

lecture 3

# **HYDROSPHERE. BIOSPHERE.**

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# PLAN:

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1. Hydrosphere and its structure.
2. The World Ocean and its parts.
3. Land's waters.
4. Structure and texture of biosphere.

# 1. HYDROSPHERE

✓ the liquid water component of the Earth.

✓ covers 70% of the surface of the Earth and is the home for many plants and animals.

✓ Total capacity of

hydrosphere is about

1.34 billion km<sup>3</sup>





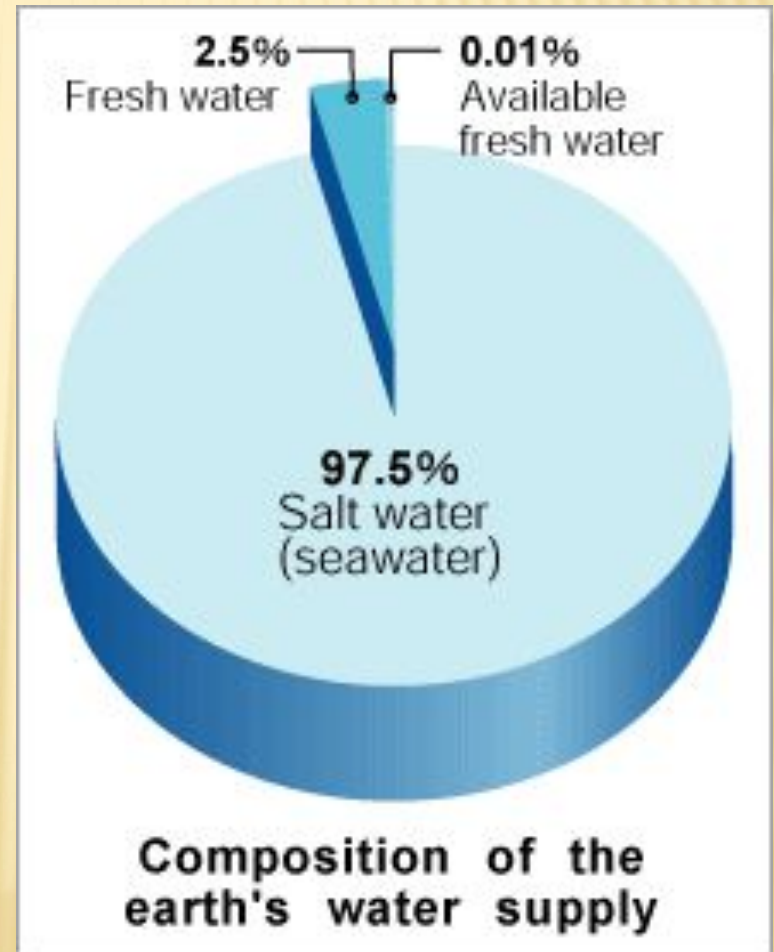
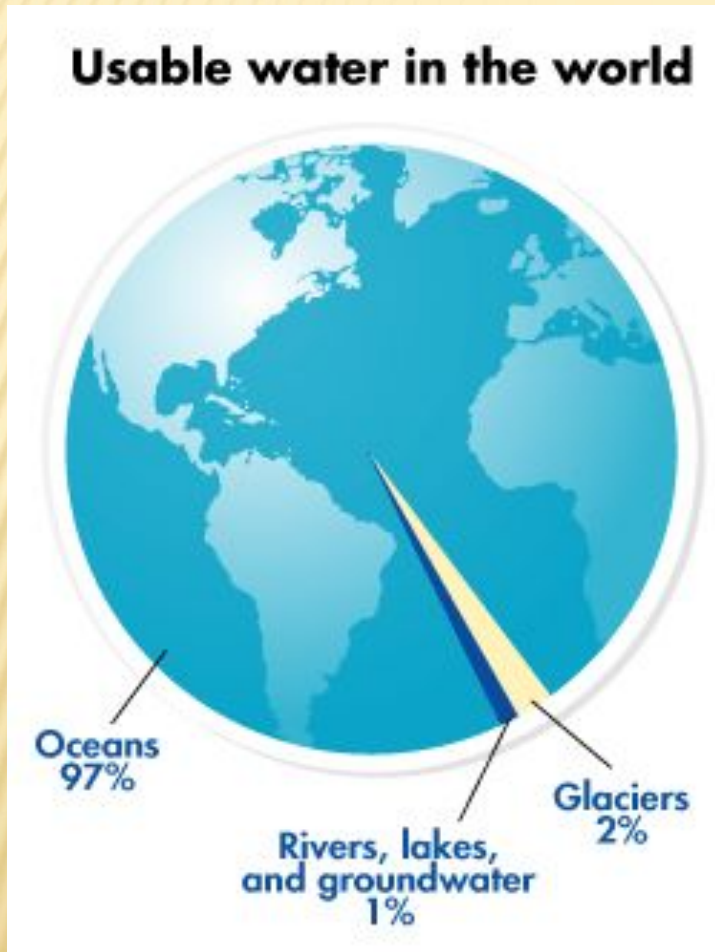
# IT INCLUDES

