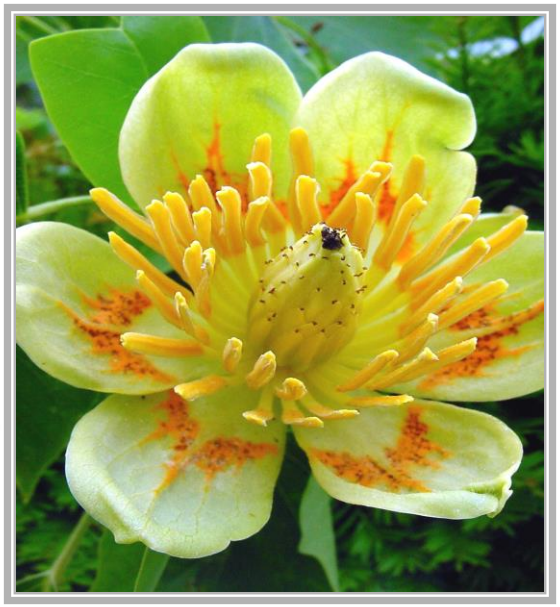
MAGNOLIALES

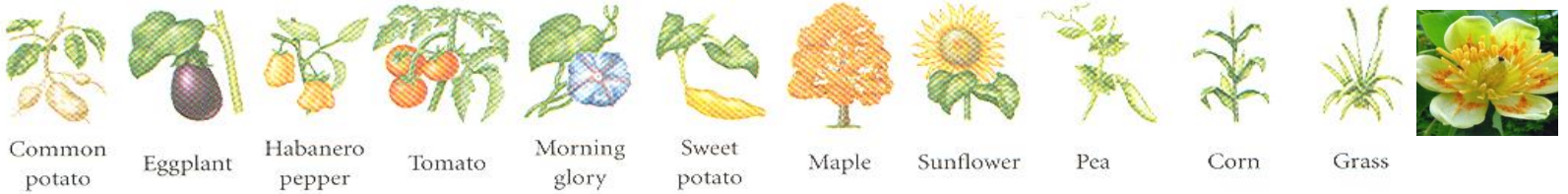
MAGNOLIACEAE

GENUS

TULIP POPLAR

RED = STANDARD ENDING





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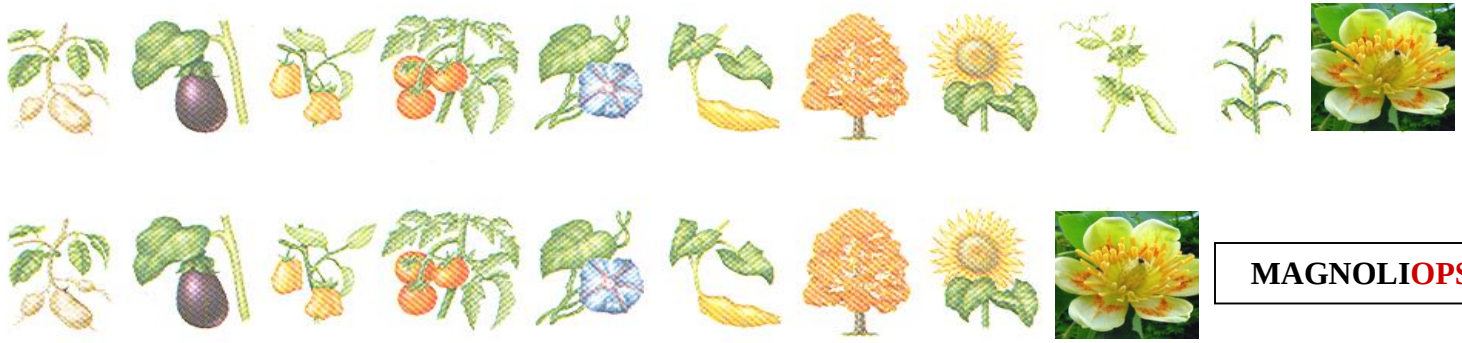


MAGNOLIOPHYTA

MAGNOLIOPSIDA

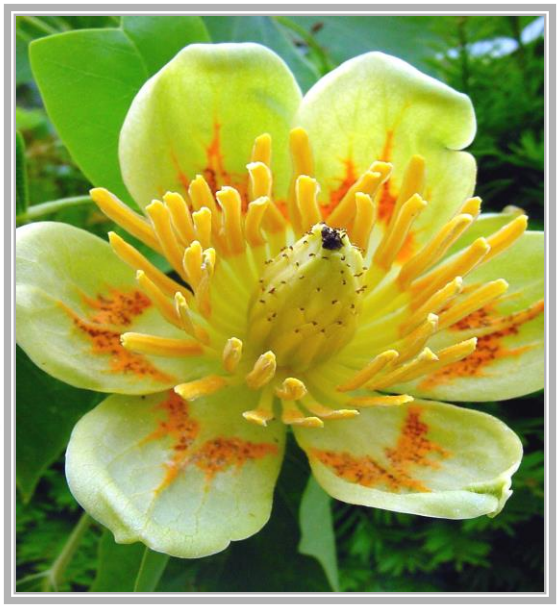
MAGNOLIALES

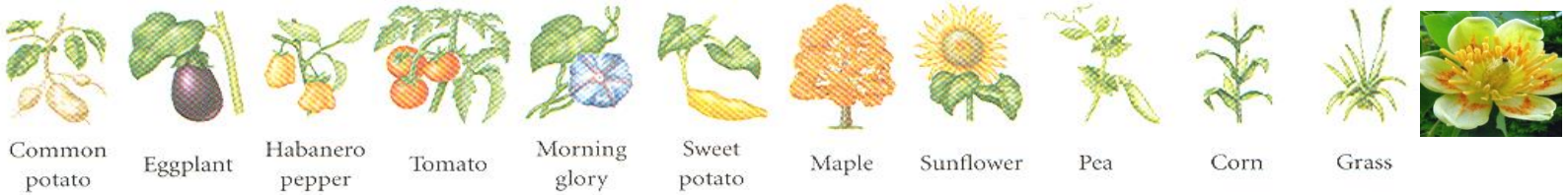
MAGNOLIACEAE

LIRIODENDRON

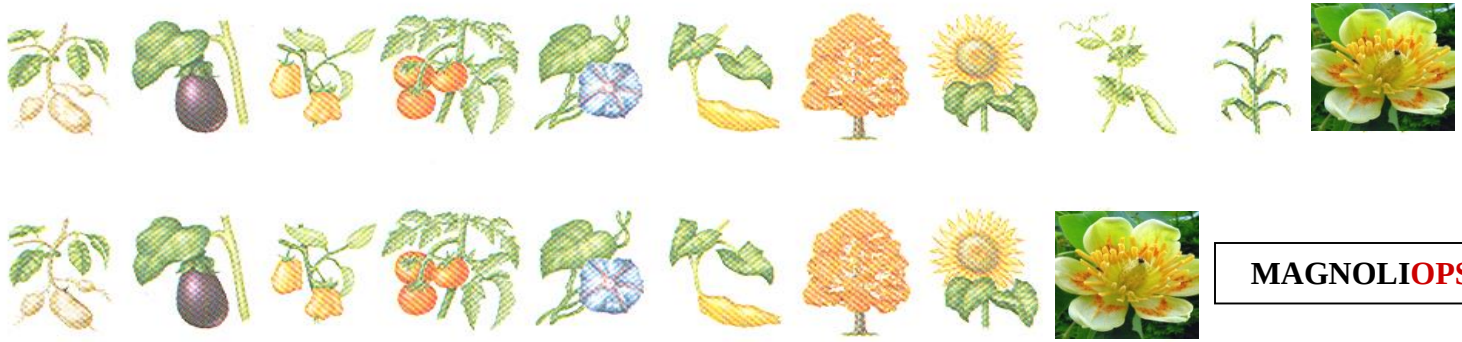
TULIP POPLAR

RED = STANDARD ENDING





PLANTAE



MAGNOLIOPHYTA

MAGNOLIOPSIDA

MAGNOLIALES

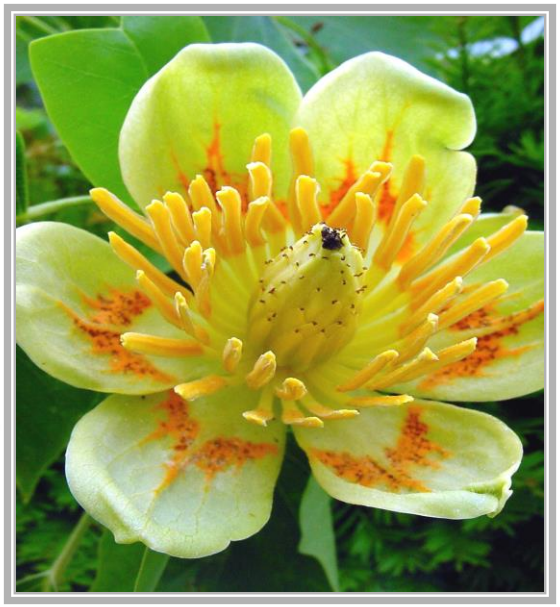
MAGNOLIACEAE

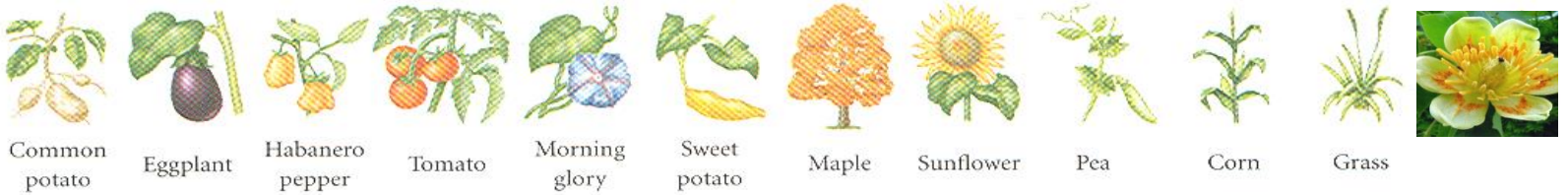
LIRIODENDRON

TULIP POPLAR

EPITHET

RED = STANDARD ENDING





PLANTAE

MAGNOLIOPHYTA

MAGNOLIOPSIDA

MAGNOLIALES

MAGNOLIACEAE

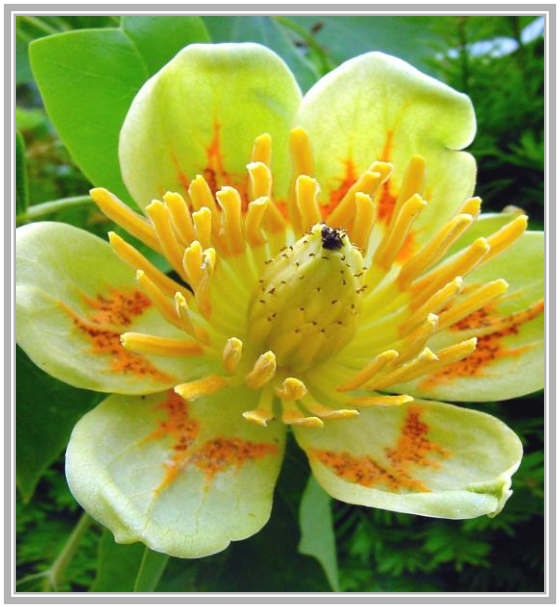
LIRIODENDRON

TULIP POPLAR

TULIPIFERA

Q

RED = STANDARD ENDING



LECTURE QUIZ

TAXONOMIC HIERARCHY

LECTURE QUIZ

GENERAL TAXONOMIC TERMS
&
TAXONOMIC HIERARCHY
STANDARD ENDINGS

LECTURE QUIZ

FORMAT

FILL IN

QUESTIONS

LECTURE QUIZ

20 SECONDS ANSWER QUESTIONS

LECTURE QUIZ

MUST SPELL CORRECTLY FOR FULL CREDIT

LECTURE QUIZ

MONDAY
22 AUGUST 2022

HO

VASCULAR PLANT EVOLUTION

****

HO

BIOLOGY 363
VASCULAR PLANTS
PHYLA CLASSIFICATION

****

-- DOMAIN - BACTERIA

-- KINGDOM - MONERA
-- PHYLUM:

-- CYANOPHYTA - BLUE-GREEN BACTERIA
GREEN BACTERIA

-- DOMAIN - EUKARYA

-- KINGDOM - PLANTAE
-- PHYLUM:

-- CHLOROPHYTA - GREEN ALGAE
-- RHYNIOPHYTA - RHYNIOPHYTES
-- ZOSTEROPHYLLOPHYTA - ZOSTEROPHYTES

****

V

GEOLOGIC TIME SCALE

****

ERA	PERIOD	DURATION
CENOZOIC	QUATERNARY	3 → PRESENT
	TERTIARY	65 → 3 MYA
MESOZOIC	CRETACEOUS	140 → 65 MYA
	JURASSIC	195 → 140 MYA
	TRIASSIC	225 → 195 MYA
	PERMIAN	280 → 225 MYA
	PENNSYLVANIAN	325 → 280 MYA
	MISSISSIPPIAN	345 → 325 MYA

VASCULAR PLANT EVOLUTION

ACRONYMS

VASCULAR PLANT EVOLUTION ACRONYMS

BYA = BILLION YEARS AGO

VASCULAR PLANT EVOLUTION ACRONYMS

VASCULAR PLANT EVOLUTION ACRONYMS

BYA = BILLION YEARS AGO

MYA = MILLION YEARS AGO

VASCULAR PLANT EVOLUTION ACRONYMS

VASCULAR PLANT EVOLUTION ACRONYMS

BYA = BILLION YEARS AGO
MYA = MILLION YEARS AGO
DMBO = DOUBLE MEMBRANE BOUND ORGANELLES

VASCULAR PLANT EVOLUTION ACRONYMS

VASCULAR PLANT EVOLUTION ACRONYMS

?

