

KEY

### In-Class Exercise: The Global Water Budget

Below is a table showing estimated volumes of water in various storage compartments for the global water budget. Complete the calculations in the table and answer the questions.

Storage Compartment	Volume (x10 <sup>3</sup> km <sup>3</sup> )	Percent of Total
<b>Water in Land Areas</b>		
Fresh water lakes	125	<u>0.009</u>
Saline Lakes	104	<u>0.008</u>
Rivers	1.25	<u>0.00009</u>
Soil Moisture (unsaturated)	67	<u>0.005</u>
Ground water (to depth fo 4000 m)	8350	<u>0.615</u>
Ice Caps / Glaciers	29200	<u>2.150</u>
Atmosphere	13	<u>0.001</u>
World Ocean	1320000	<u>97.21</u>
<b>Total</b>	<u>1.36 x 10<sup>9</sup> km<sup>3</sup></u>	<u>100%</u>

1. Which part of the global water budget has the greatest percentage of water in storage?

OCEANS

Which part has the least?

RIVERS

2. What percent of the total "water in land areas" is contained in the form of groundwater?

$$\text{TOTAL LAND H}_2\text{O} = 37847 \times 10^3 \text{ km}^3$$

3. What percent of the total "water in land areas" is contained in the form of ice caps/glaciers?

$$\% \text{ ICE} = \left( \frac{29200 \text{ km}^3}{37847 \text{ km}^3} \right) \times 100\% = 77.2\%$$

4. Calculate the percent of storage in world oceans if climate change resulted in a doubling of the volume of water stored in icecaps/glaciers. Show all of your work.

IF ICE VOLUME DOUBLES, THEN  $29200 \times 10^3 \text{ km}^3$  IS REMOVED FROM OCEANS.

$$\% \text{ CHANGE IN OCEANS} = \left( \frac{29200}{1320000} \right) \times 100\% = 2.2\% \text{ CHANGE}$$

5. Freshwater drinking supplies are derived primarily from either rivers or groundwater. Which storage compartment represents the greatest drinking water resource on the planet?

GROUND WATER = 22% OF LAND WATER AVAILABLE

6. The western U.S. is associated with a significant number of dam projects on rivers. Many of these dams supply drinking water from the reservoirs. In terms of the hydrologic cycle, is damming / reservoir development the most efficient method of providing water resources? Why or why not, explain your answer.

NO - (EVAPORATION) WATER LOSS IN

ARID CLIMATES