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- the oceans,
- seas,
- lakes,
- ponds,
- rivers and
- streams.

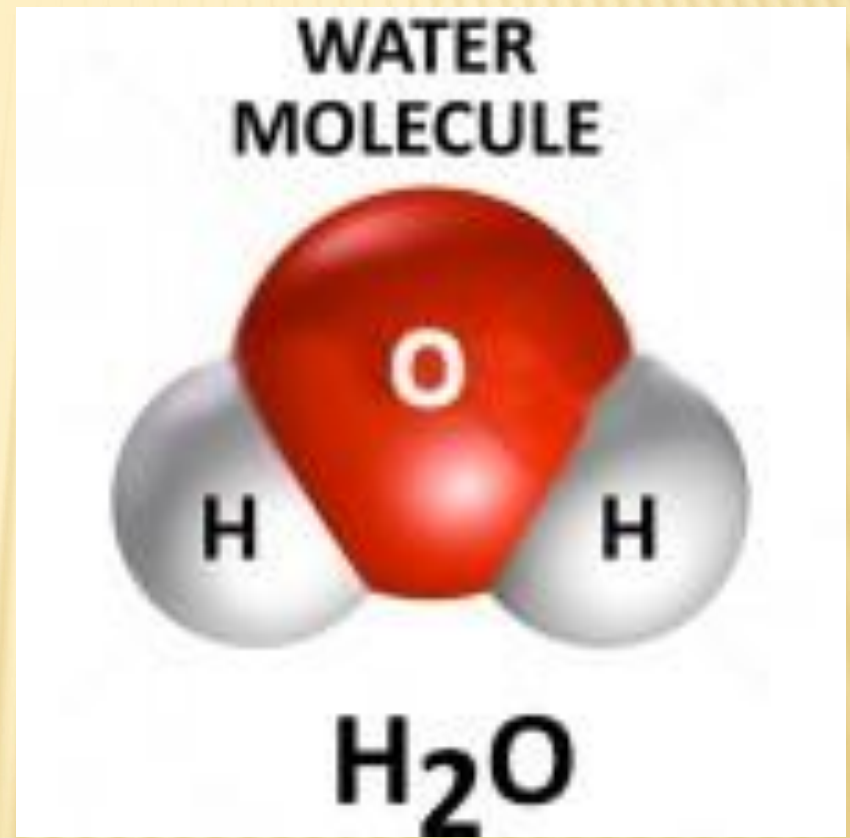


# WATER IS THE MOST WIDESPREAD SUBSTANCE ON THE PLANET

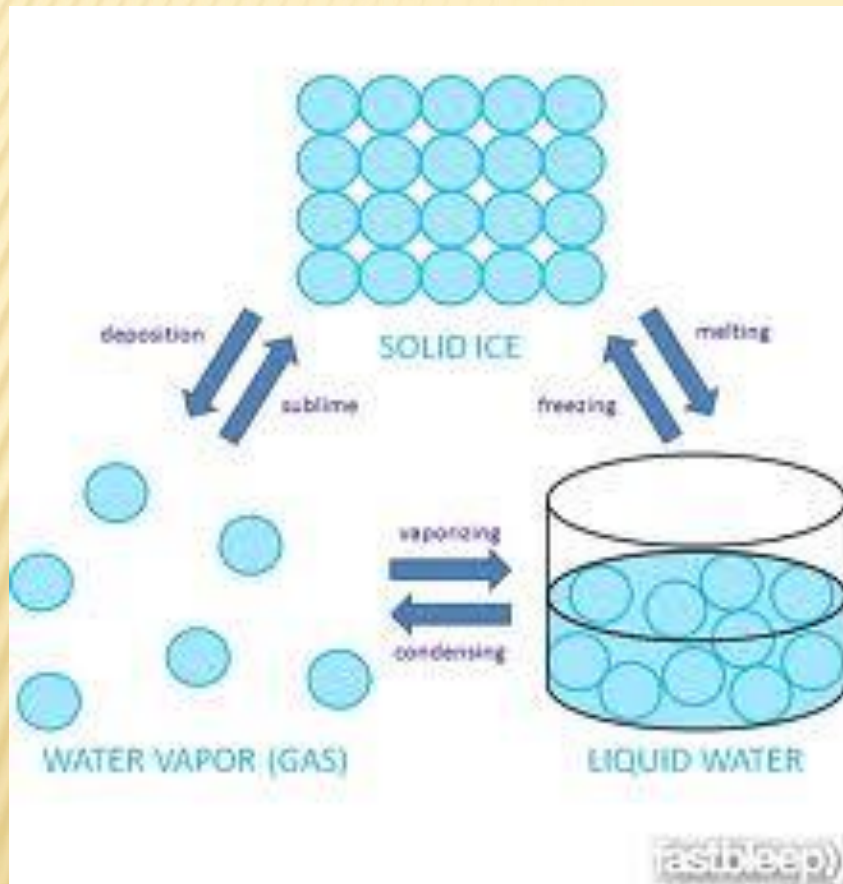




