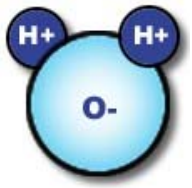
Properties of Water



Heat Capacity

Water has one of the highest heat capacities on earth. The ocean absorbs the sun's heat during the day and releases it slowly at night. They keep the earth's temperature relatively stable throughout the 24-hour day. Without the oceans, the planet's temperature would swing hundreds of degrees between day and night.

Atmospheric water vapor is just as important! Water vapor holds a great deal of heat energy. The vapor shows how fast and how much earth's temperature changes. Without atmospheric water vapor, we would be unbearably cold at night and blazing hot during the day.

Water vapor is also the earth's air conditioner: When water evaporates, it carries away heat with the vapor. Then, when the vapor condenses, it releases heat back into the atmosphere. In that way, water vapor transfers heat from where it is hot to where it is cold. That heat transfer keeps the planet's overall temperature relatively stable.

Try the activity on the following page to see if you learned about heat capacity.

WATCHING HEAT CHANGE

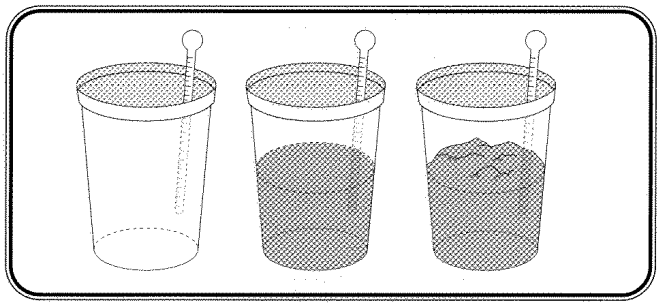
Do all substances get hot and cool at the same rate? Do they all hold heat for the same length of time? Try this little experiment to find out...

You will need

- 3 coffee cups or Styrofoam© cups
- Water
- Dry dirt from the yard or a garden store
- An incandescent light bulb (60-watt, 75-watt, or 100-watt)
- A thermometer
- A watch or clock with a second hand

Directions

1. Put an inch or so of water in one cup; put an inch or so of dry soil in another; and fill the third cup with air. (In other words, leave it empty.)
2. Heat the three cups by shining an incandescent light directly on them.
3. Measure and record the temperature inside each cup every minute for ten minutes.
4. Turn the light off, and continue recording the temperatures for another ten minutes.
5. Draw a line graph showing the different rates of change in temperature. Put elapsed time along the X axis and temperature along the Y axis. Draw each of the three lines (air, water, soil) in a different color and label them. Which cup changed temperature fastest?



Record of Temperature Readings

	Air	Dirt	Water
Start	____ o	____ o	____ o
1 min	____ o	____ o	____ o
2 min	____ o	____ o	____ o
3 min	____ o	____ o	____ o
4 min	____ o	____ o	____ o
5 min	____ o	____ o	____ o
6 min	____ o	____ o	____ o
7 min	____ o	____ o	____ o
8 min	____ o	____ o	____ o
9 min	____ o	____ o	____ o
10 min	____ o	____ o	____ o

LIGHT OFF

11 min	____ o	____ o	____ o
12 min	____ o	____ o	____ o
13 min	____ o	____ o	____ o
14 min	____ o	____ o	____ o
15 min	____ o	____ o	____ o
16 min	____ o	____ o	____ o
17 min	____ o	____ o	____ o
18 min	____ o	____ o	____ o
19 min	____ o	____ o	____ o
20 min	____ o	____ o	____ o