BYA = BILLION YEARS AGO

MYA = MILLION YEARS AGO

DMBO = DOUBLE MEMBRANE BOUND ORGANELLES

→ = OUTCOME

VASCULAR PLANT EVOLUTION ACRONYMS

QUESTION

HOW OLD
IS THE UNIVERSE?

QUESTION

~14

BILLION YEARS

UNIVERSE ORIGIN

~14 BILLION YEARS AGO

UNIVERSE ORIGIN

UNIVERSE ORIGIN

PRIMORDIAL NUCLEUS

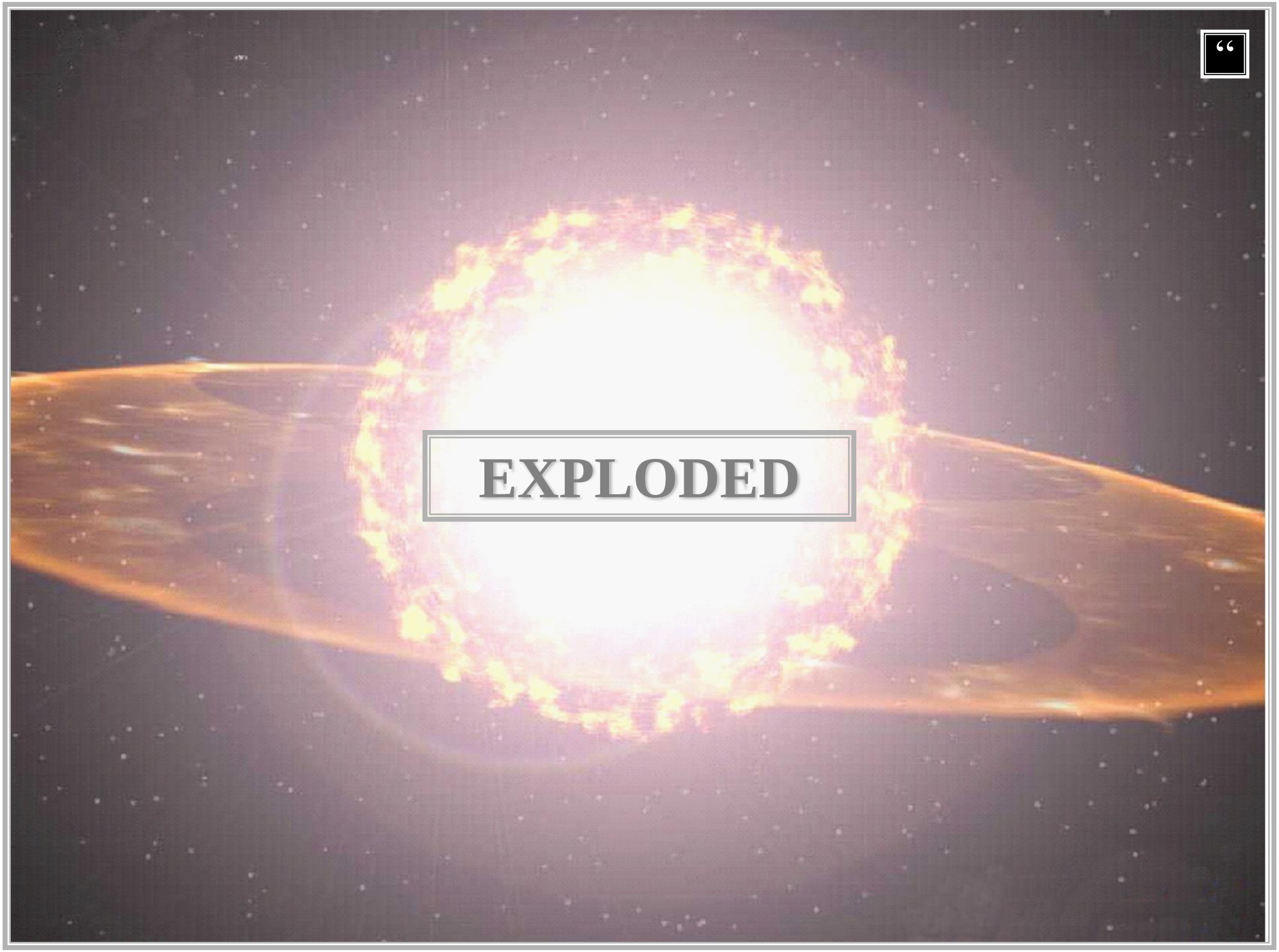
UNIVERSE ORIGIN

E