# CHEMICAL COMPOSITION



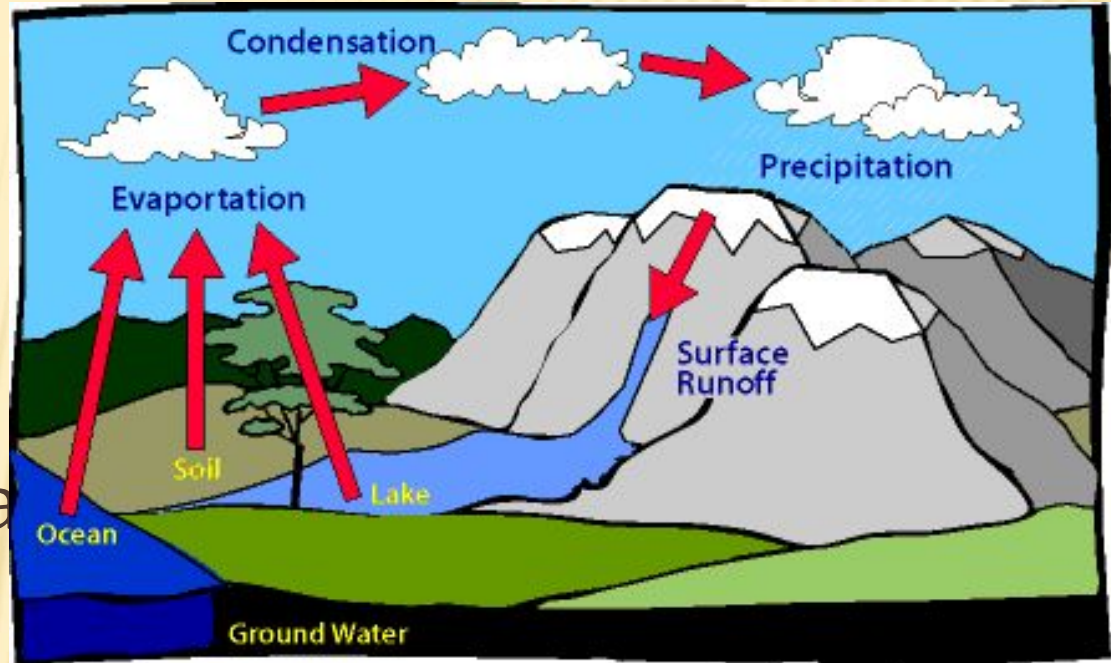
# PROPERTIES OF WATER



1. Aggregate state
2. When water freezes, it increases its capacity
3. Water is solvent
4. Water warms slowly and gets cold slowly.

