

The image features a light gray background with a subtle gradient. In the top-left and bottom-right corners, there are several realistic water droplets of varying sizes, rendered with soft shadows and highlights to give them a three-dimensional appearance. The main text is centered and reads "ENERGY TRANSFER" in a bold, dark blue, sans-serif font, split across two lines.

ENERGY TRANSFER



ESSENTIAL QUESTION:

**HOW DOES ENERGY MOVE
THROUGH EARTH'S SYSTEM?**





BILL NYE HEAT VIDEO

HOW ARE ENERGY AND TEMPERATURE RELATED?

- **TEMPERATURE IS THE MEASURE OF THE AVERAGE KINETIC ENERGY OF PARTICLES.**
- **THERMAL ENERGY IS THE TOTAL KINETIC ENERGY OF PARTICLES.**



Which has more THERMAL ENERGY?

WHAT IS THERMAL EXPANSION?

- **THE MORE ENERGY, THE FARTHER APART THE PARTICLES WILL MOVE APART.**
- **MOST OBJECTS WILL EXPAND WHEN HEATED AND CONTRACT WHEN COOLED.**

- **THERMAL EXPANSION CAUSES A CHANGE IN DENSITY.**

MASS	VOLUME	DENSITY
100 kg	100 cm ³	1 kg/cm ³
100 kg	200 cm ³	.5 kg/cm ³

The background of the slide is a light gray gradient. In the top-left and bottom-right corners, there are several realistic water droplets of various sizes, some overlapping. A faint, circular, textured pattern is visible in the upper center of the slide, behind the text.

HOW DOES A HOT AIR BALLOON WORK?

WHAT IS HEAT?

- **ENERGY THAT IS TRANSFERRED BETWEEN OBJECTS THAT ARE AT DIFFERENT TEMPERATURES.**
- **ENERGY ALWAYS TRANSFERS FROM A HIGHER TEMPERATURE TO A LOWER TEMPERATURE OBJECT.**

WHY CAN TEMPERATURES OF LAND, AIR, AND WATER DIFFER?

- **LAND WILL WARM UP AT A FASTER
RATE THAN WATER AND AIR DO.**

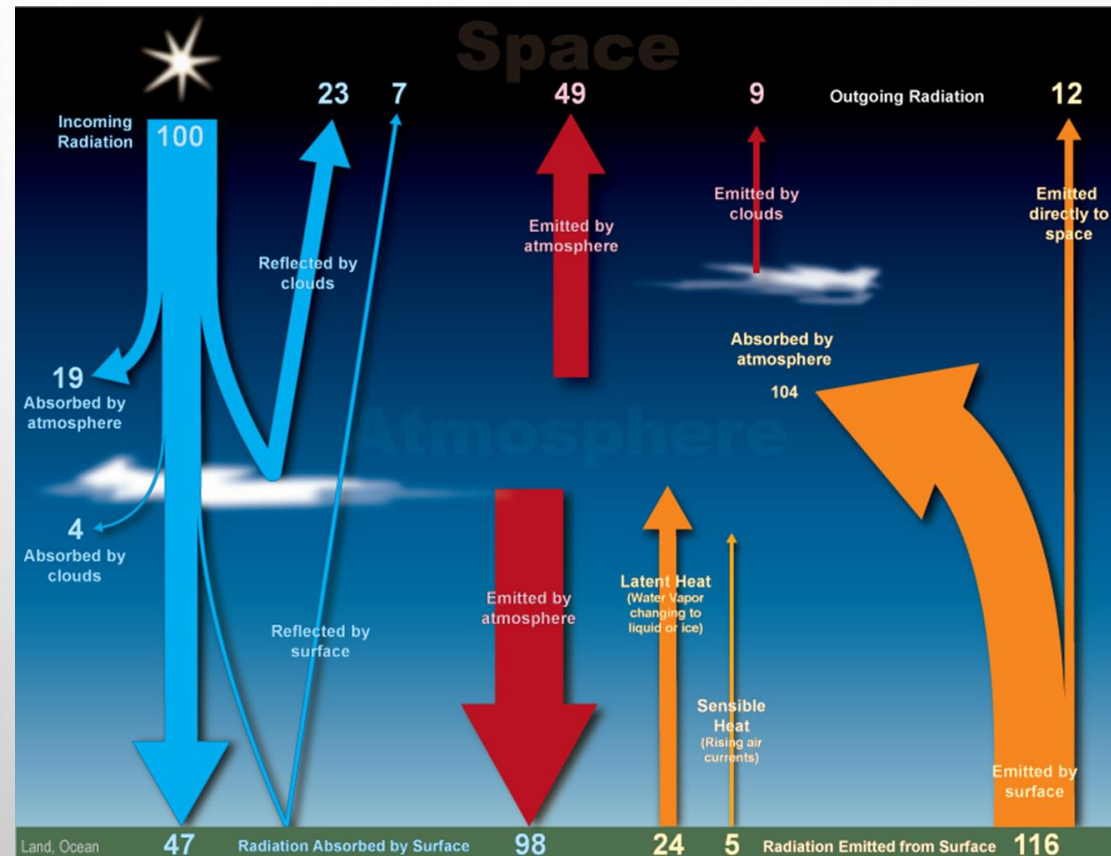
WHAT IS SPECIFIC HEAT?

