FUTURE POWER ENERGY

SOLAR POWER

POWERING THE FUTURE

A GREEN NOTE

A MESSAGE TO CHILDREN
BY DR R K PACHAURI, CHAIRMAN
INTERGOVERNMENTAL PANEL
ON CLIMATE CHANGE
JOINT WINNER OF THE
NOBEL PEACE PRIZE 2007

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The Energy and Resources Institute

A note from Dr R K Pachauri

Human society has reached a stage of prosperity, which was not expected several decades ago. Yet, a large number of people live in poverty and are barely able to keep alive. It appears that they have not been touched by human progress at all. At the same time, what we regard as progress has resulted in damage and destruction of our natural resources and caused serious problems such as human-induced climate change, which threaten all forms of life in different parts of the world in the form of sea-level rise, heatwaves, floods, droughts, and melting of glaciers.

All of this provides a strong reason for us to re-examine what we have mistakenly believed as human progress and change the way we have been pursuing human activities. For instance, we must now use renewable sources of energy and eco-friendly methods of production and consumption, make efficient use of water in every activity, and protect biodiversity.

It is in the hands of the children to try to change their own lives towards greater protection of the environment and all our natural resources. They can also take active part in changing the thinking of adults. Children can take the lead in organizing actions, which support conservation of resources, recycling of waste water, and greater use of renewable sources of energy, at the community level.

This series of children's books is aimed at providing children with knowledge on what needs to be done in all these areas. I hope those who read these books will not only enjoy them greatly but also feel inspired to implement actions that are described in these pages, so that we create a beautiful, peaceful, and healthy future for the human race.

R K Pachauri

Director-General, TERI

Chairman, Intergovernmental Panel on Climate Change

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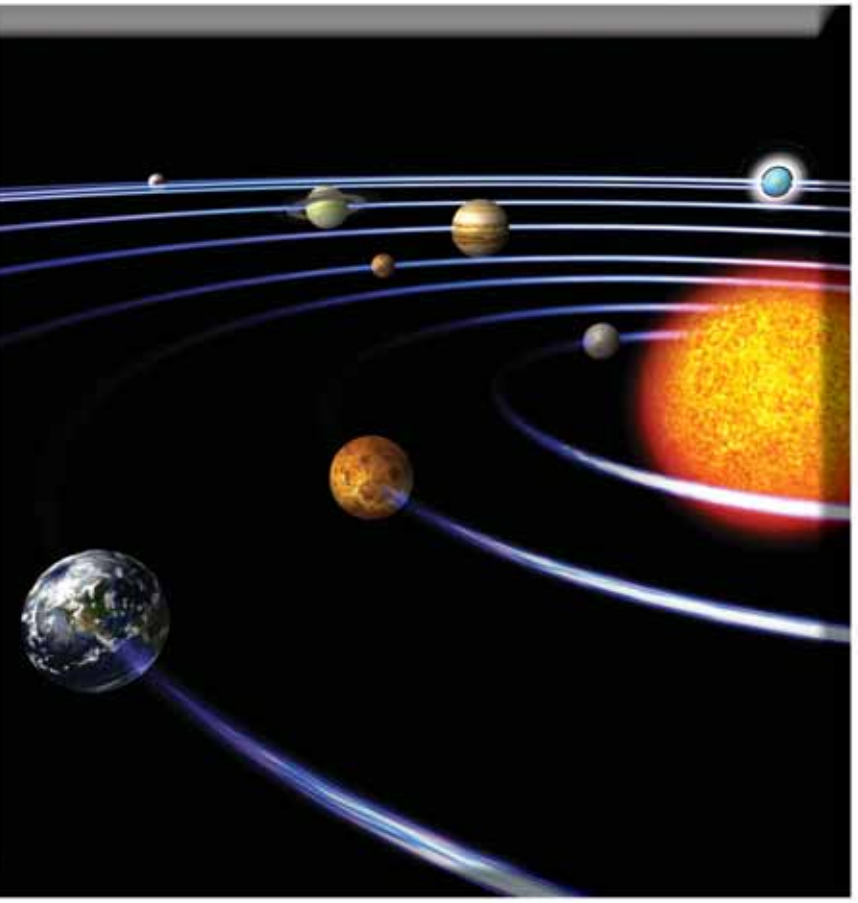
CATCH A SUNBEAM



▲ *The sun contains about 98 per cent of the total mass in the solar system.*

There are millions and millions of stars in the sky. But only one of these provides us with light during the day and helps the moon glow at night. It also creates rainbows on rainy days and helps plants and animals grow. This is the most diligent star—the sun.

A star is born!