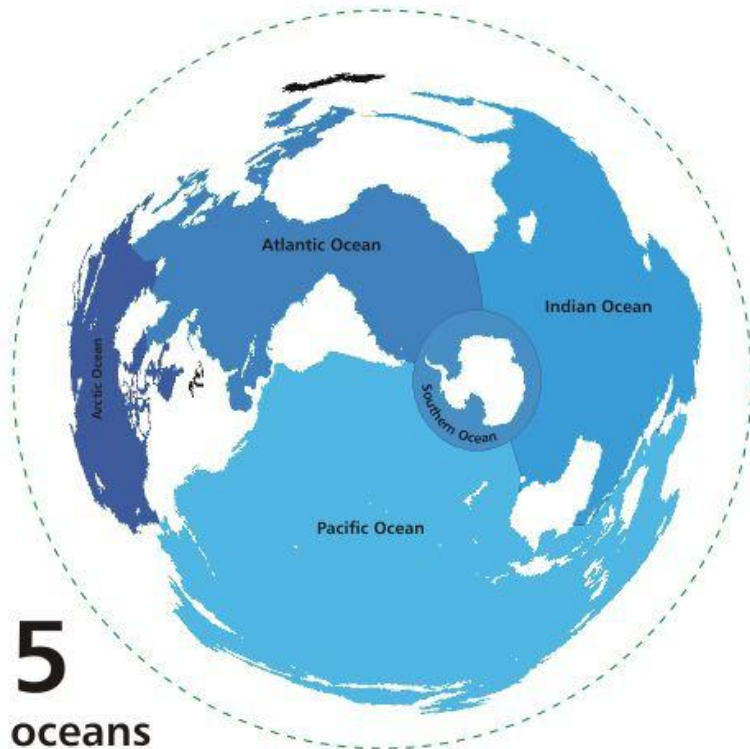
# WATER CYCLE

Continuous cycle water movement in atmosphere, hydrosphere, lithosphere, which takes place under influence of the solar energy and gravity force, is called world water cycle.





## 2. WORLD OCEAN



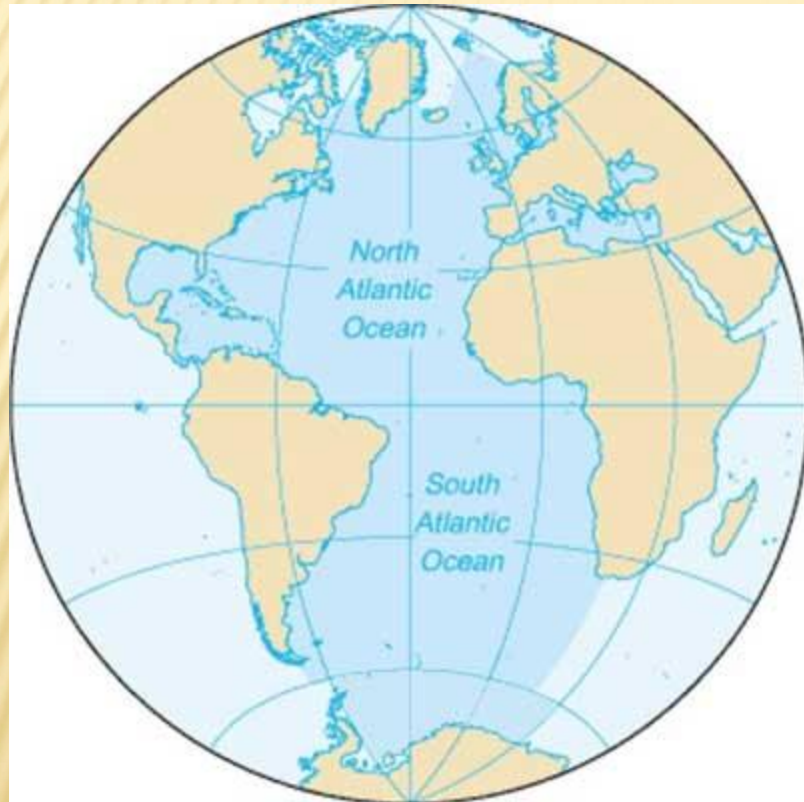
- total capacity is about 1 billion 370 million km
- 94% of hydrosphere
- There are 73 from 110 chemical elements in its waters.
- includes oceans, seas, gulfs and channels.  
There are four oceans.