- **DIFFERENT RATES IN WHICH MATERIALS BECOME WARMER OR COOLER.**
- **OBJECTS THAT REQUIRE A LOT OF ENERGY TO HEAT HAVE A HIGHER SPECIFIC HEAT THAN THOSE THAT REQUIRE LESS ENERGY. EXAMPLE: WATER HAS A HIGHER SPECIFIC HEAT THAN LAND SO IT WILL HEAT UP MORE SLOWLY.**

HOW IS ENERGY TRANSFERRED BY RADIATION?

- **RADIATION IS TRANSFERRED AS ELECTROMAGNETIC WAVES.**
- **WARMTH FROM THE SUN, VISIBLE LIGHT AND RADIO WAVES ARE EXAMPLES OF ELECTROMAGNETIC WAVES.**
- **EM WAVES DO NOT NEED A MEDIUM**

WHERE DOES RADIATION OCCUR ON EARTH?

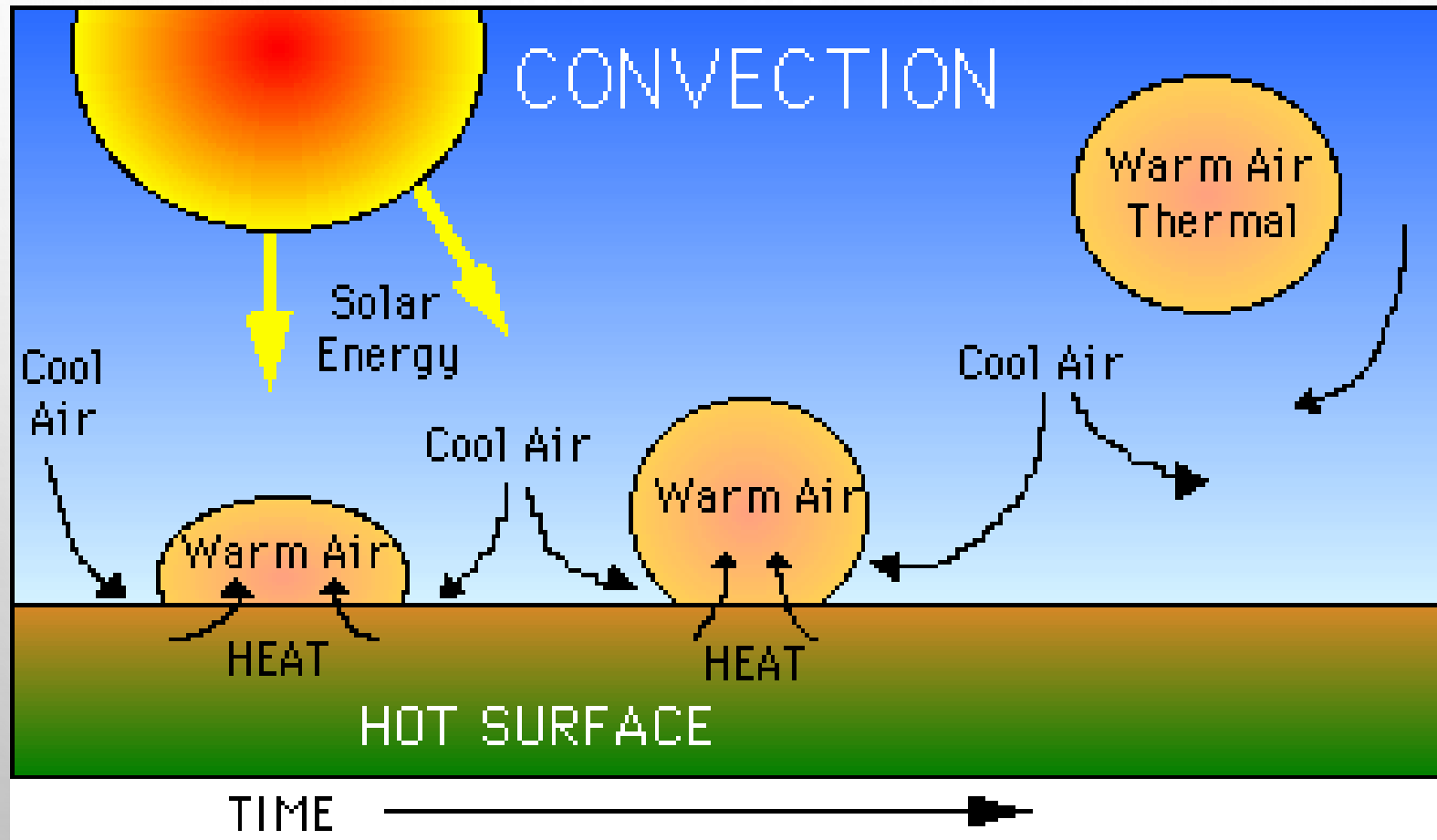




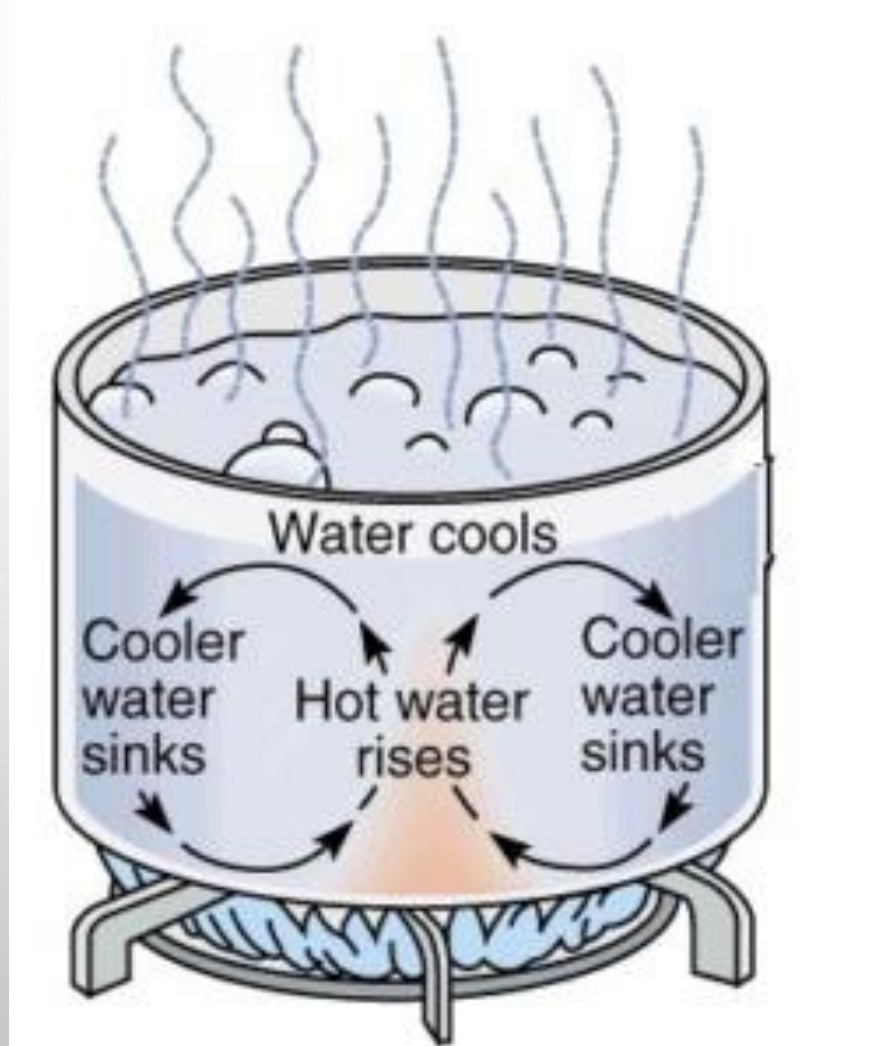
HOW IS ENERGY TRANSFERRED BY CONVECTION?

