

The Earth is our friend

Learn about Earth-friendly solar panels



A talk in the woods

Sola, Little-bird, and Dog are very good friends. One day they went out and played in the woods as usual and they heard someone crying in the distance.

Sola said, “What’s that?”

“What’s the matter? Who’s crying over there?”

“Wah! My friends are all disappearing, one by one,” said the tree.

“I’m getting lonely.”

“A lot of trees are being cut down, all over the world, and the animals who live in the woods can’t find anywhere to live.”

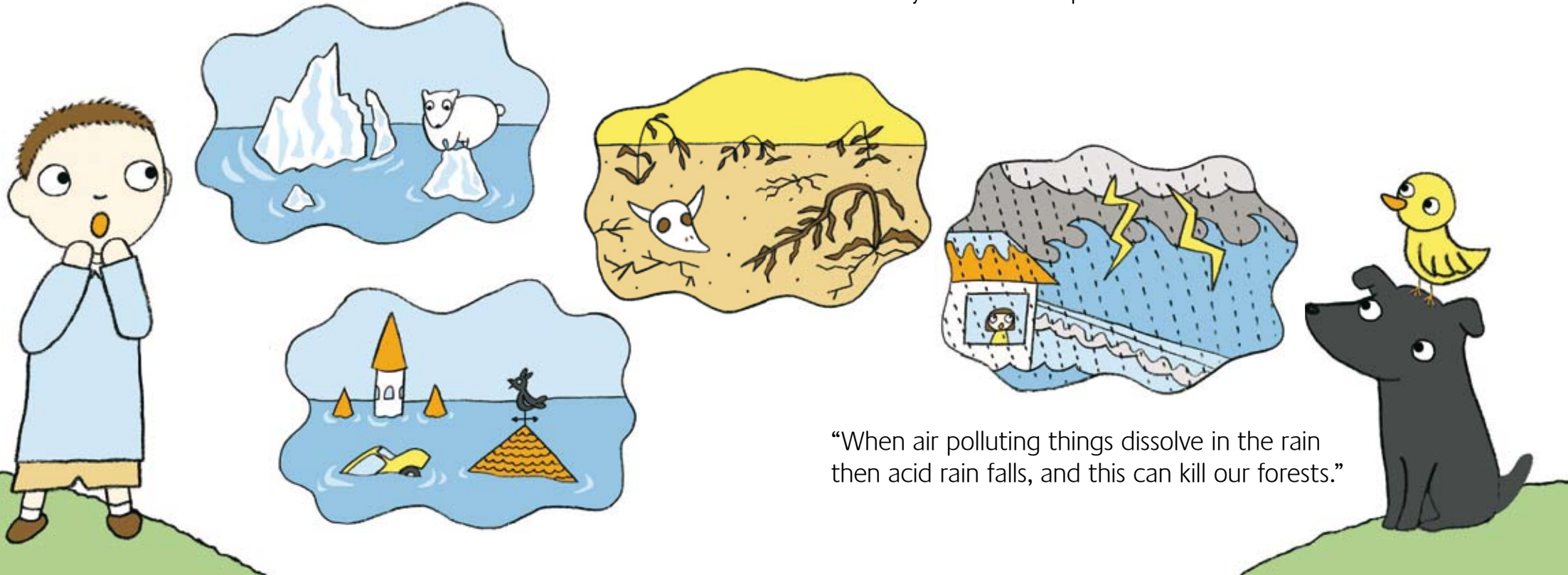
It looks like the Earth has got some problems!



What is happening to the Earth now?

“Hey, please tell us what kind of problems we have because we are all friends living together here on the Earth,” said Sola.

“Environmental changes are causing global warming. That means the temperature is going up on the Earth. We can see the effects of this, such as ice starting to melt at the North Pole, low-lying countries are sinking, drought is preventing people from farming, and there is unusual weather – like downpours of heavy rain in some places.”



“When air polluting things dissolve in the rain then acid rain falls, and this can kill our forests.”

What on Earth is the reason?

Sola was thinking hard about why all this has been happening.

When he looked back on his everyday life, he remembered several things ...