# THE PACIFIC OCEAN

- the largest and the deepest of all, its total area is greater than that of all the dry land.



# THE ATLANTIC OCEAN



- The Atlantic Ocean stretches from the Arctic Ocean downward to the shores of Antarctica. This makes it the same size from north to south as the Pacific Ocean. However, from east to west, the Atlantic Ocean is only about half as wide as the Pacific.



# THE INDIAN OCEAN

- The Indian Ocean is only slightly smaller than the Atlantic.
- The Indian Ocean lies between Africa on the west, Australia on the east, Asia on the north, and Antarctica on the south. 90% of this ocean lies to the south of the Equator.



# THE ARCTIC OCEAN

- The smallest ocean is the Arctic Ocean with the North Pole in the centre.
- This ocean is connected to the Pacific and Atlantic Oceans via small gaps between continents.





# SEA

## TOP TEN LARGEST OCEANS AND SEAS

A R C T I C O C E A N



Small and large parts of ocean that are divided by land, islands or underwater uplands are called seas.

PACIFIC OCEAN

PACIFIC OCEAN

Caribbean Sea

Mediterranean Sea

ATLANTIC OCEAN

Arabian Sea

South China Sea

Philippine Sea

INDIAN OCEAN

Coral Sea

- |                    |                     |
|--------------------|---------------------|
| 1. Pacific Ocean   | 64,196,000 sq.miles |
| 2. Atlantic Ocean  | 33,400,000 sq.miles |
| 3. Indian Ocean    | 28,400,000 sq.miles |
| 4. Southern Ocean  | 20,327,000 sq.miles |
| 5. Arctic Ocean    | 5,100,000 sq.miles  |
| 6. Philippine Sea  | 2,000,000 sq.miles  |
| 7. Coral Sea       | 1,850,000 sq.miles  |
| 8. Arabian Sea     | 1,491,000 sq.miles  |
| 9. South China Sea | 1,148,000 sq.miles  |
| 10. Caribbean Sea  | 971,000 sq.miles    |

S O U T H E R N O C E A N

Map not to scale

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Gulf is a component of oceans, seas, lakes, which juts out the land, but has free exchange with their major parts.