- **CONVECTION IS ENERGY TRANSFERRED
THROUGH THE MOVEMENT OF MATTER.**
- 

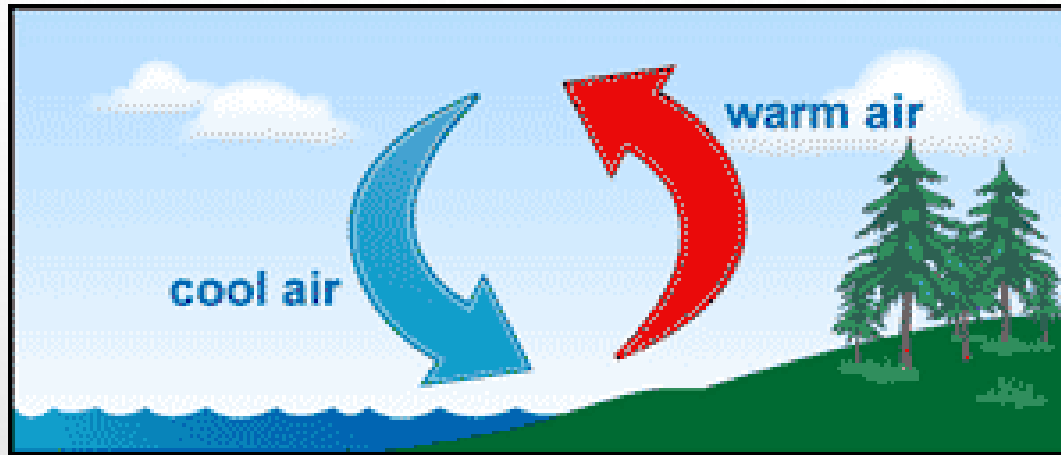
Convection



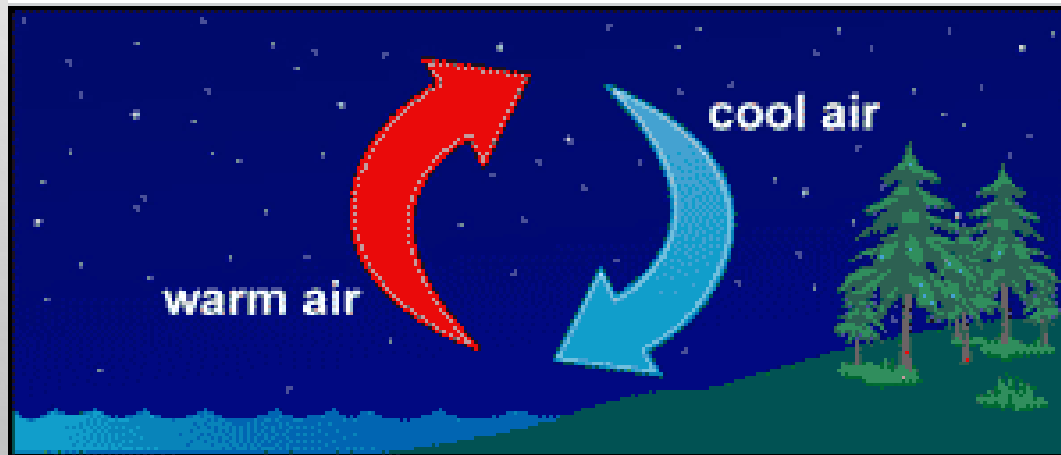
CONVECTION CURRENTS



WHERE DOES CONVECTION OCCUR ON EARTH?