UNIVERSE ORIGIN

PRIMORDIAL NUCLEUS

UNSTABLE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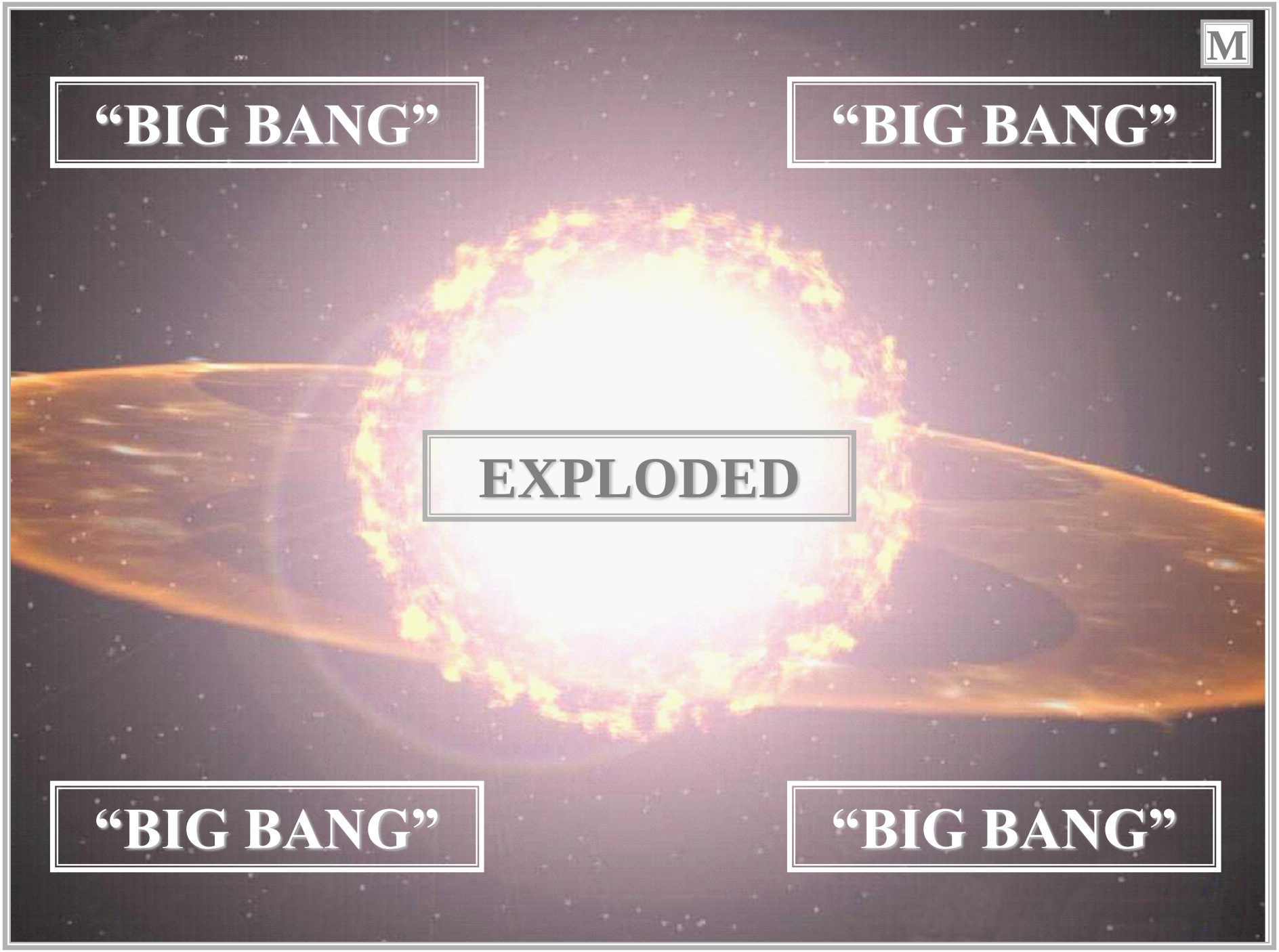
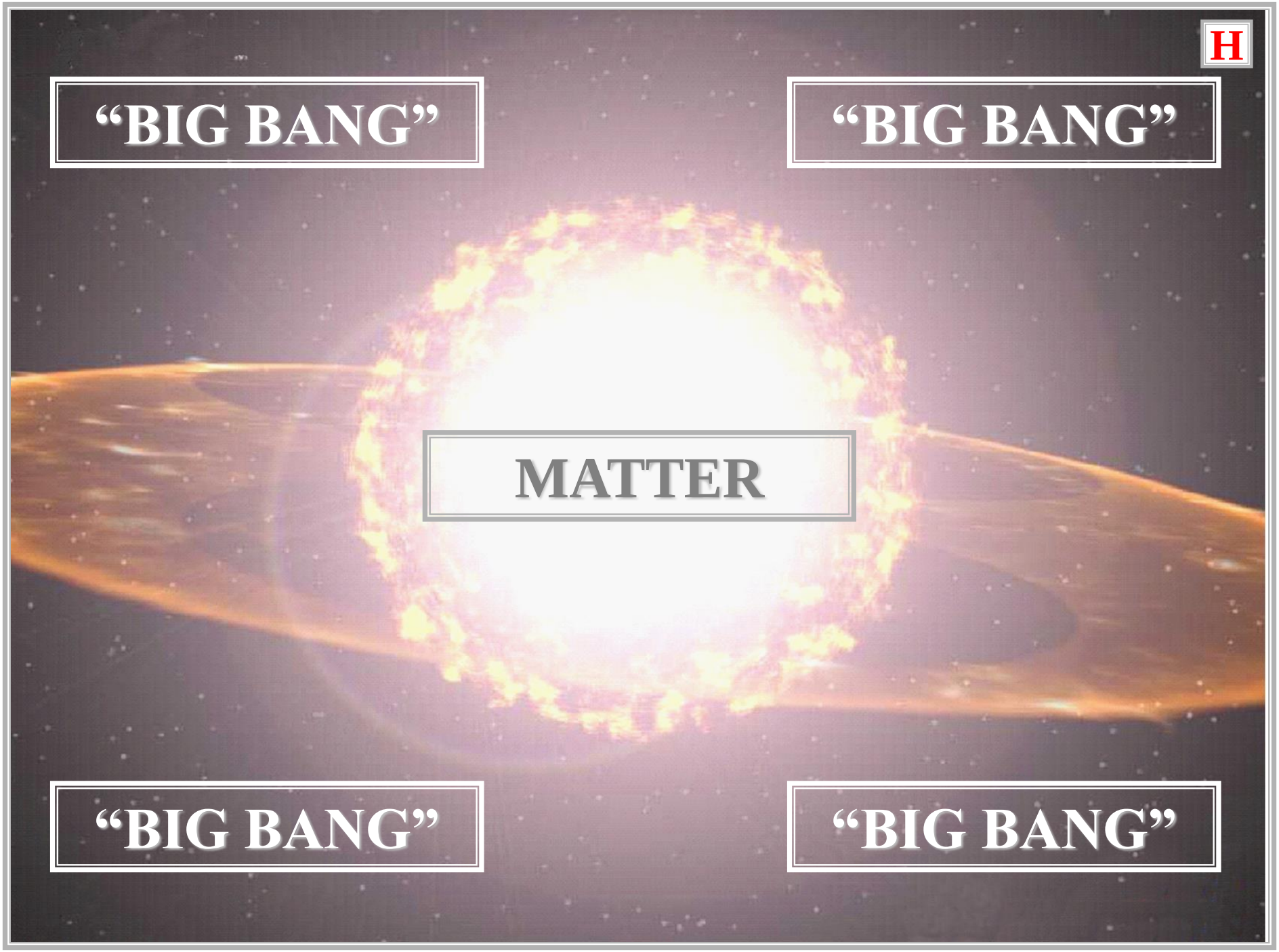
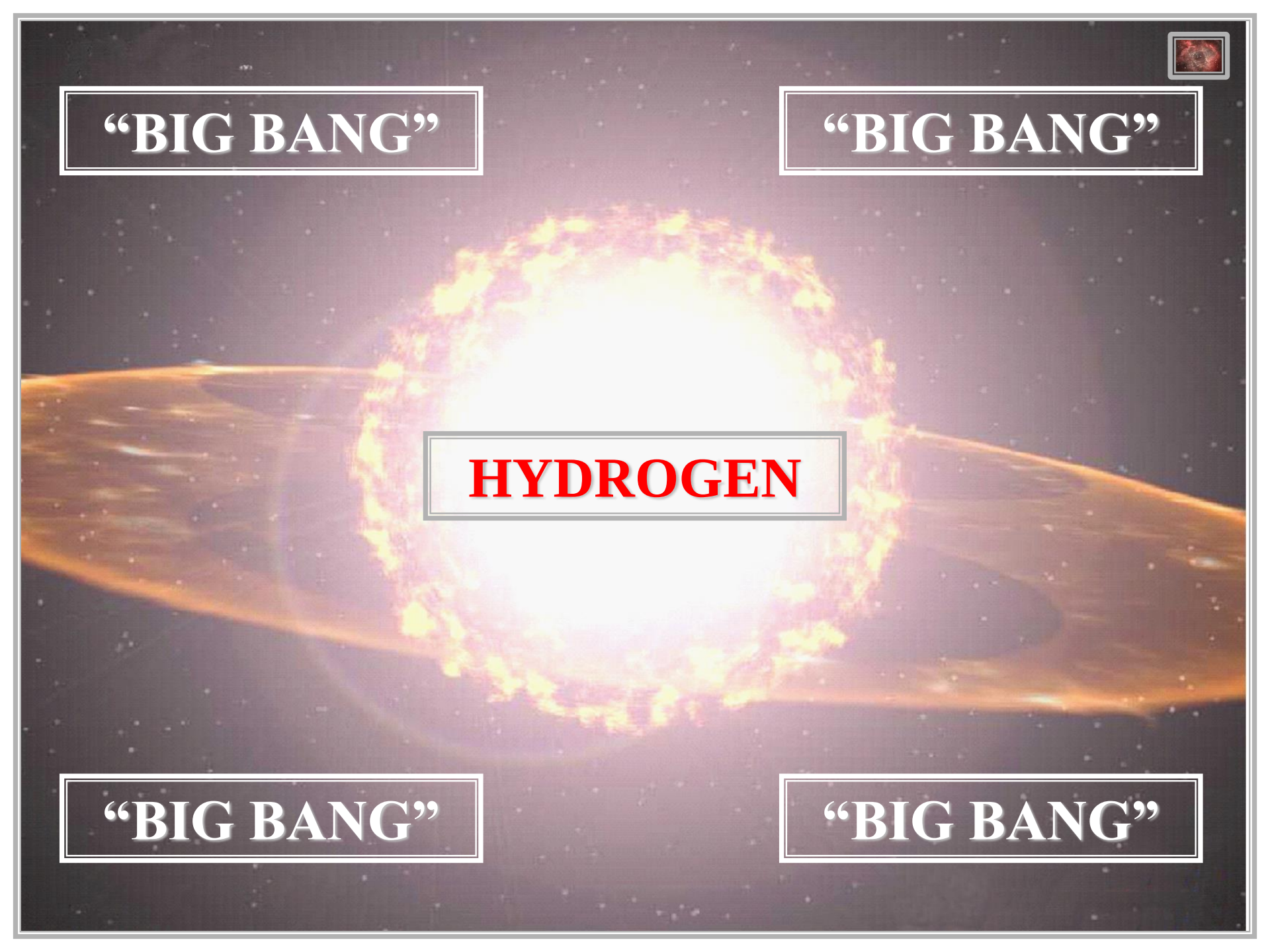
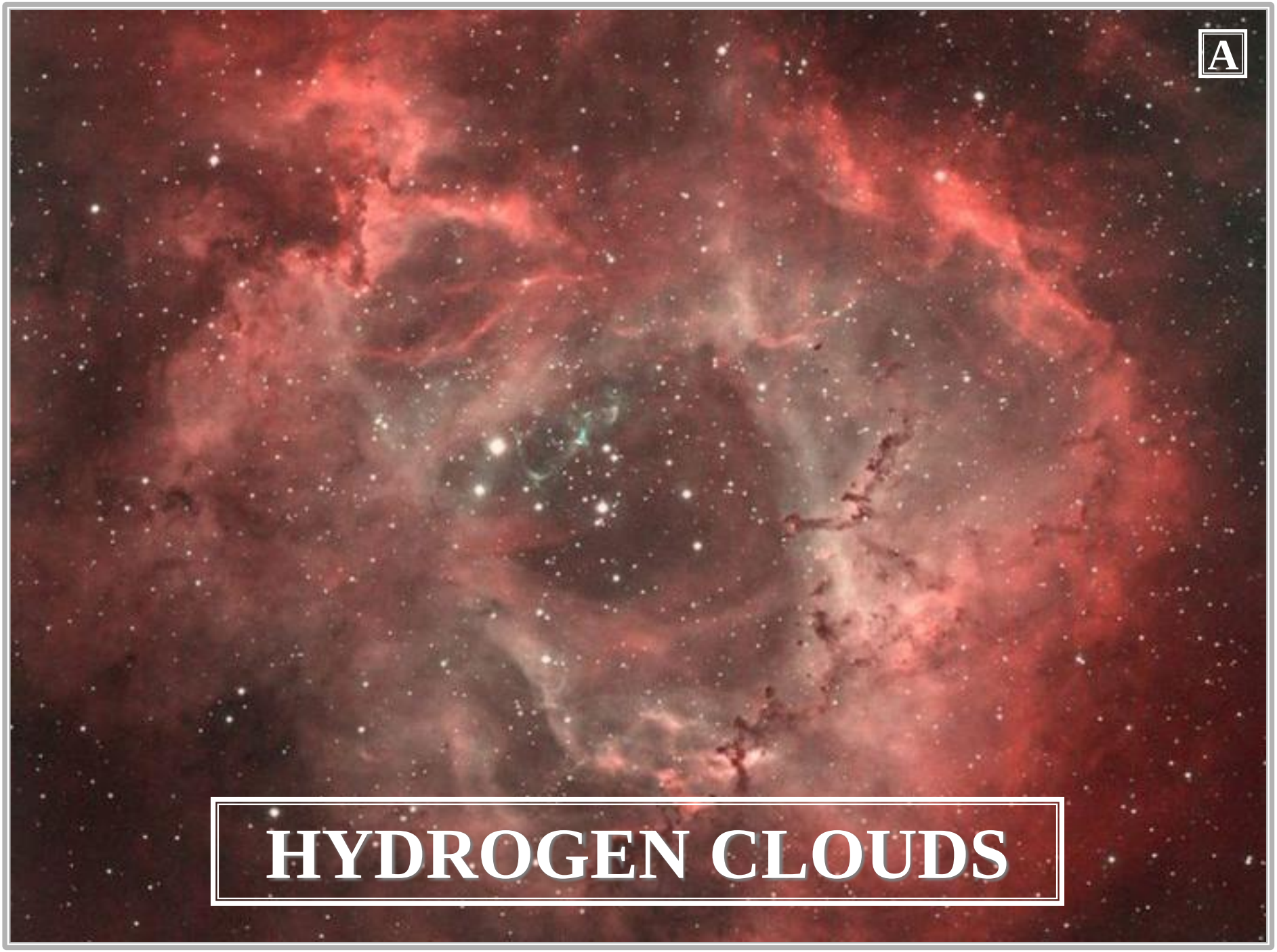
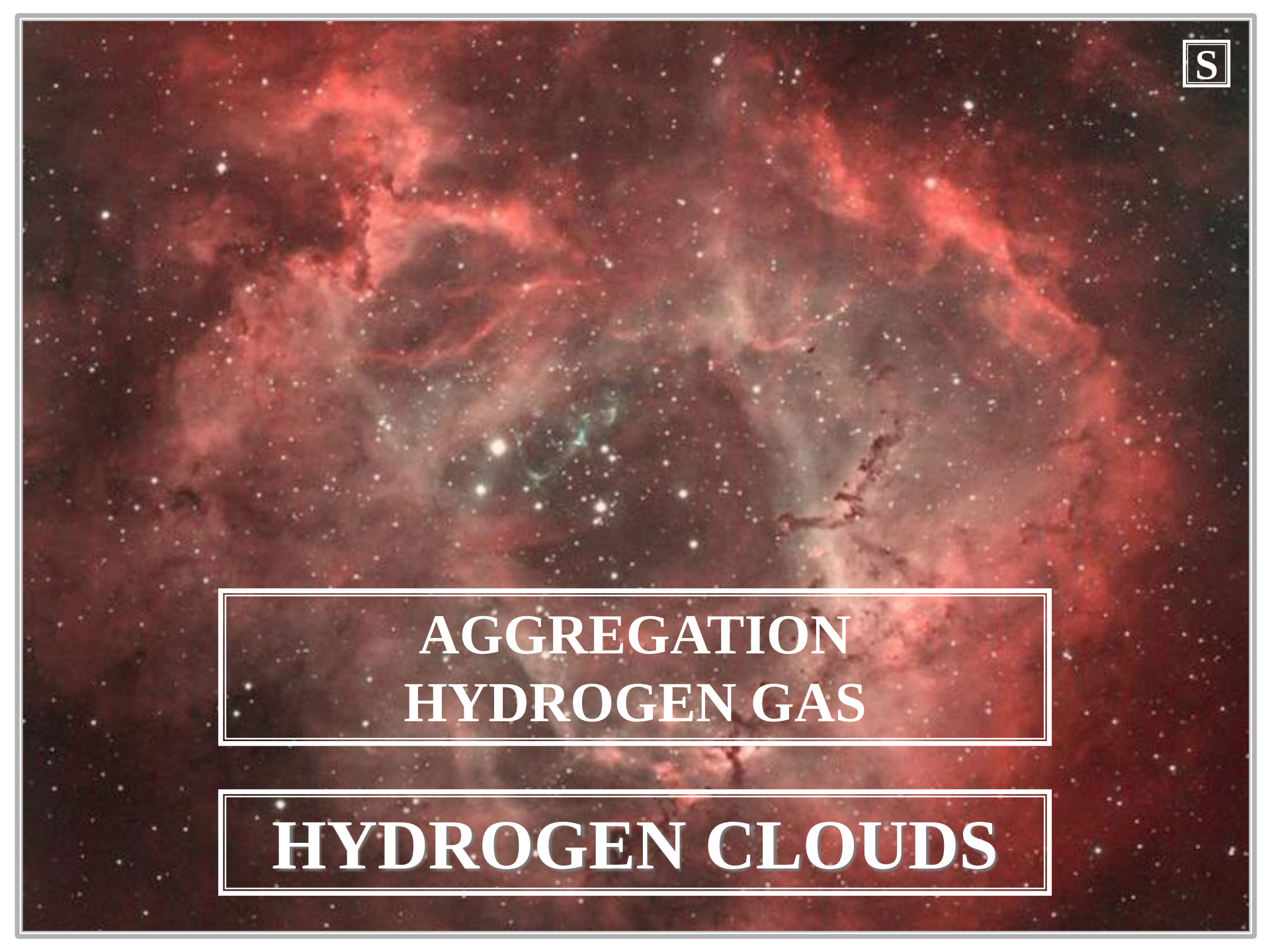
EXPLODED


M
“BIG BANG”
“BIG BANG”
EXPLODED
“BIG BANG”
“BIG BANG”