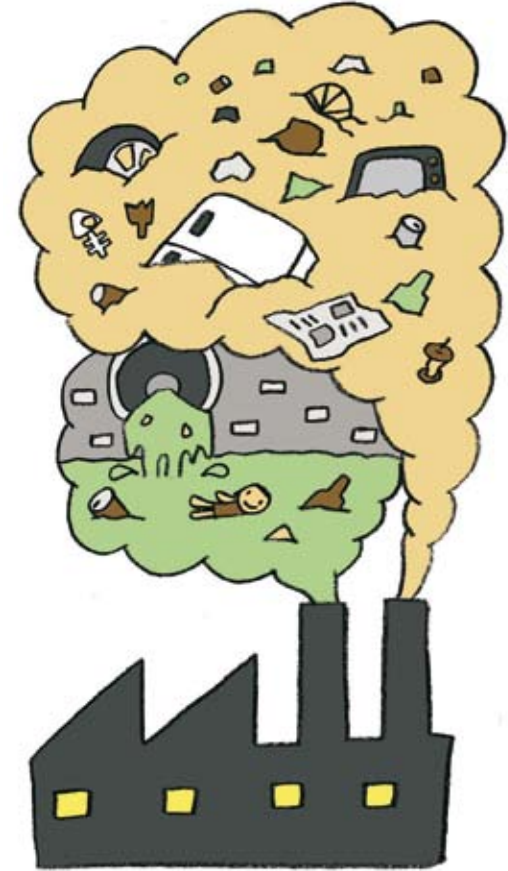


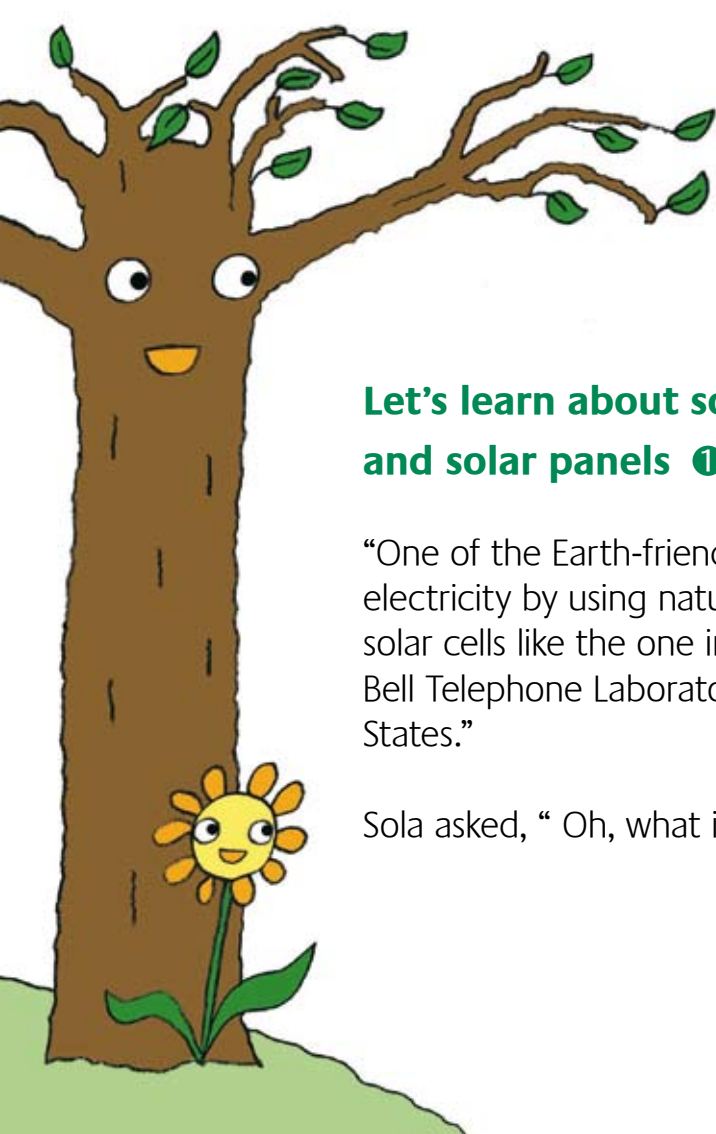
“Come to think of it, we human beings use a whole lot of water, oil, gas, electricity, and other resources, without even thinking about it. We do this in order to make our lives more comfortable, don’t we?”