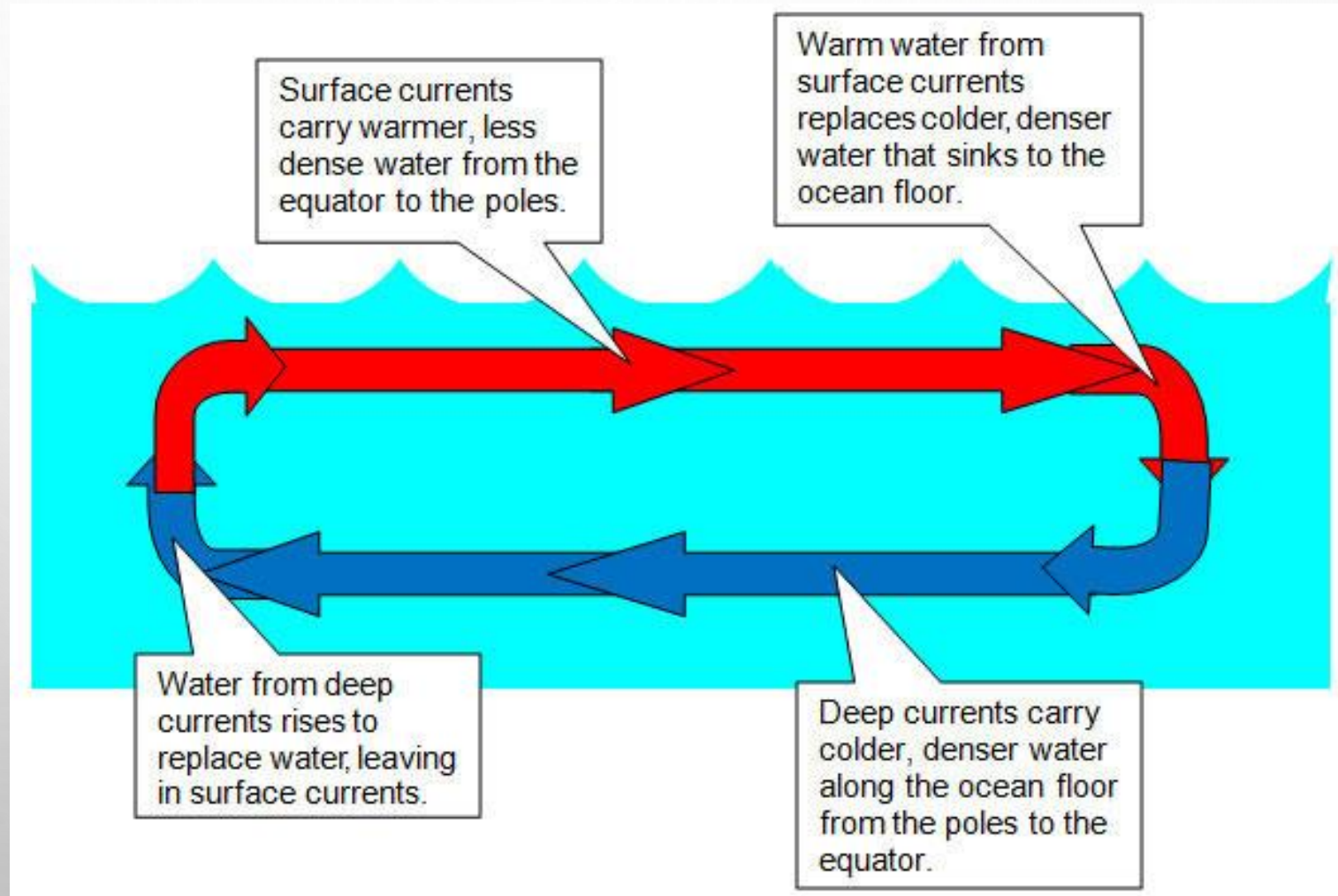


DAY TIME