# CHANNEL



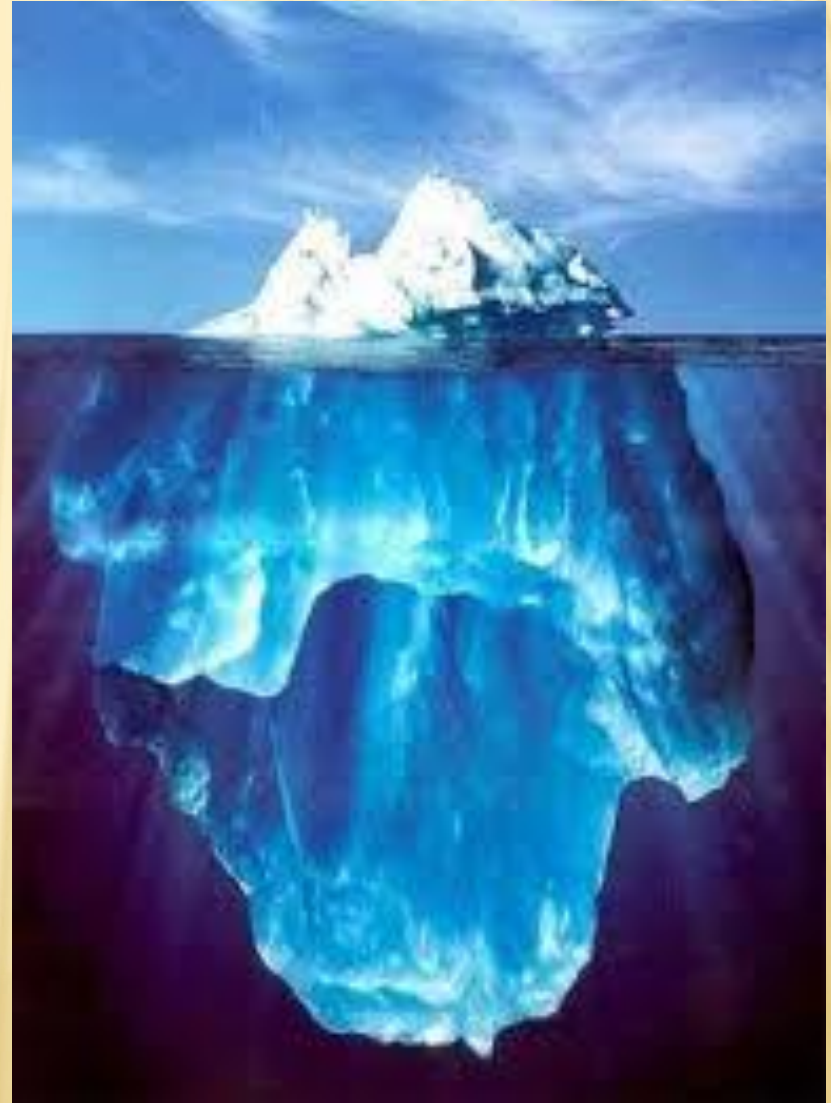
Channel is rather narrow space, which connects water area with any separate land's parts. It's natural water basin.

Canal – man-made basin. (Suez, Panama Canals)



# 3. LAND'S WATERS

- ❑ **Ground waters**, (Water, which leaks through the Earth crust upper layer, is forming ground waters.)
- ❑ **rivers**,
- ❑ **lakes**, (Lake is the natural reservoir, filling up with water, which has not a direct connection with the World Ocean. Lakes occupy about 2% of the land and are situated unevenly)
- ❑ **glaciers**, (Glacier is a perennial icy layer, formed on the land at the expense of accumulation and transform of the falling solid precipitations. There are 24 millions km of fresh water in glaciers)





# RIVERS



## The Longest Rivers in the World



Length in kilometers



Source: [www.watchmojo.com](http://www.watchmojo.com)