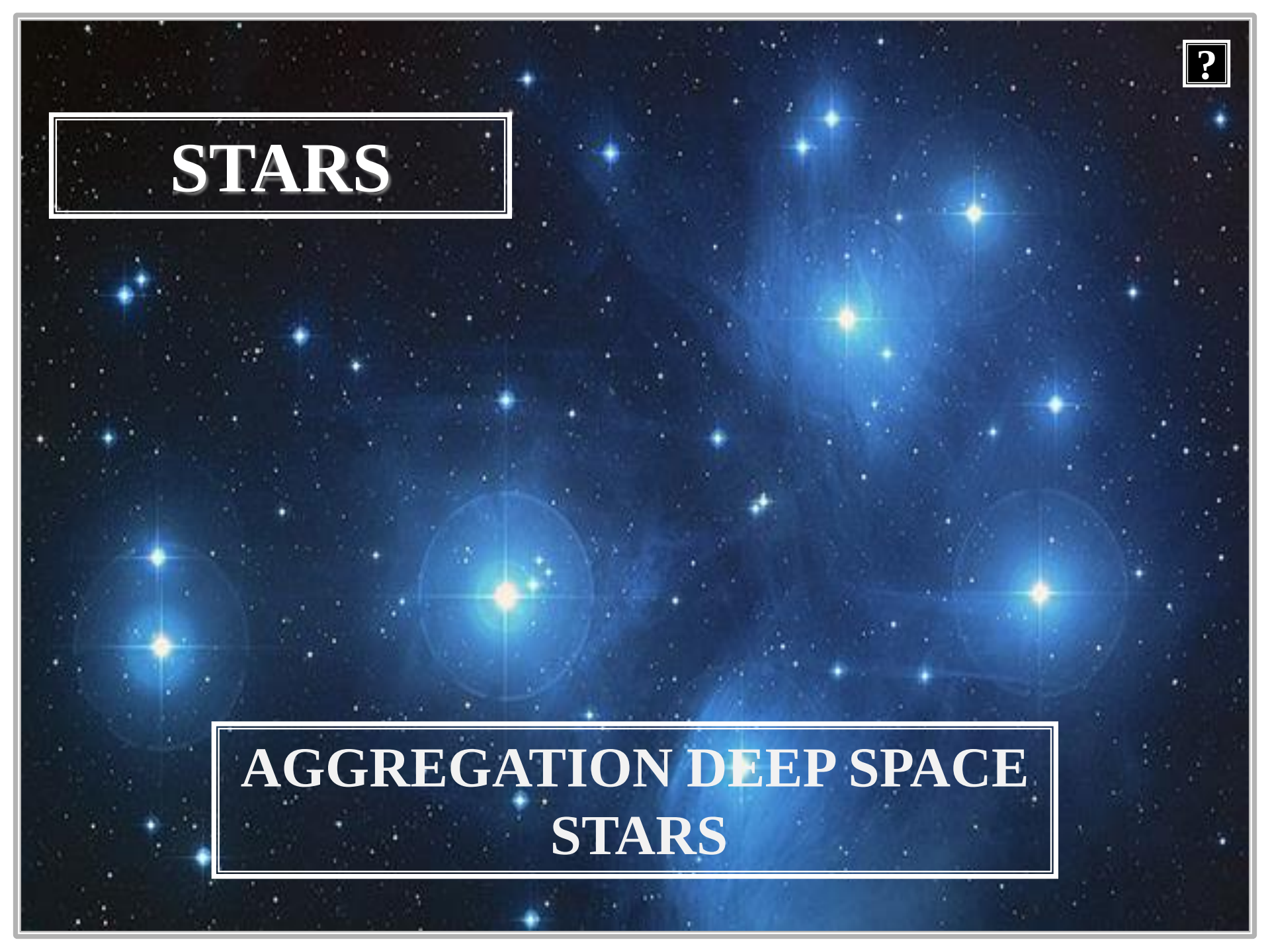

H
“BIG BANG”
“BIG BANG”
MATTER
“BIG BANG”
“BIG BANG”

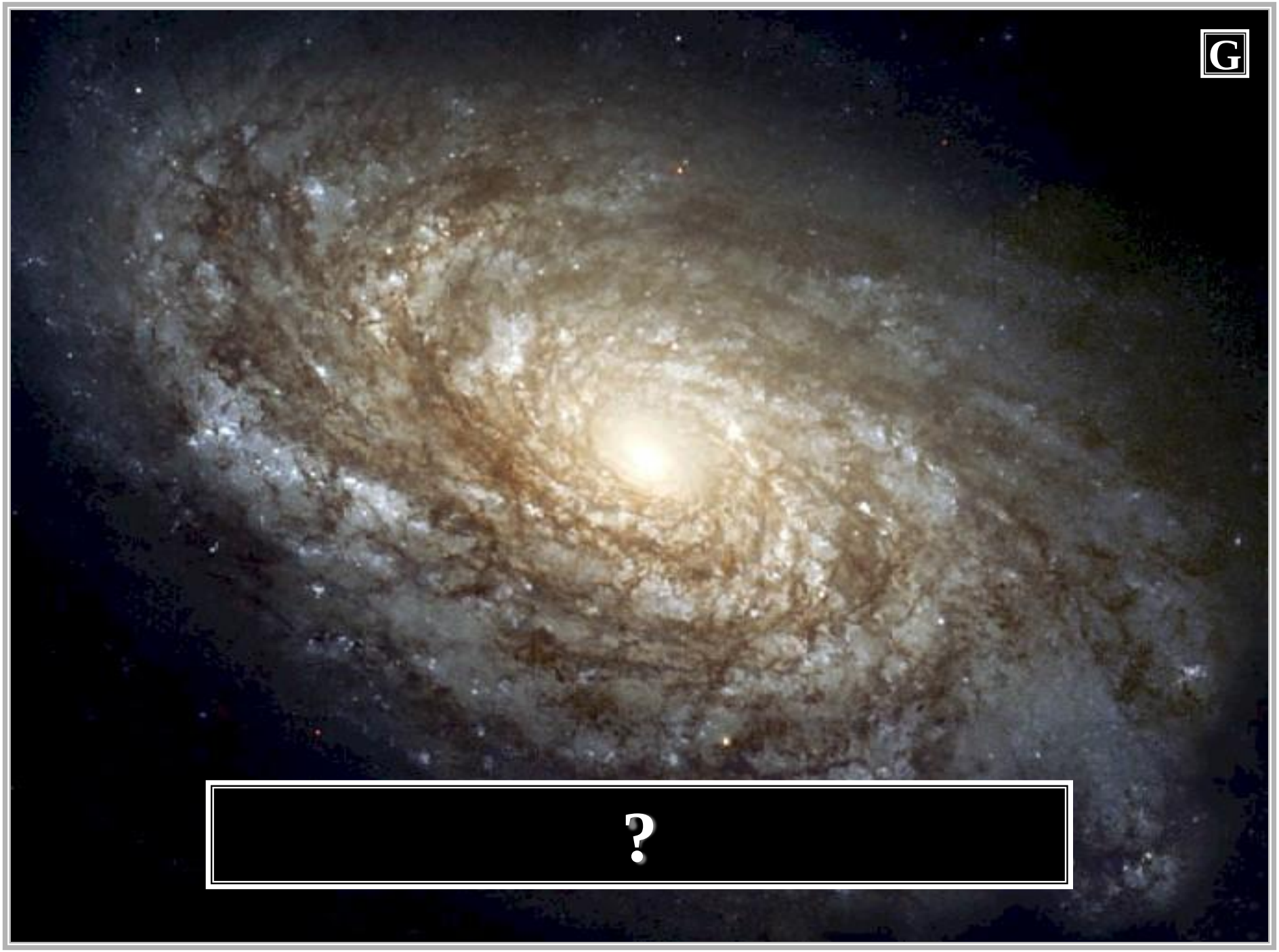

“BIG BANG”
“BIG BANG”
HYDROGEN
“BIG BANG”
“BIG BANG”


A
HYDROGEN CLOUDS

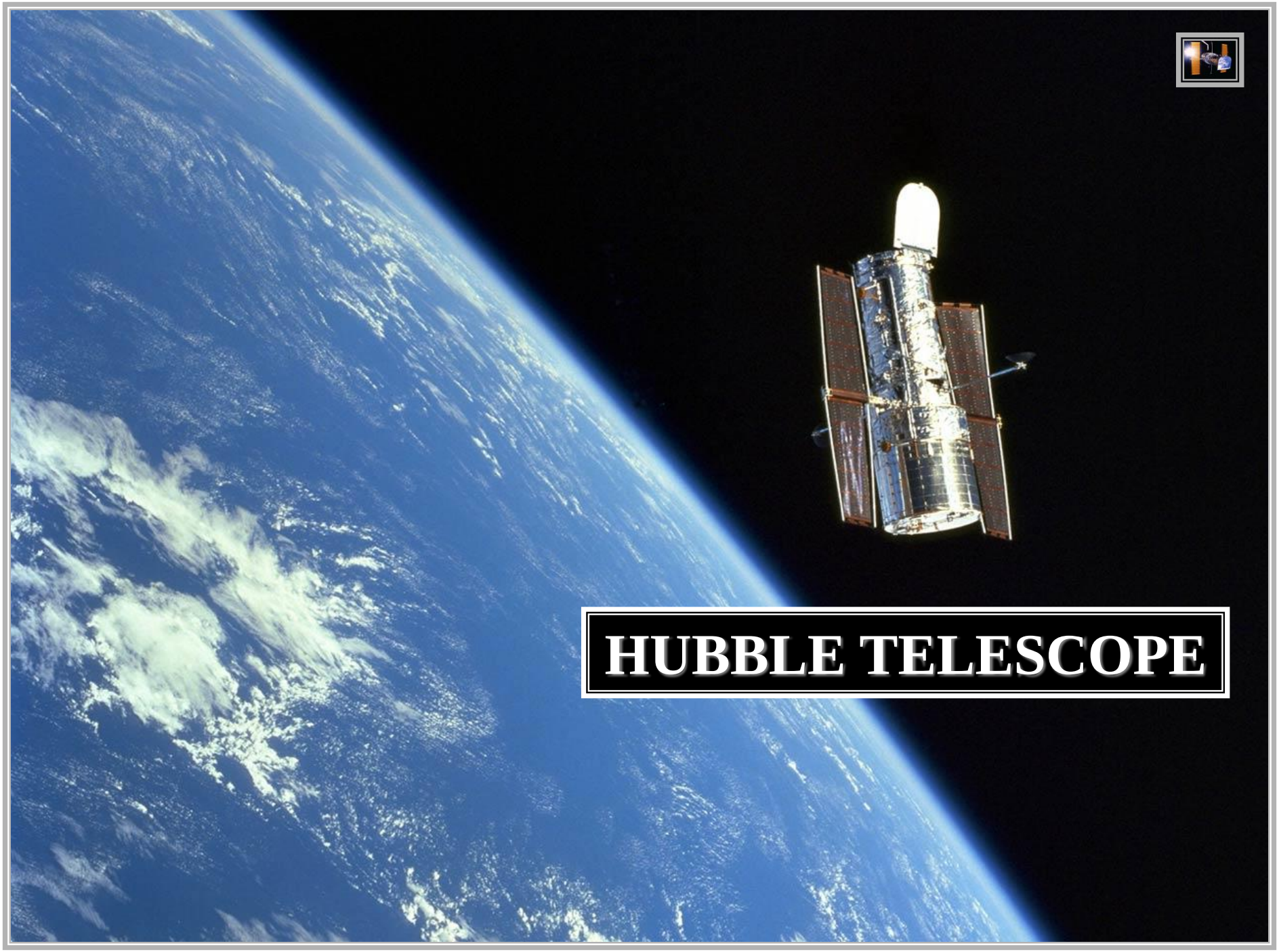

S
AGGREGATION
HYDROGEN GAS
HYDROGEN CLOUDS


A
STARS


?
STARS
AGGREGATION DEEP SPACE STARS


G
?