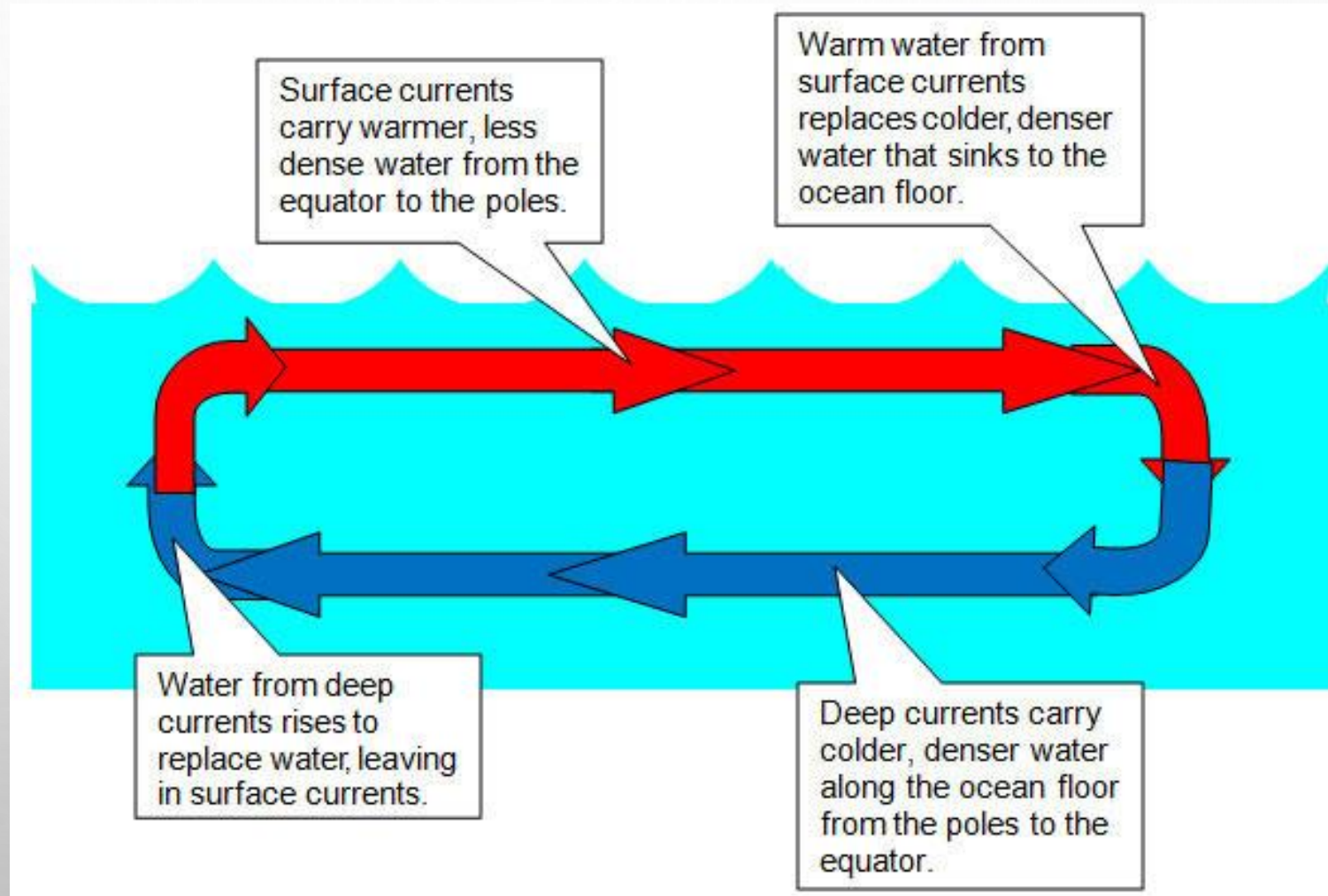


NIGHT TIME

