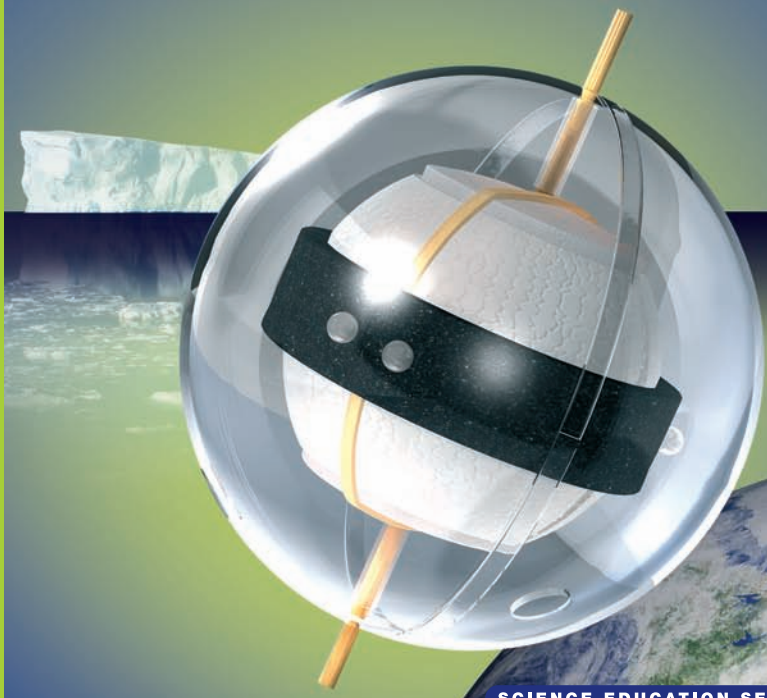
Thames & Kosmos®

Experiment Manual

GLOBAL WARMING



SCIENCE EDUCATION SET

WARNING — This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

A Word to Parents and Supervising Adults

This kit will give your child a broad overview of climate and climate change. Experiments and background information will provide him or her with basic information about a fascinating topic, one of extreme importance and interest to both adults and children.

The topic is complex and the experiments are not always simple, so they should be carried out with thought and care. Please be prepared to stand by your child to offer help and advice and provide support whenever it may be needed. If an experiment does not work as expected the first time, you may need to try it again.

The climate is a massive natural system, but despite its enormous size, often phenomena or changes in the climate are very subtle and hard to detect in a short amount of time. The experiments in this kit model aspects of the climate on a smaller scale, thus making them easier to observe. However, some of the experiments will yield very subtle results, and you will have to look closely to see them. Encourage your child to be a good detective and look closely to see the results of the experiments.

Read through the instructions together before beginning the experiments and follow them. Pay attention to the basic rules for safe experimentation on the inside cover and be sure both you and your child review the safety warnings that are provided with the individual experiments.

We wish you and your young researcher lots of fun and success with the experiments.

Kit Contents

No.	Description	Qty.	Part No.
1	Transparent half-spheres	2	706346
2	Die-cut sheet	1	706376
3	Continent sticker sheet	1	706378
4	Transparent plastic sheet for experiment basin	1	706381
5	Cork stopper	1	071118
6	Pins	5	706382
7	Wooden sticks	3	020042
8	Incense cones	5	706385
9	Balloon	1	701060
10	Black disk	1	706387
11	Black equator strip	1	706442
12	Tubing	1	706384

No.	Description	Qty.	Part No.
13	Thermometer with case	1	232105
14	Petri dish	1	700408
15	Sponge	1	000585
16	Tea light containers	3	706377
17	Paper clips	4	020040
18	Pipette	1	232134
19	Clay	50 g	000588
20	Rubber band	2	529122
21	Drinking straw	1	704257
	Polystyrene foam tray holding:		706373
22	Sphere with indentations	1	
23	Hemispheres	2	
24	Ramp	1	

Also Required

Glue, flashlight, paper, tape, felt-tip pen, table lamp, empty plastic bottle, insulated flask (e.g. Thermos), watch, lighter, scissors, knife, ink, white bowl, salt, plastic wrap, baking powder, vinegar, paper towels, teaspoon. The components that are not contained in the kit are marked in italic at the beginning of each experiment.