GALAXY


HUBBLE TELESCOPE


HUBBLE TELESCOPE

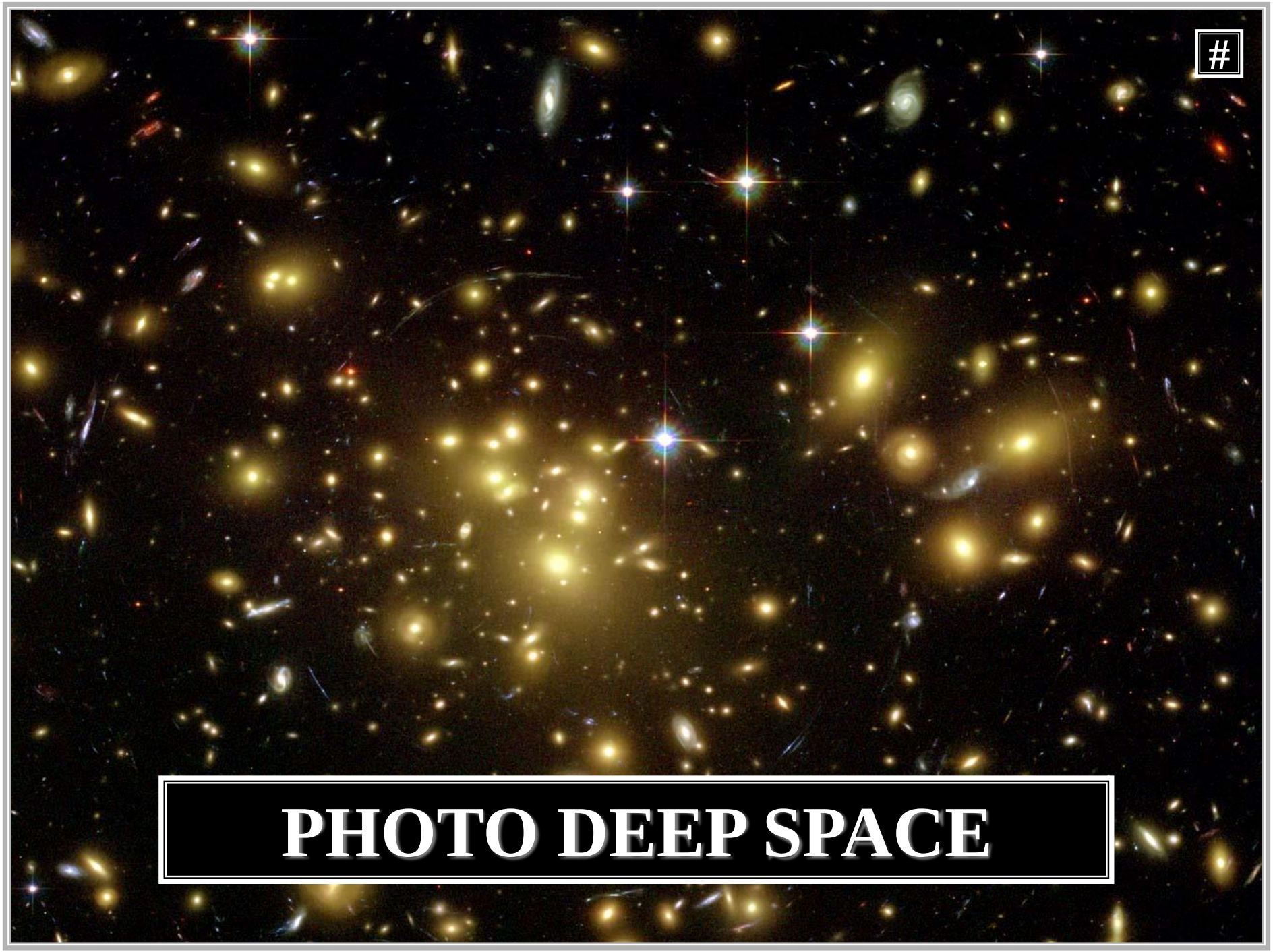

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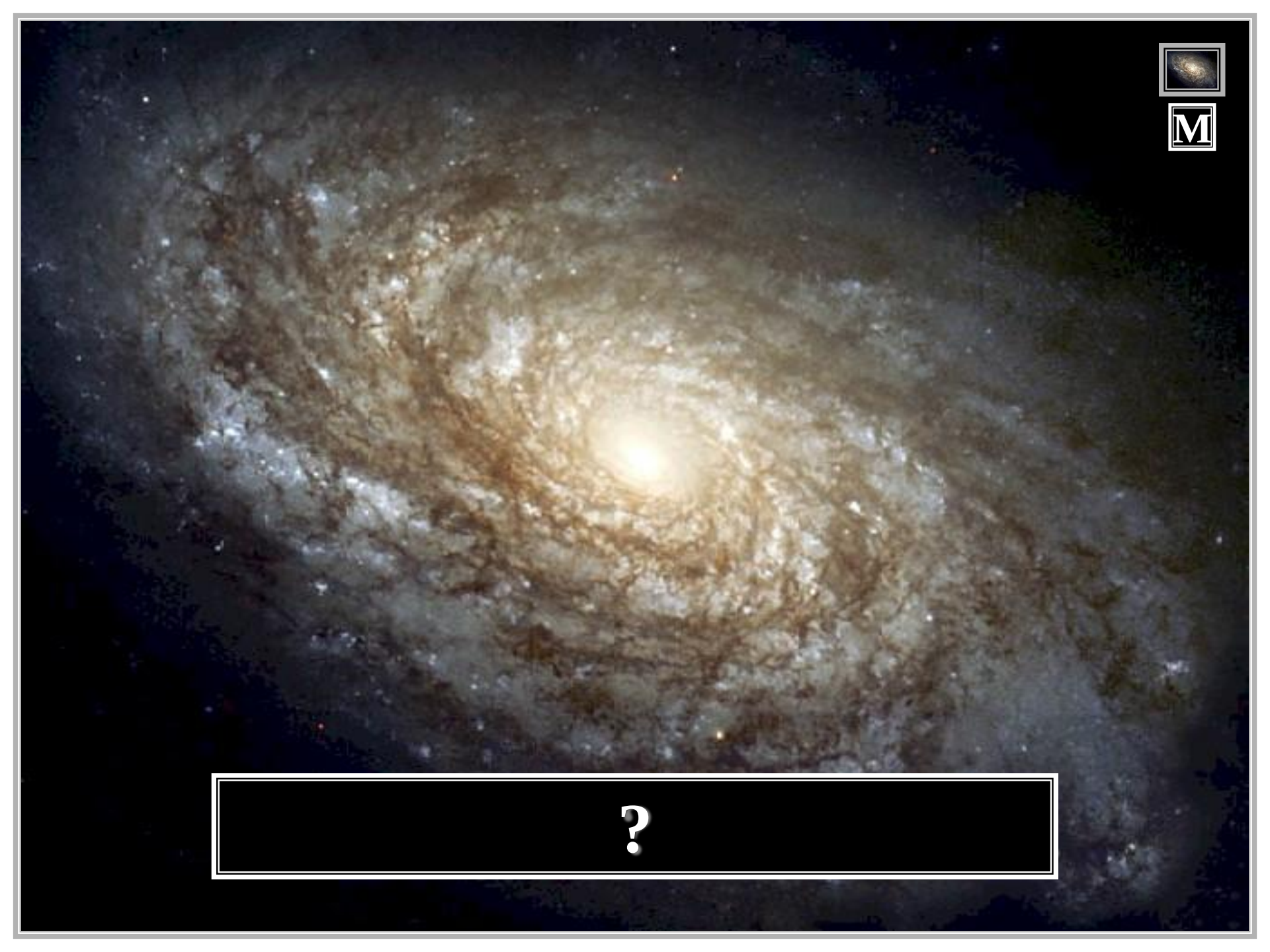
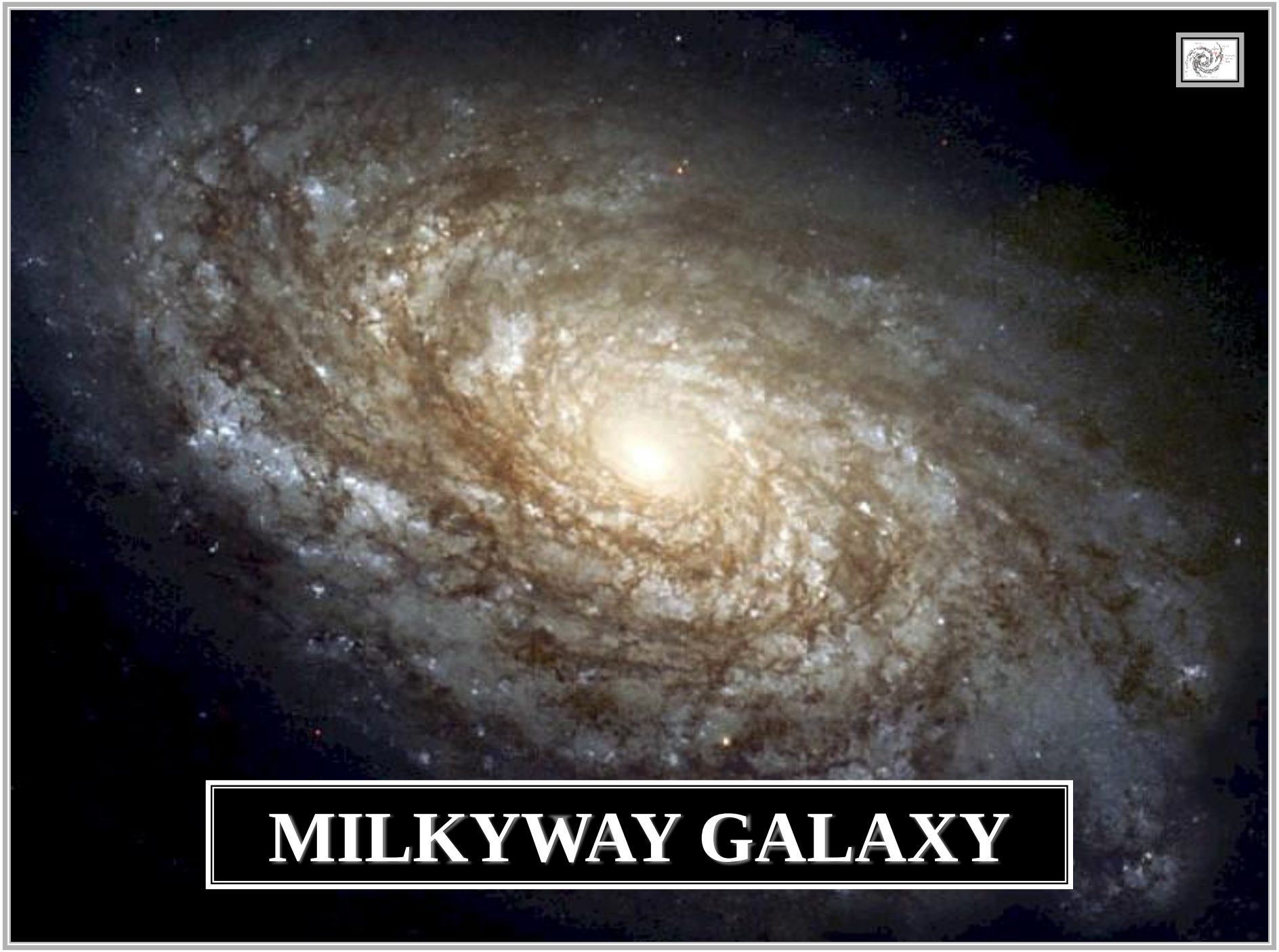
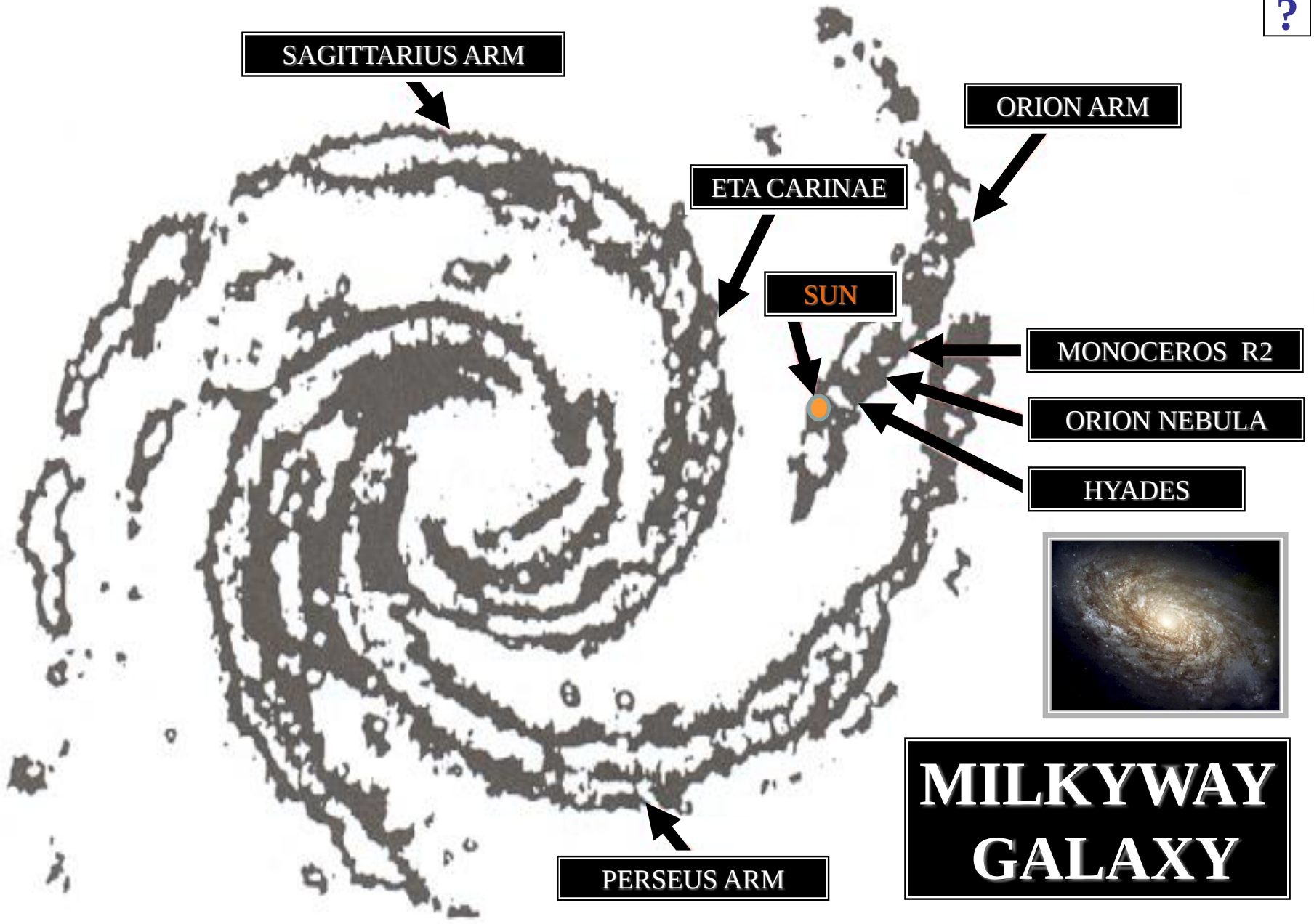
PHOTO DEEP SPACE


?
~100 BILLION GALAXIES


M
?


MILKYWAY GALAXY

?



MILKYWAY GALAXY

QUESTION

HOW OLD IS OUR STAR?