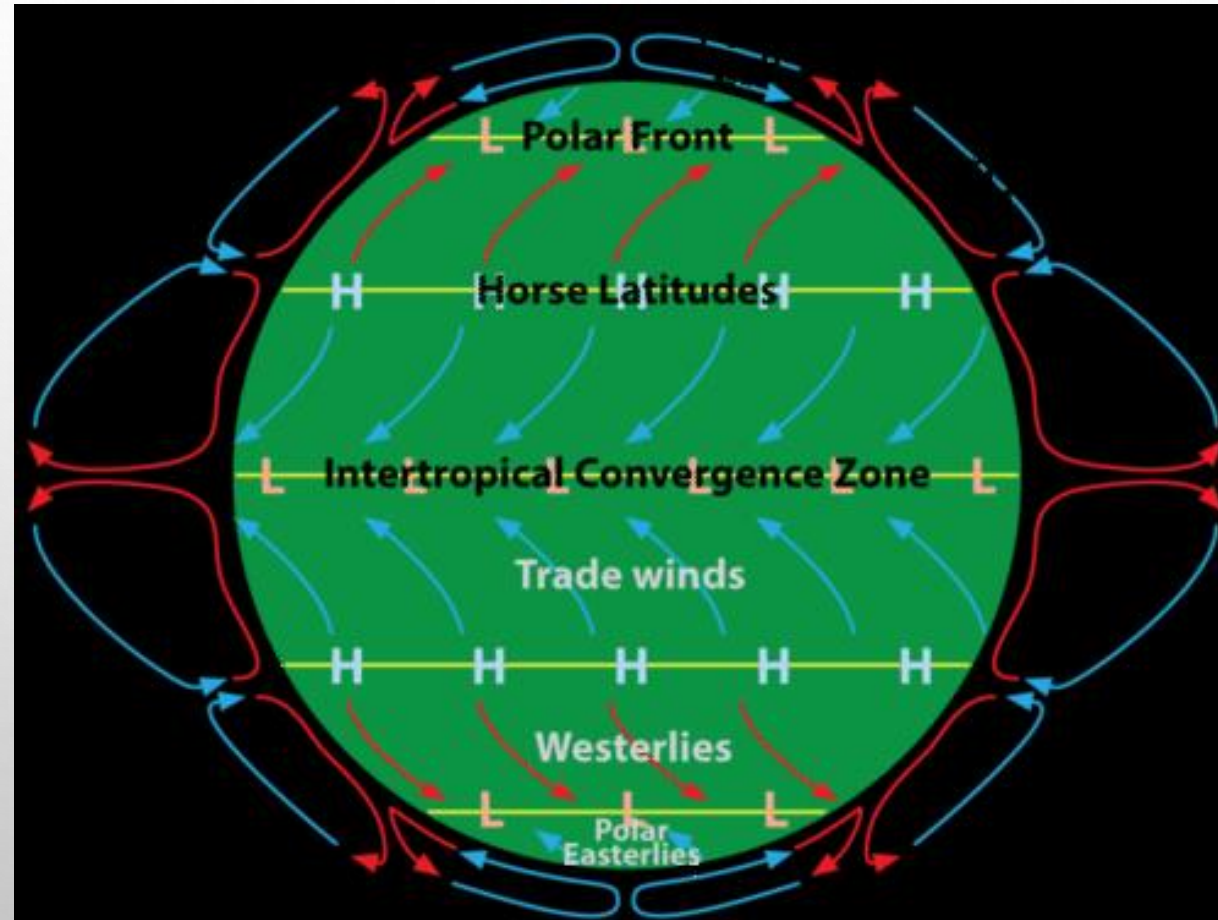
WHERE DOES CONVECTION OCCUR ON EARTH?