Photo: © absolutvision.com

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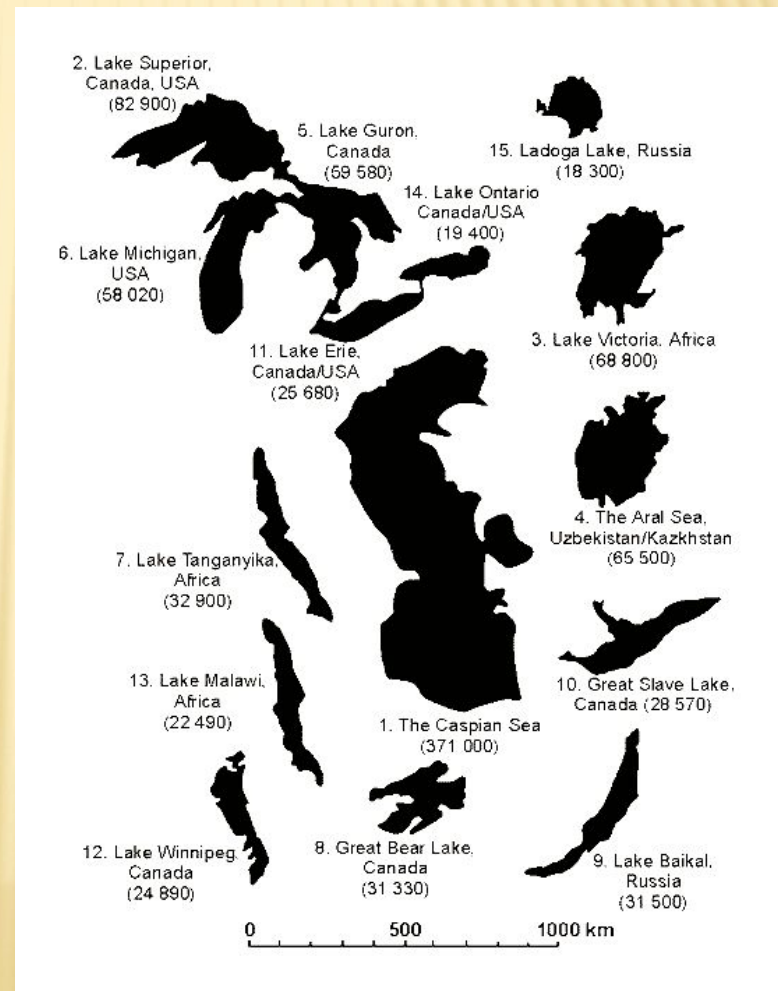
# LAKES

## World's Largest Lakes

Rank (by area)	Area (km <sup>2</sup> )	Greatest Depth (m)
1. Caspian Sea	371 000	980
2. Superior	84 500 *	405
3. Aral Sea	64 500	68
4. Huron	63 500 *	229
5. Victoria	62 940	81
6. Michigan	58 020	281
7. Tanganyika	32 000	1471
8. Baykal	31 500	1620
9. Great Bear	31 400 *	413
10. Great Slave	28 400 *	614
11. Erie	25 800 *	64
12. Winnipeg	24 400 *	18
15. Ontario	19 300 *	244
23. Athabasca	7 940 *	120
25. Reindeer	6 640 *	219
31. Winnipegosis	5 360 *	12
32. Nettilling	5 530 *	NA

\* Partly or entirely within Canada

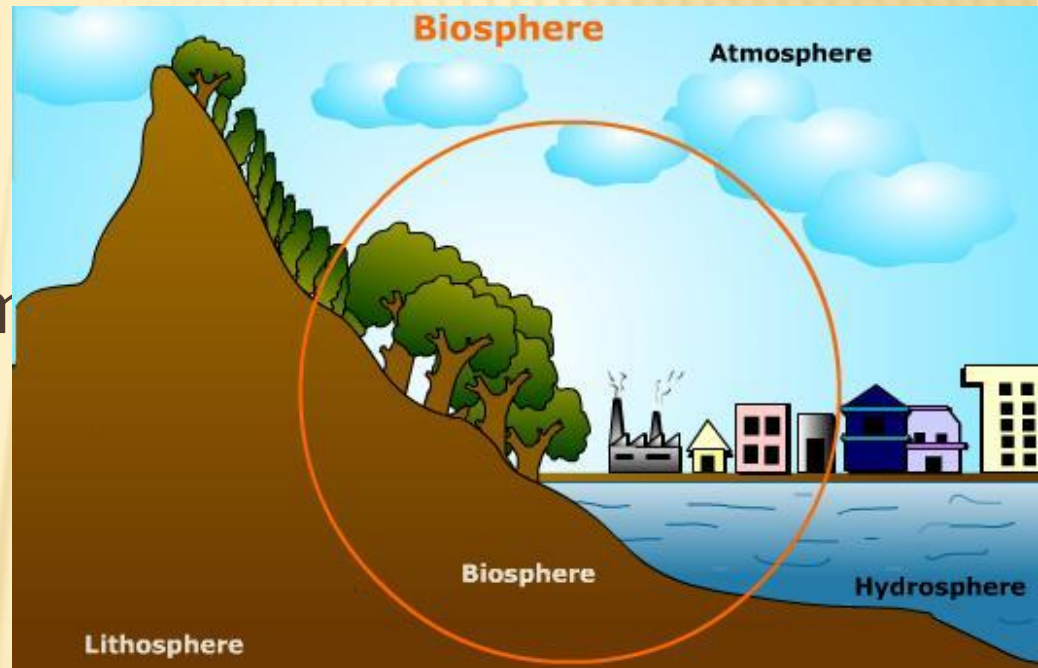
Sources: *Canadian Survey on the Water Balance of Lakes*, published by the Secretariat, Canadian National Committee, International Hydrological Decade, Environment Canada, 1975; and *The World in Figures*, by Victor Showers, Toronto: John Wiley and Sons, 1973.