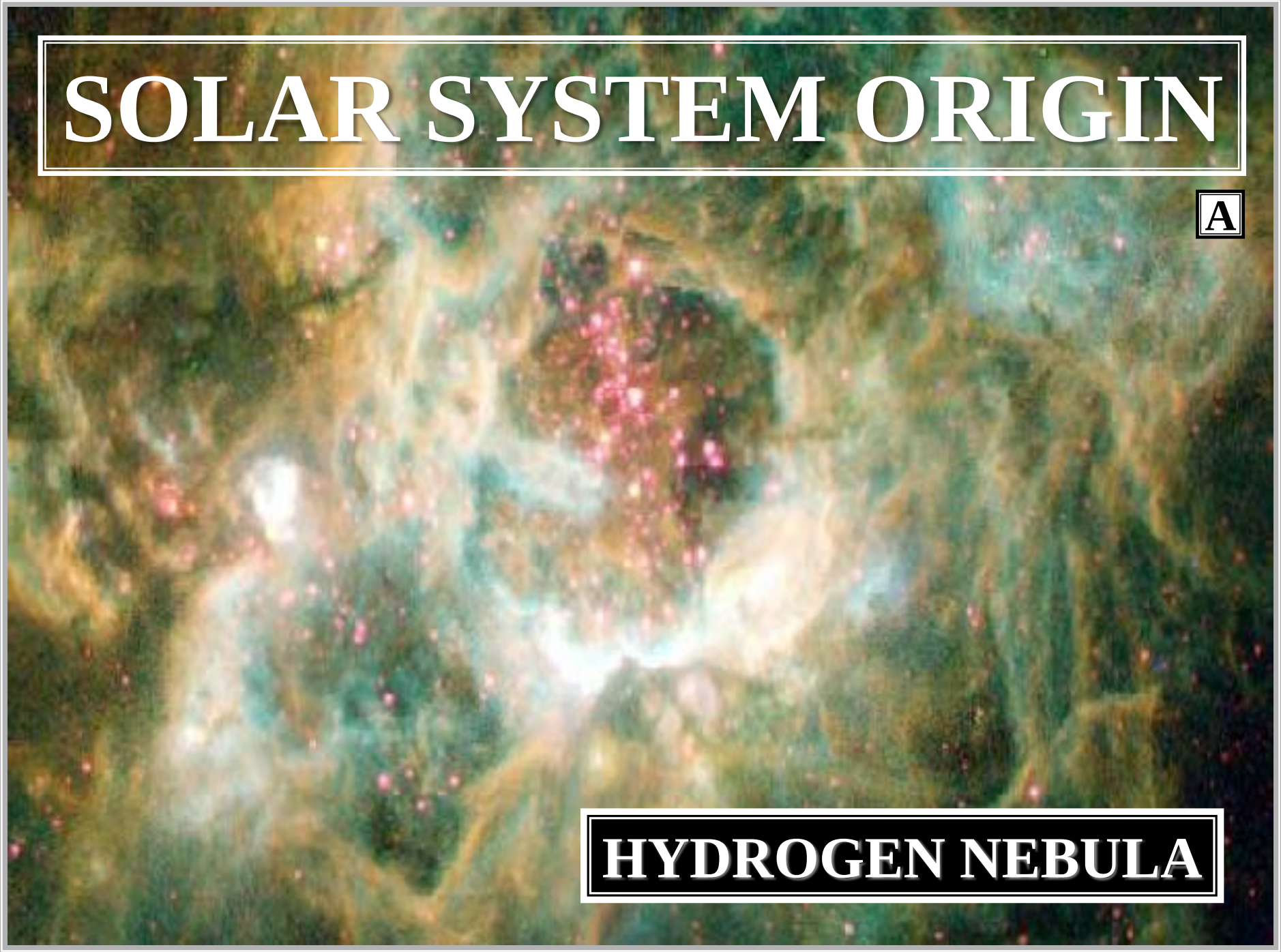
QUESTION

~5

BILLION YEARS

SOLAR SYSTEM ORIGIN

A



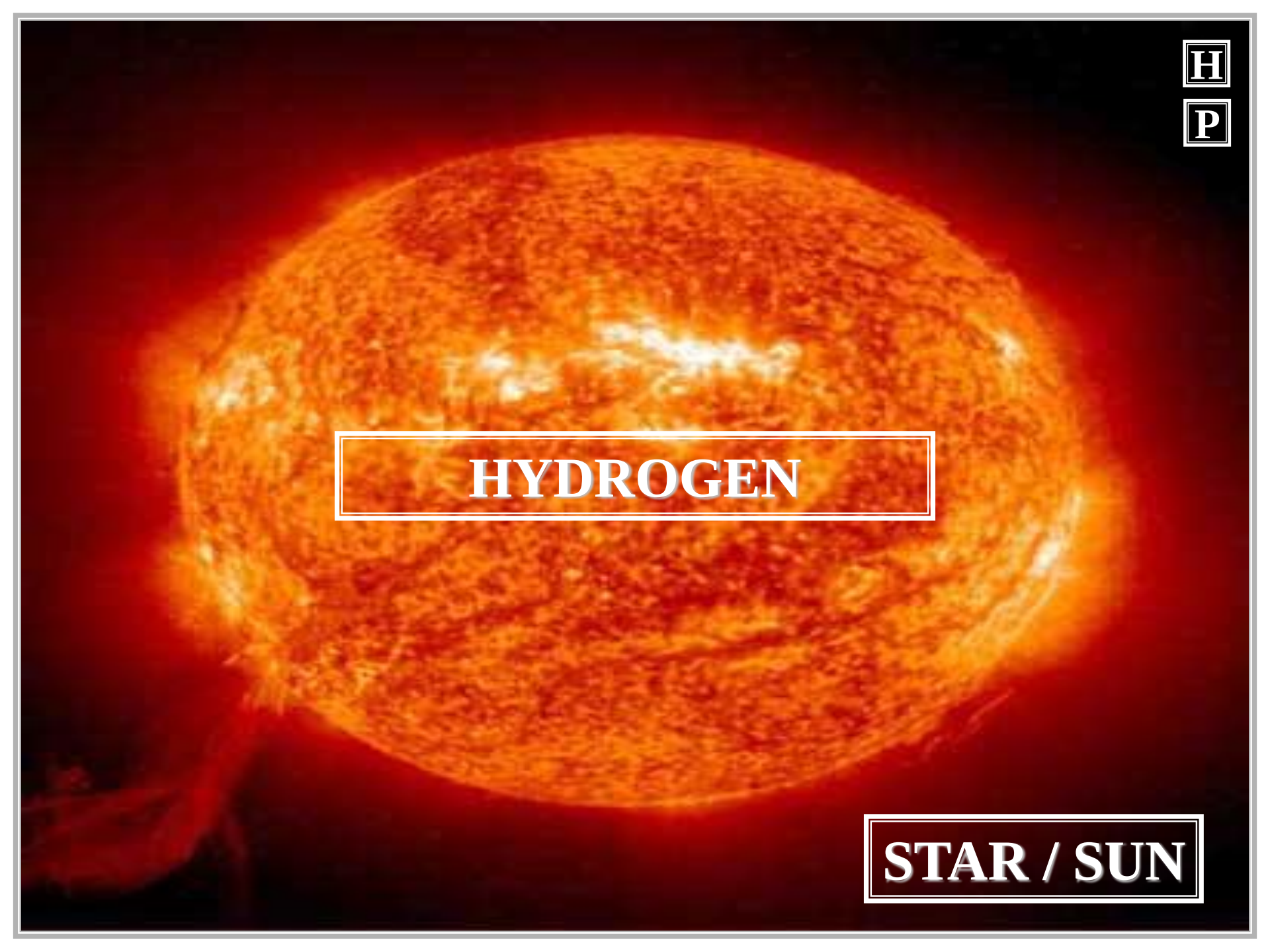
HYDROGEN NEBULA

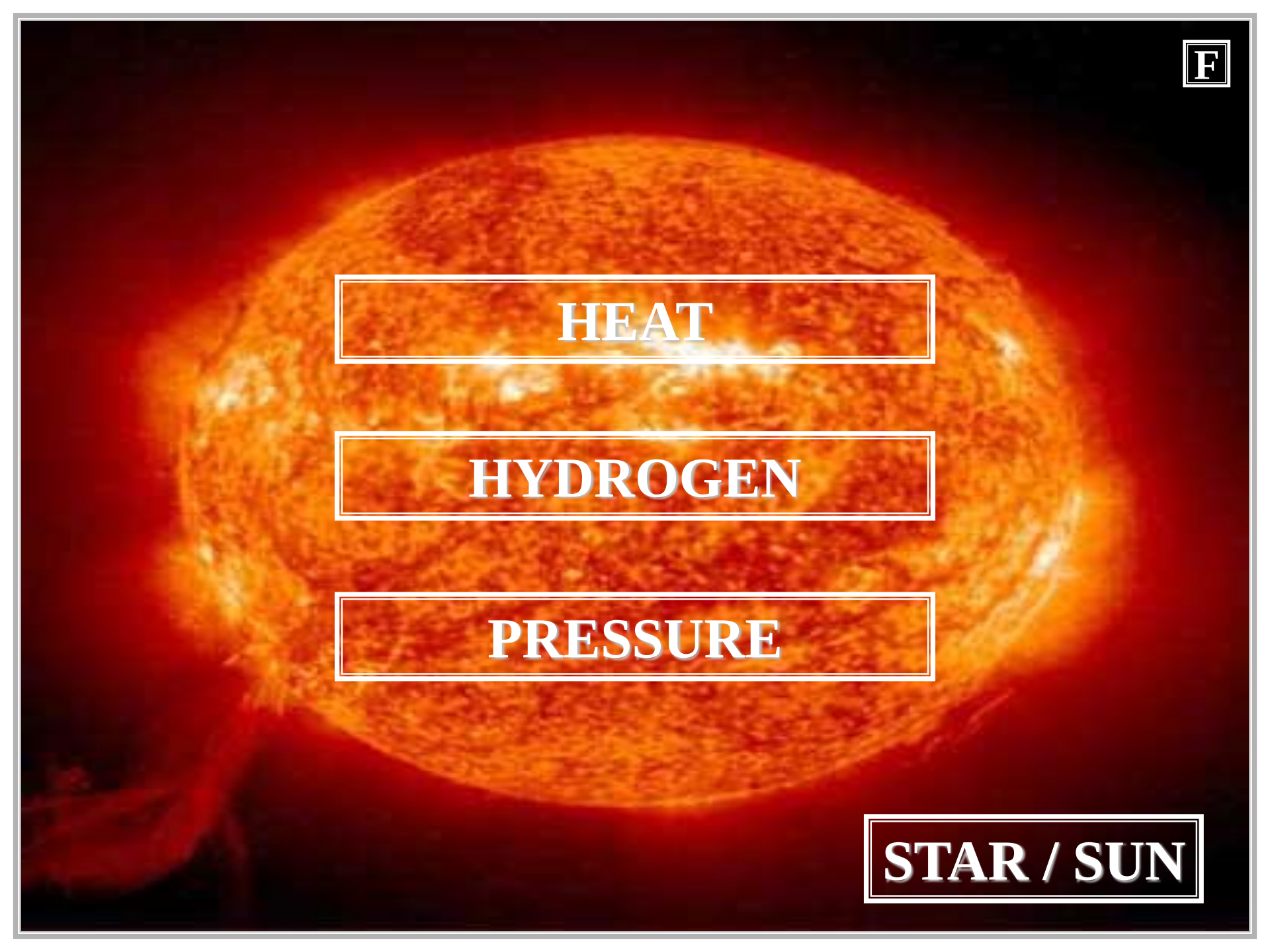
SOLAR SYSTEM ORIGIN

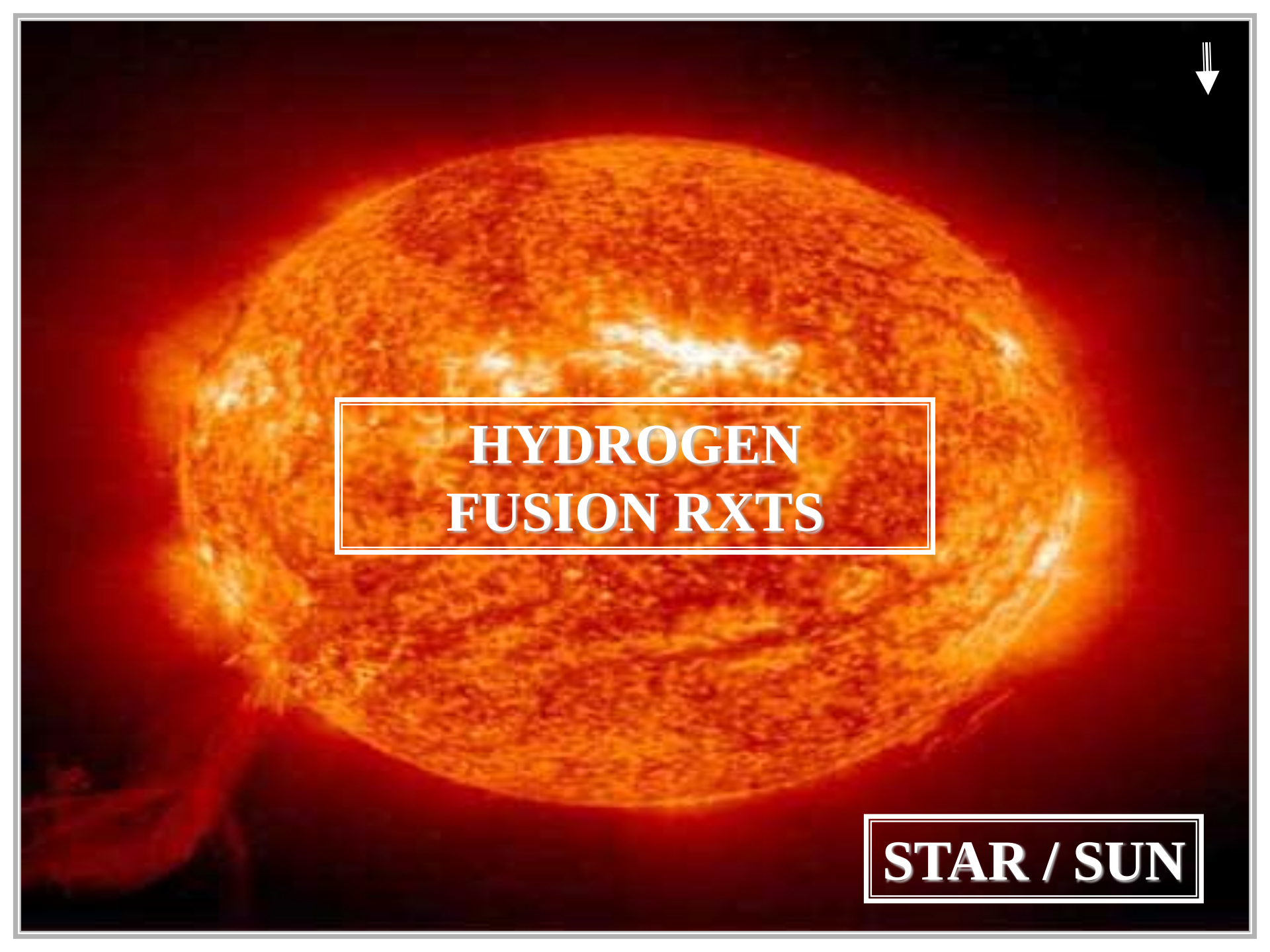
AGGREGATION
HYDROGEN GAS

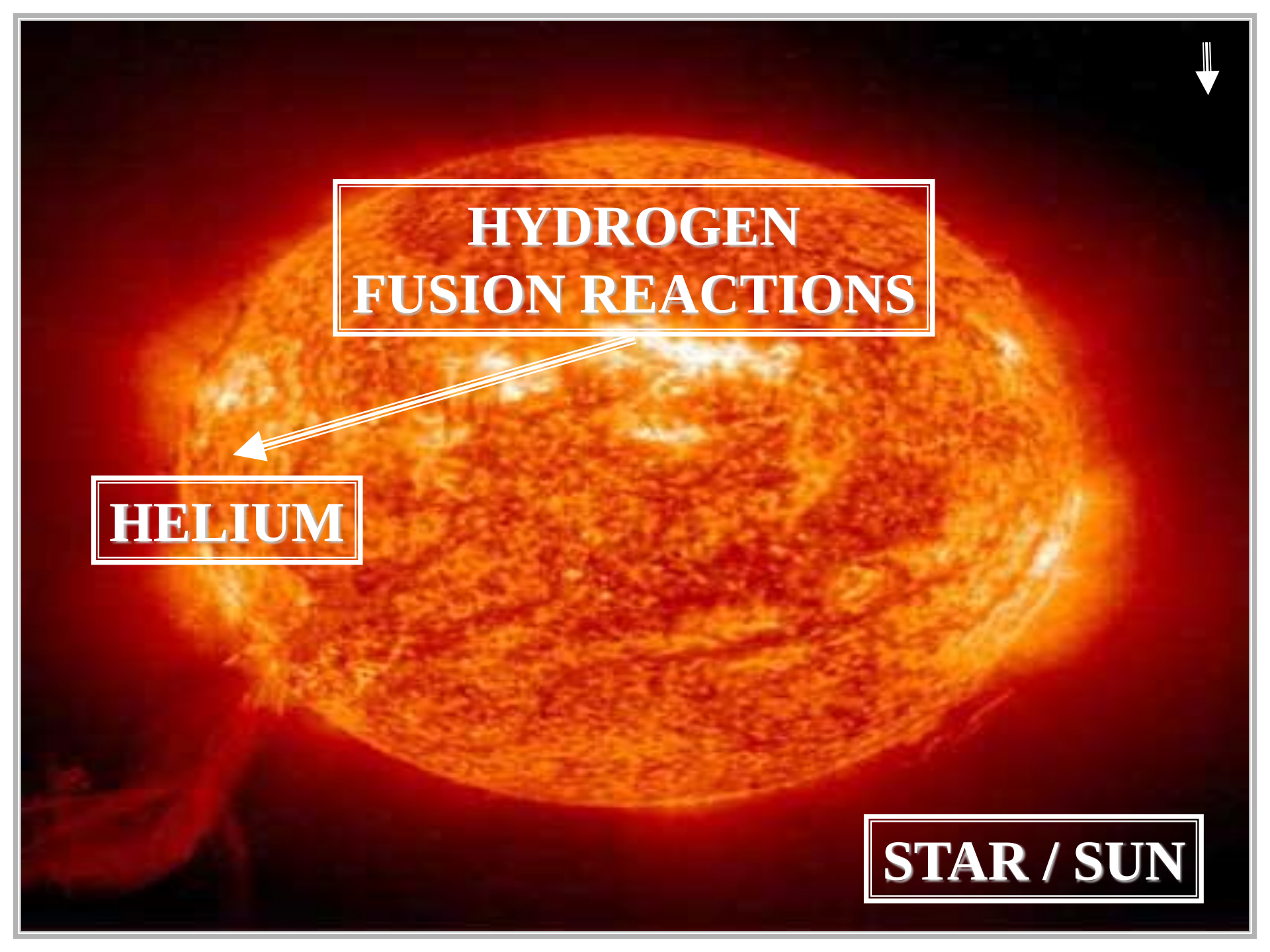
HYDROGEN NEBULA

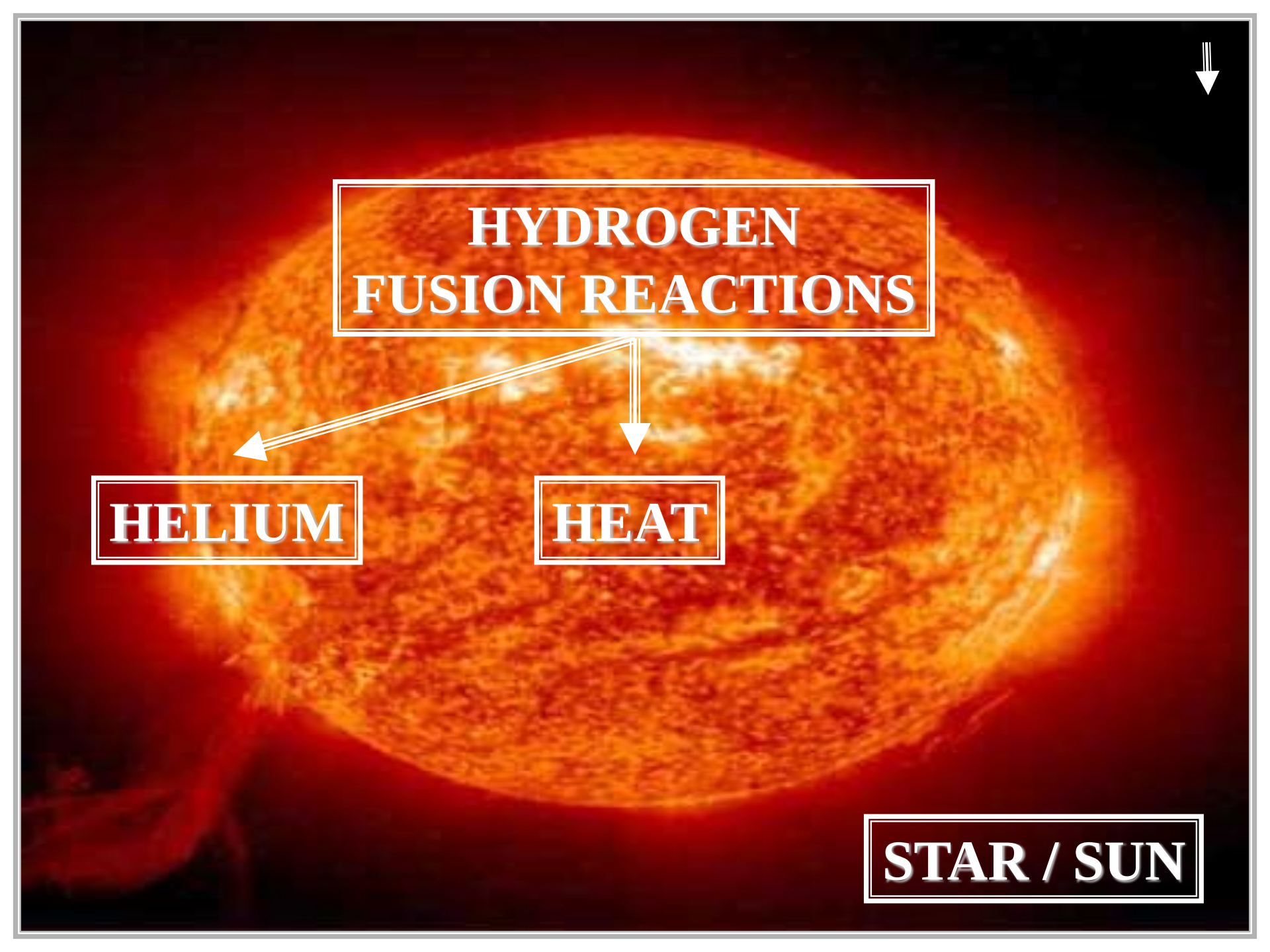

SUN / STAR ORIGIN

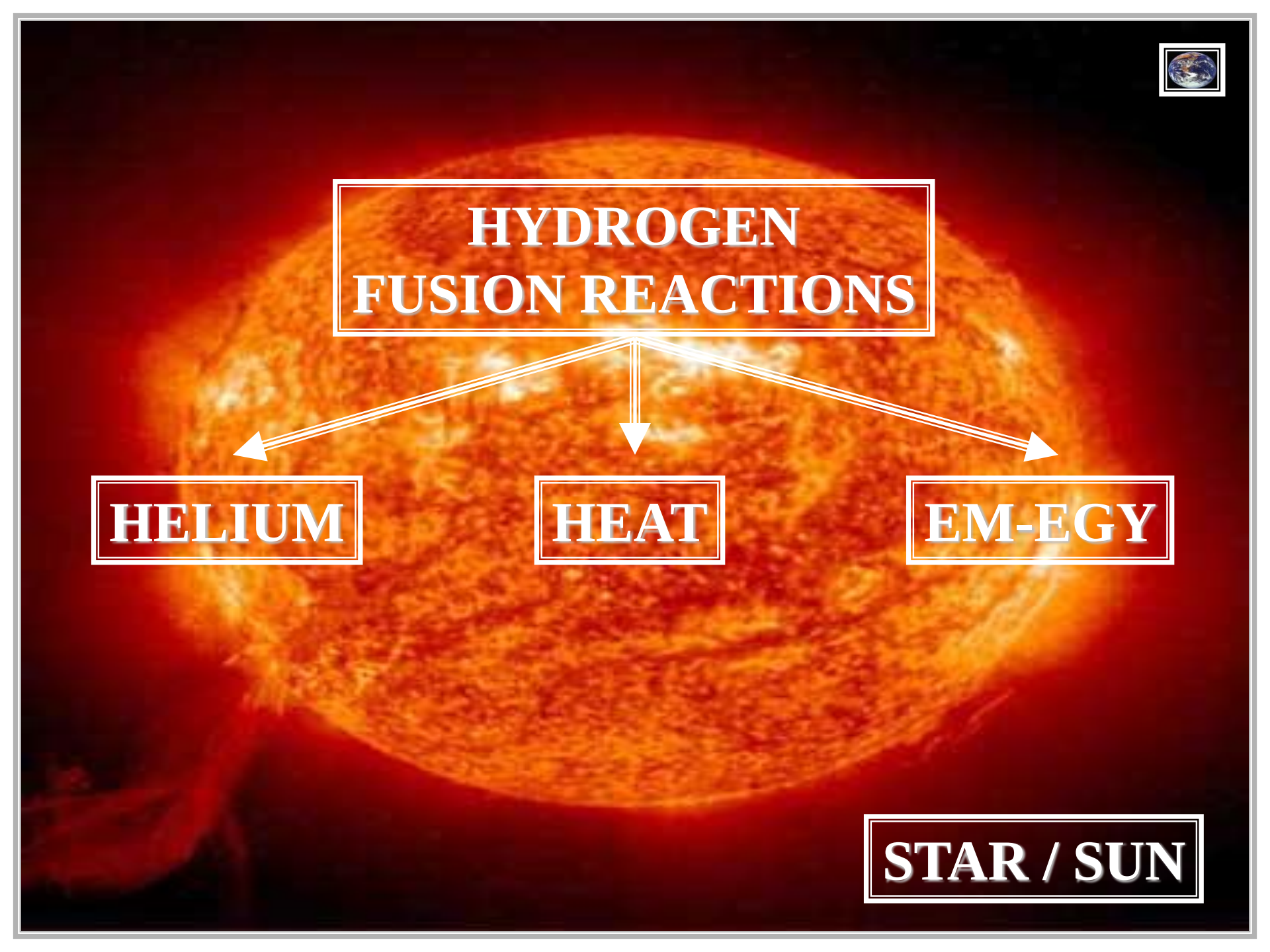

H
P
HYDROGEN
STAR / SUN


F
HEAT
HYDROGEN
PRESSURE
STAR / SUN


HYDROGEN
FUSION RXTS
STAR / SUN


HYDROGEN
FUSION REACTIONS
HELIUM
STAR / SUN


HYDROGEN
FUSION REACTIONS
HELIUM
HEAT
STAR / SUN


HYDROGEN
FUSION REACTIONS
HELIUM
HEAT
EM-EGY
STAR / SUN

D

HYDROGEN FUSION REACTIONS

HELIUM

HEAT

EM-EGY

STAR / SUN