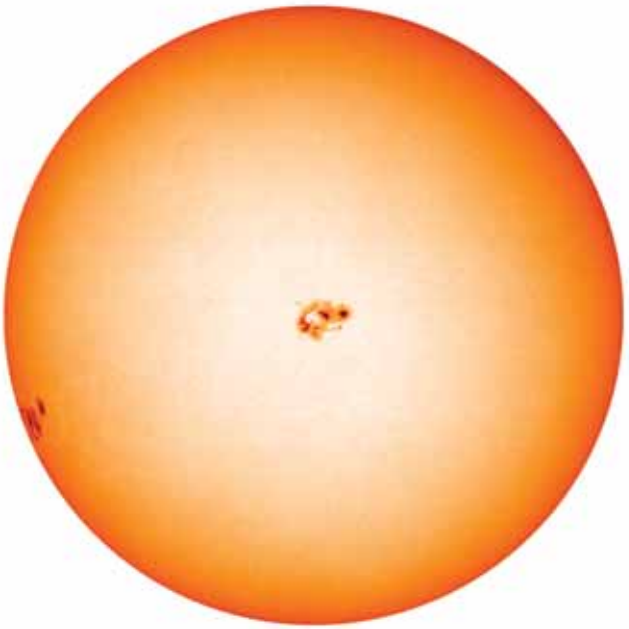
The sun was formed more than four billion years ago. Gases and dust in space were pulled together by gravity. These swirled into a huge disc, condensing into a tremendous ball of gas. The pressure of the gases increased until the central part of the disc got hotter and smaller and detached itself from the disc to form the sun. The planets of the solar system were formed from the rest of the disc, and still revolve around their parent star, the sun.

Star light, star bright...

About 1,000,000 Earths would fit inside the sun and its centre is about 160,000 times hotter than boiling water! It doesn't seem so hot or large because it is very far away—over 150,000,000 kilometres from the earth.

The sun's surface, called the photosphere, is not smooth and uniform. Just like the earth has mountains, valleys, and oceans, the sun has sunspots and storms. Sunspots are cooler areas on the sun's surface, and they look like dark freckles through a telescope. The sun also produces big explosions of energy called solar flares.

▼ *Sunspots may be as large as eighty thousand kilometres in diameter.*



SUPERPOWERED FACT

In one hour, more sunlight falls on the earth than what is used by the entire population of the earth in one year.

Inside the Sun

The sun is made up mostly of hydrogen and helium. There are traces of other elements like carbon, oxygen, nitrogen, iron, neon, silicon, sulphur, and magnesium.

In the sun's core, the hydrogen atoms combine together to form helium. This reaction gives out huge amounts of heat and light, making the sun very hot.

▶ *While the temperature on the surface of the sun is about six thousand degrees Celsius, inside the core, it is ten to fifteen million degrees Celsius.*

Nothing lasts forever

Scientists believe that the sun will not shine forever. It will probably continue to shine for about seven billion years before it gets bigger and bigger until it scorches all life on the Earth. Afterwards, it will shrink again until it is smaller and smaller. It will end its life as a white dwarf star.

■ Gravity: Natural force of attraction

The early days

The sun gives out huge amounts of light and heat energy. This is called solar energy, and only some of it reaches the earth's surface.

The sun as god

Since the beginning of time, people worshipped the sun in many forms. The very first civilization, the Sumerians, even had a sun god. However, sun worship reached its height with the Aztec, Maya, and Inca civilizations of South America.

▲ *The Incas of the thirteenth century worshipped the sun; they regarded their king as the 'child of the sun'.*

▼ *If the sun's rays are focused on a piece of paper, it will catch fire.*

Old is gold

Man has used solar energy for thousands and thousands of years—from keeping warm to drying food. In prehistorical times, cavemen sought south-facing caves as dwellings to take advantage of the sun's heat and light.