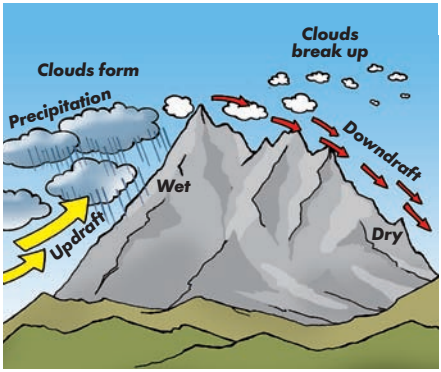
Table of Contents

The drops will keep growing if you take the light away and let the dome cool. When the drops are large enough, they will run down the sides of the dome. Taste the water of condensation. Is it still salty? If your experiment were to run long enough, all the water would evaporate and the salt would remain behind in the petri dish. This technique can be used in an emergency to make drinking water out of seawater. However, the evaporated and condensed water would lack important minerals.

Explanation:

Only pure water evaporates from the oceans, leaving the salt behind. The water condenses in the air and collects into larger droplets, which eventually rain down again as fresh water. That is why rainwater is never salty, even near the ocean.

Evaporation does not only occur above bodies of water. Evaporation also takes place over land, from water stored in the ground and, above all, in plants. That is why you have to water the garden so often in summer when temperatures are high.



Clouds collect on the Sierra Nevada.

DID YOU KNOW ?

It's Raining...

The distribution of land and water masses over the Earth largely determines where rain falls. Rainfall is also influenced by large mountain ranges and plains, and by air pressure regions. In the interior areas of the continents, dry climates prevail with cold winter months and nights and hot summer months and days. Maritime climates determine the weather on the coasts, with mild winters and cool summers. Desert climates generally prevail over large land masses bordered by mountain ranges against which clouds release their rain. For example, the high Sierra Nevada mountain range in California catches the rain from the moist Pacific Ocean air as it flows eastward. On the ocean side of the range, you will find thick forests and fertile valleys. On the other side, to the east, is where the hot California desert begins.

Heat Reservoirs

The features of a particular area of Earth's surface play an important role in evaporation and cloud formation for that area — for example, whether it is covered by water or not, how much vegetation there is, and the composition of the soil.

But Earth's surface also has another kind of impact on Earth's climate. The sun delivers heat to the Earth. Oceans, seas, and rivers, as well as the land and the air, absorb the sun's warmth during the day. The amount of sunlight that an area of Earth's surface absorbs is primarily determined by its color. Dark objects absorb more heat than light-colored ones, because light-colored objects are reflecting the light while dark-colored ones are absorbing it.

An experiment with three different-colored landscape disks will show that different-colored bodies hold different quantities of heat.

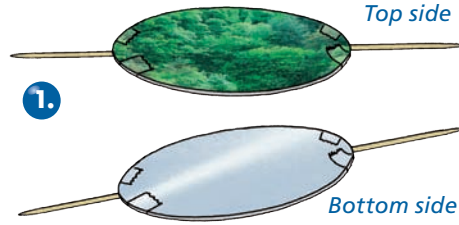
08–10 *Experiments*

Heat Absorption

- **Materials from the kit:** transparent half-spheres, landscape disks (forest, ocean, ice), thermometer, stand from the die-cut sheet (globe side up), wooden stick
- **Additional materials:** *tape, clay, tape, lamp, watch*

Procedure:

Place the green forest disk and the white ice disk together back to back, slide the wooden stick between them, and secure the disks together with pieces of tape to the left and right of the wooden stick.



Lay the disks inside one half-sphere, put the two half-spheres together, and place the combined plastic sphere on the globe stand.

Set the entire apparatus in the sun or under a lamp (at least 60 watts) so that the white ice side of the landscape disk is illuminated directly. Push the thermometer into the hole and seal it off with a little clay. Seal off the hole on the underside with clay too. Support the end of the thermometer with something placed under it, e.g. books, or by securing it with clay or tape to a support like a glass or block of wood.