HYDROGEN FUSION REACTIONS

HELIUM

HEAT

EM-EGY

DISSIPATES INTO SPACE

STAR / SUN

HYDROGEN FUSION REACTIONS

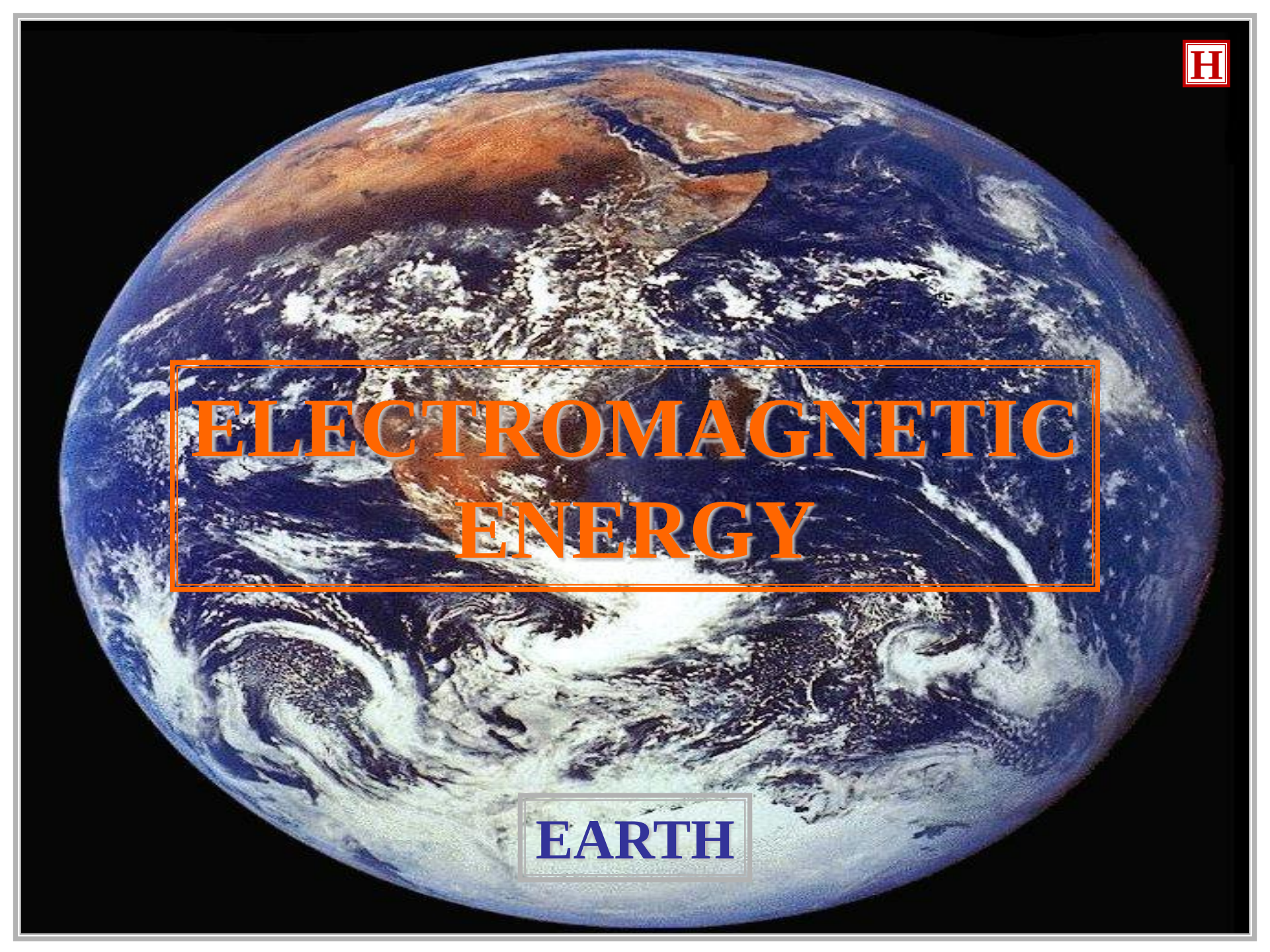
HELIUM

HEAT

EM-EGY

DISSIPATES INTO SPACE

STAR / SUN


ELECTROMAGNETIC ENERGY
EARTH


HEAT ENERGY
EARTH

S

HYDROGEN FUSION REACTIONS

HELIUM

HEAT

EM-EGY

DISSIPATES INTO SPACE

STAR / SUN

SUMMARY

SUN

HF

ELECTROMAGNETIC ENERGY

HYDROGEN FUSION REACTIONS

SUN

HYDROGEN FUSION REACTIONS

E

ELECTROMAGNETIC ENERGY

HYDROGEN FUSION REACTIONS

SUN

HYDROGEN FUSION REACTIONS

*

ELECTROMAGNETIC SPECTRUM

HIGH ENERGY

LOW ENERGY

Gamma rays | X rays | Ultraviolet | Visible | Near infrared | Infrared | Radio waves

SHORT WAVELENGTH

LONG WAVELENGTH

ELECTROMAGNETIC ENERGY

HYDROGEN FUSION REACTIONS

SUN

HYDROGEN FUSION REACTIONS