WORD POWER ▶ Nomadic: People who have no fixed home

From Greek gods to Roman emperors

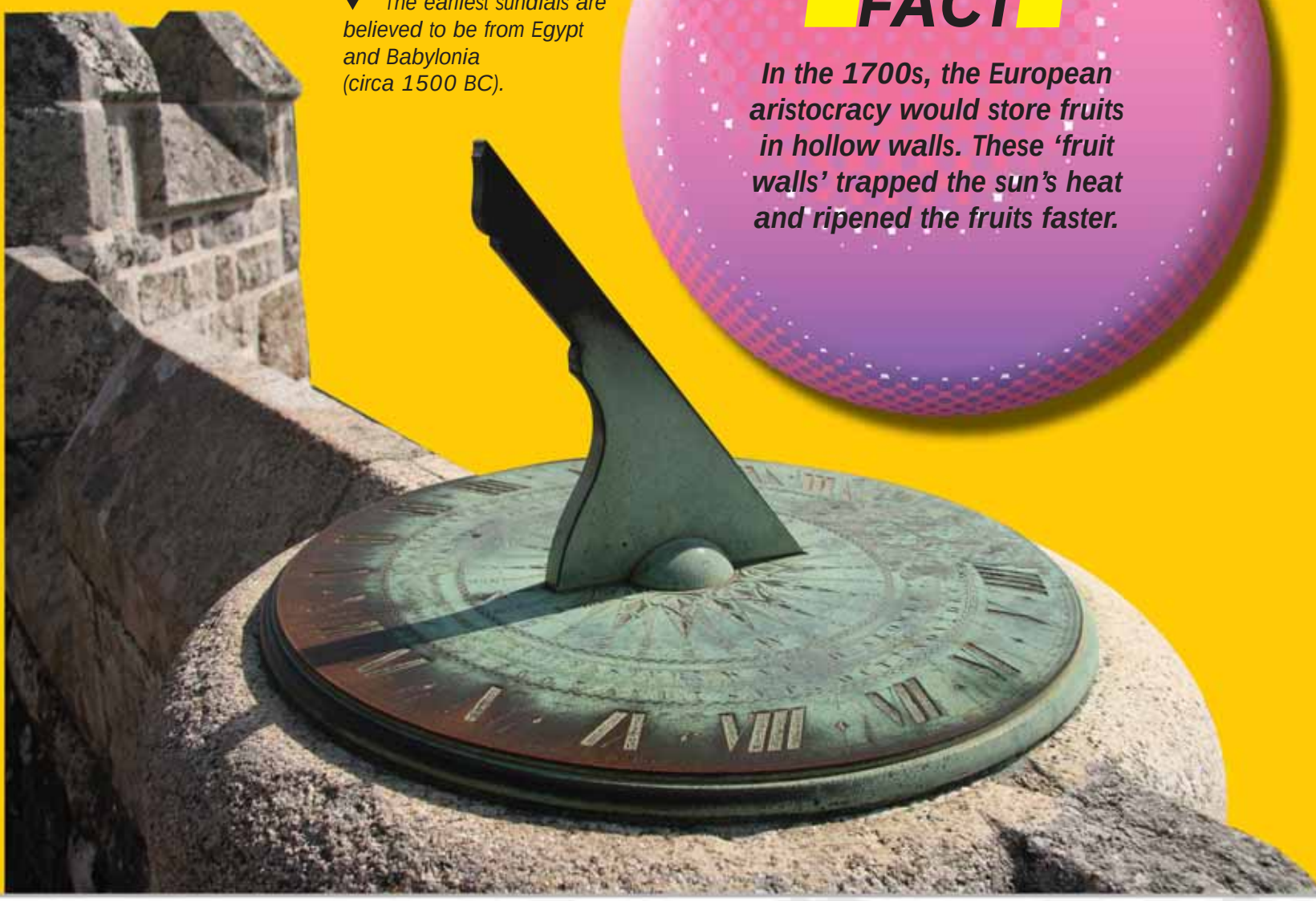
Ancient Greeks and Romans made use of the sun's energy to light and heat indoor spaces. The Romans covered openings of buildings with glass or mica to retain the heat of the winter sun. The Romans got the idea to put glass in windows, which allowed sunlight to pass through and trapped its heat.

Telling time

Long ago, people did not have clocks. They told time by looking at the length of the shadow of a stick. They would place the stick vertically on the ground. As the position of the sun changed, so did the length (and position) of the shadow. The shadow stick is called a gnomon. The gnomon and the base form a sundial. A sundial is one of the earliest inventions of man. It can tell time as accurately as a watch. Some nomadic people still use sundials for timekeeping.

SUPERPOWERED FACT

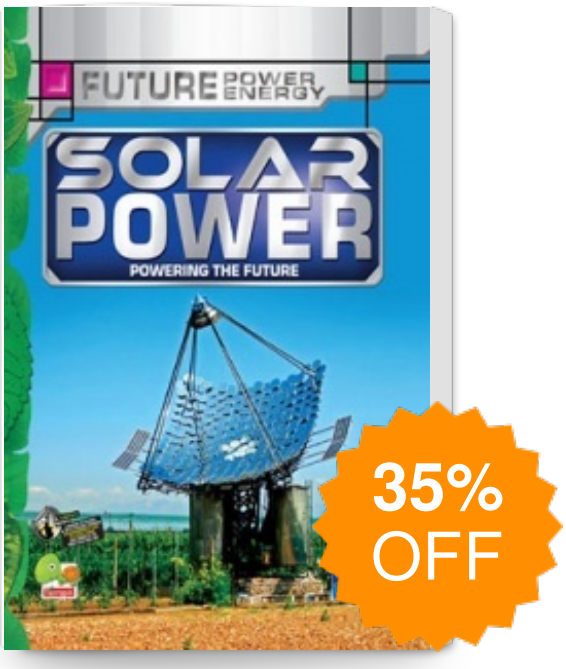
In the 1700s, the European aristocracy would store fruits in hollow walls. These 'fruit walls' trapped the sun's heat and ripened the fruits faster.



▼ *The earliest sundials are believed to be from Egypt and Babylonia (circa 1500 BC).*

■ **Mica:** Mineral commonly found in igneous and metamorphic rocks

Future Power,Future Energy : Solar Power



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