WHERE DOES CONVECTION OCCUR ON EARTH?



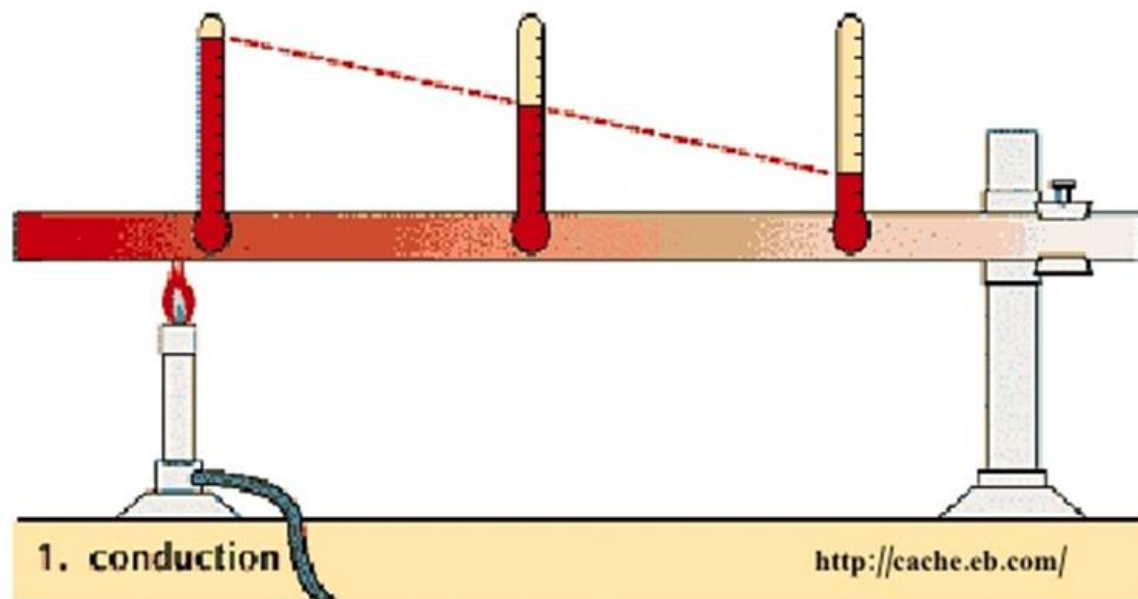
WHERE DOES CONVECTION OCCUR ON EARTH?



HOW IS ENERGY TRANSFERRED BY CONDUCTION?

- **ENERGY TRANSFER FROM ONE OBJECT TO
ANOTHER OBJECT THROUGH DIRECT
CONTACT.**

Conduction



Heat is transferred from atoms that are touching. It is not carried by a liquid or gas.

Example: You walk on a hot sidewalk barefooted and your feet get hot. The heat is moving from the atoms of the sidewalk to your feet.

Video segment on conduction

WHERE DOES CONDUCTION OCCUR ON EARTH?

- **WHEN COOLER AIR MOLECULES COME IN CONTACT WITH THE WARM GROUND.**
- **IF AIR PARTICLES TRANSFER ENERGY TO LIQUID WATER, EVAPORATION WILL OCCUR.**
- **IF WATER VAPOR TRANSFERS ENOUGH ENERGY INTO THE AIR, WATER DROPLETS DEVELOP.**