P

ELECTROMAGNETIC SPECTRUM

HIGH ENERGY

LOW ENERGY

Gamma rays | X rays | Ultraviolet | Visible | Near infrared | Infrared | Radio waves

*

SHORT WAVELENGTH

LONG WAVELENGTH

ELECTROMAGNETIC ENERGY

HYDROGEN FUSION REACTIONS

SUN

HYDROGEN FUSION REACTIONS

ELECTROMAGNETIC SPECTRUM

HIGH ENERGY

LOW ENERGY

SHORT WAVELENGTH

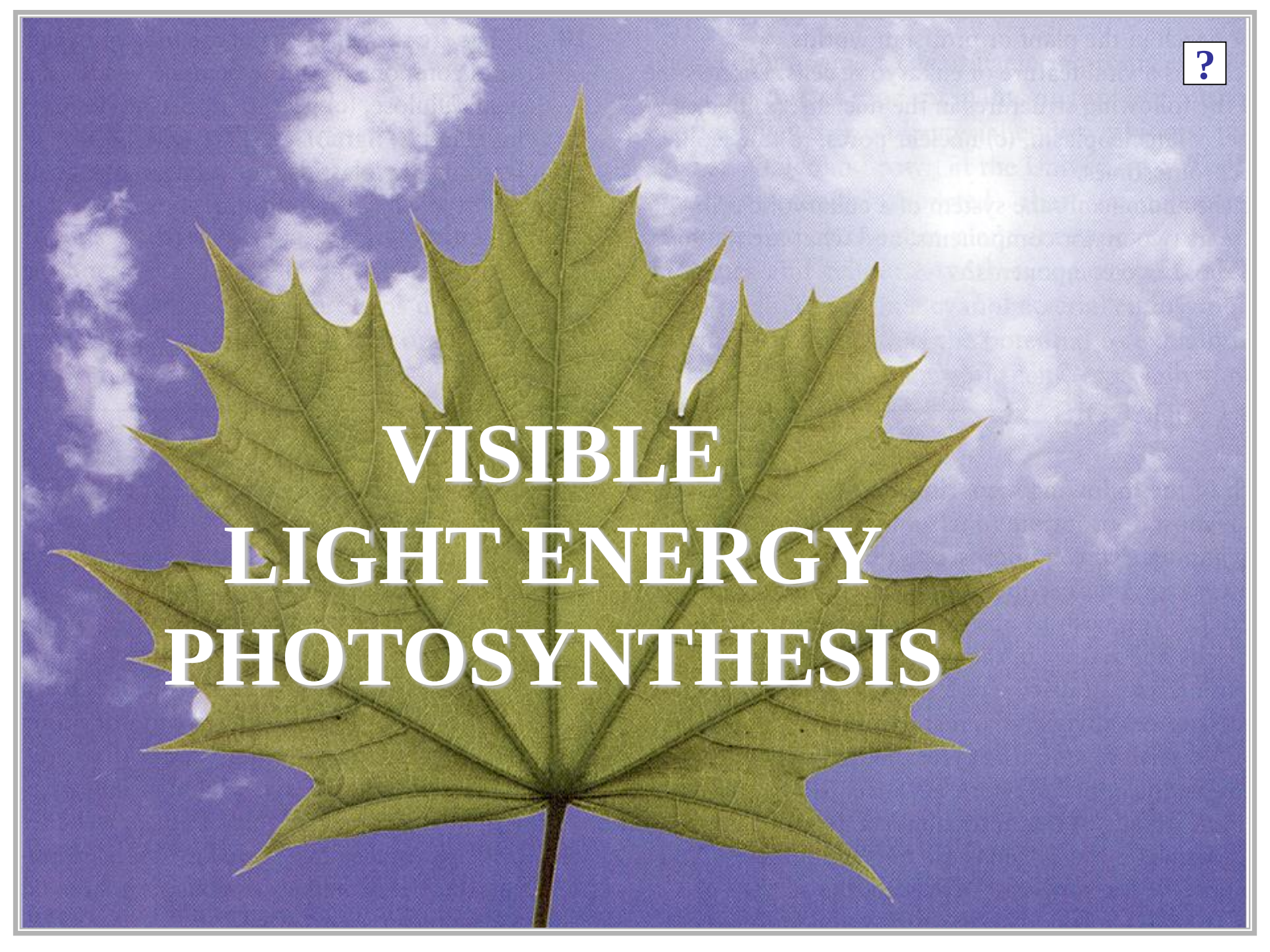
LONG WAVELENGTH

PHOTOSYNTHESIS

PHOTOSYNTHESIS

PHOTOSYNTHESIS

PHOTOSYNTHESIS


?
VISIBLE
LIGHT ENERGY
PHOTOSYNTHESIS

QUESTION

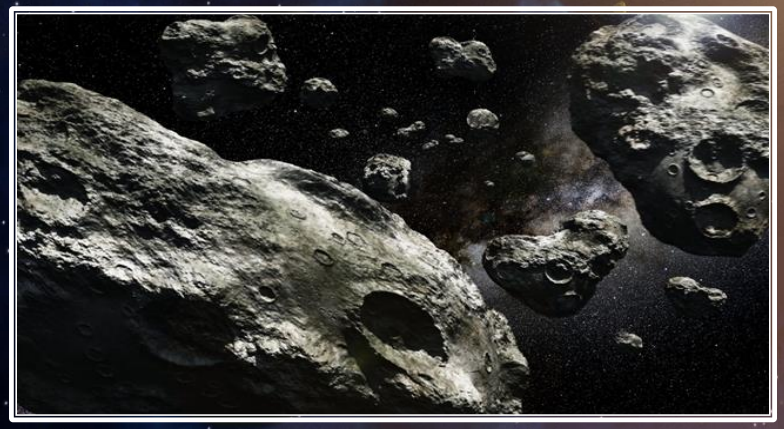
HOW OLD IS THE EARTH?

QUESTION

~4.5
BILLION YEARS

EARTH ORIGIN

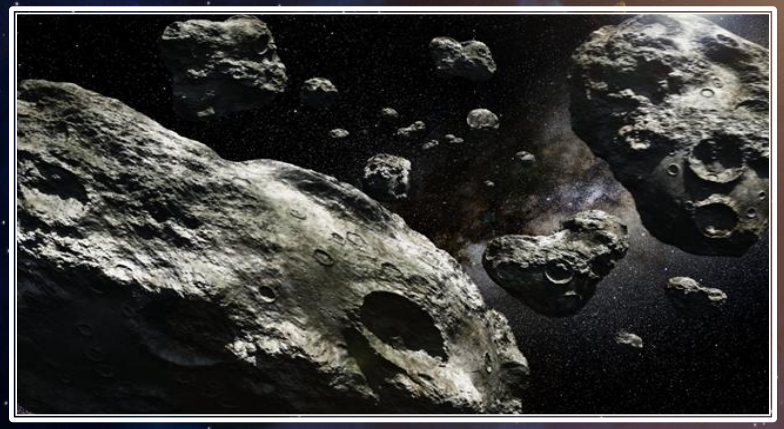
A



ICE & DUST

EARTH ORIGIN

AGGREGATION
ICE & DUST



ICE & DUST

EARTH ORIGIN

A

ATMOSPHERE

PRIMORDIAL EARTH