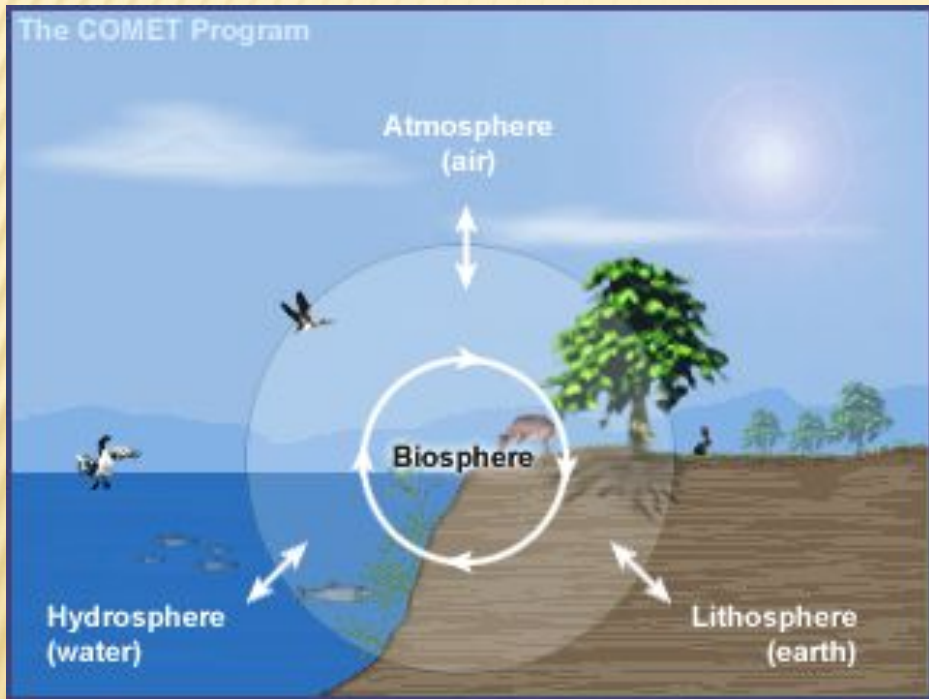


# 4. BIOSPHERE

- ✓ a special Earth cover, where activity of all living organisms and cycle of matter and energy between them is realized actively.
- ✓ «vital cover» of the Earth.



# BIOSPHERE



- includes the bottom of atmosphere, hydrosphere and upper lithosphere.
- There is no general opinion among scientists about upper and bottom biosphere borders. Living organisms are very closely located in the bottom atmosphere, especially up to 100 meters. Nowadays, taking into account living organisms' spreading, upper bound of biosphere is drawn along the ozone layer (25-30 km); lower bound is drawn along the bottom of the World Ocean deepest channel.



# LIVING ORGANISMS

## Flora (plants)



## Fauna (animals)







# LIVING ORGANISMS THAT TAKE PART IN SUCH PERIODS OF THE BIOLOGICAL CYCLE ARE DIVIDED INTO 3 GROUPS:

## Producers



## Consumers



## Decomposers



# HOME TASKS:

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1. Learn the lecture notes
2. Learn by heart new words
3. Answer the questions:
  - 1) Describe water circulation.
  - 2) What is the difference between the world ocean and land waters?
  - 3) Characterize producers, consumers, decomposers.
  - 4) Where is biosphere situated? Give examples of extreme conditions in which living beings occur.