“That’s right. Now, it just seems natural to make a lot, use a lot, and throw away a lot.”

“For example, when we use a lot of coal or oil to make electricity, carbon dioxide is put into the air, and this causes global warming and air pollution.”

“Then why don’t we use more Earth-friendly sources of energy, instead of oil and coal?”





Let's learn about solar cells and solar panels ①

“One of the Earth-friendly ways to make electricity by using natural energy is to use solar cells like the one invented in 1954 by Bell Telephone Laboratories in the United States.”

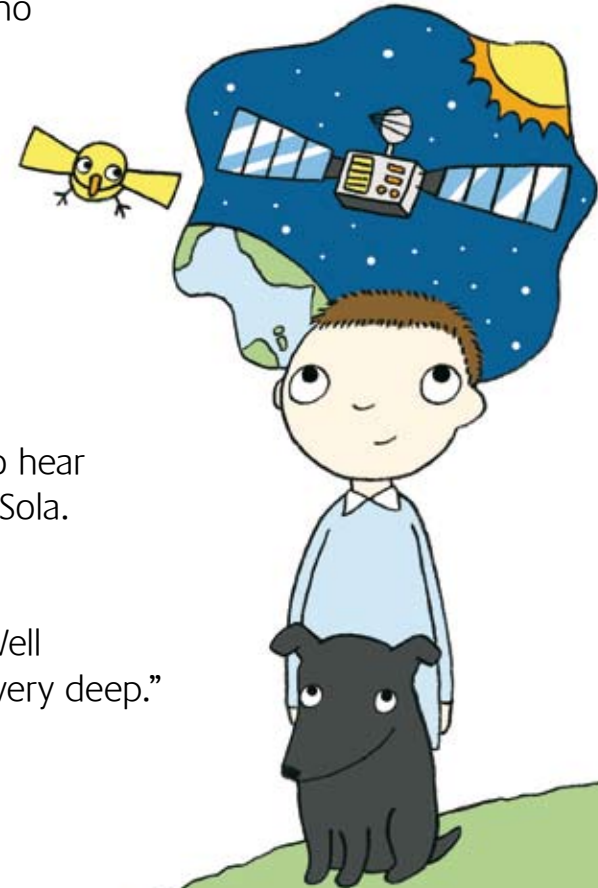
Sola asked, “ Oh, what is that like?”

“The solar cell makes electricity by itself as long as it gets sunlight. It has been used in places without electricity, such as lighthouses and places with no electric power companies.

The first place in the world where solar cells were used was, what a surprise, on a satellite in space!”

“Wow! That’s great. I want to hear more about solar cells,” said Sola.

“Why don’t you go ask Mr. Well in the woods about it? He’s very deep.”



Let's learn about solar cells and solar panels ②

Right away Sola and his friends went to see Mr. Well, the wisest one in the woods.

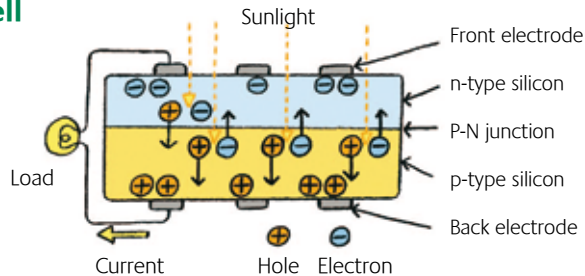
“Hello, Mr. Well,” Sola said. “Would you tell us about solar cells?”

“A solar cell is the main part needed for changing sunlight into electricity. If you have sunlight and solar cells, you can make electricity anywhere. To get lots of energy, you can connect solar cells together to make solar panels.”

“But can you really make electricity with this solar cell? It looks like a simple thin plate.”

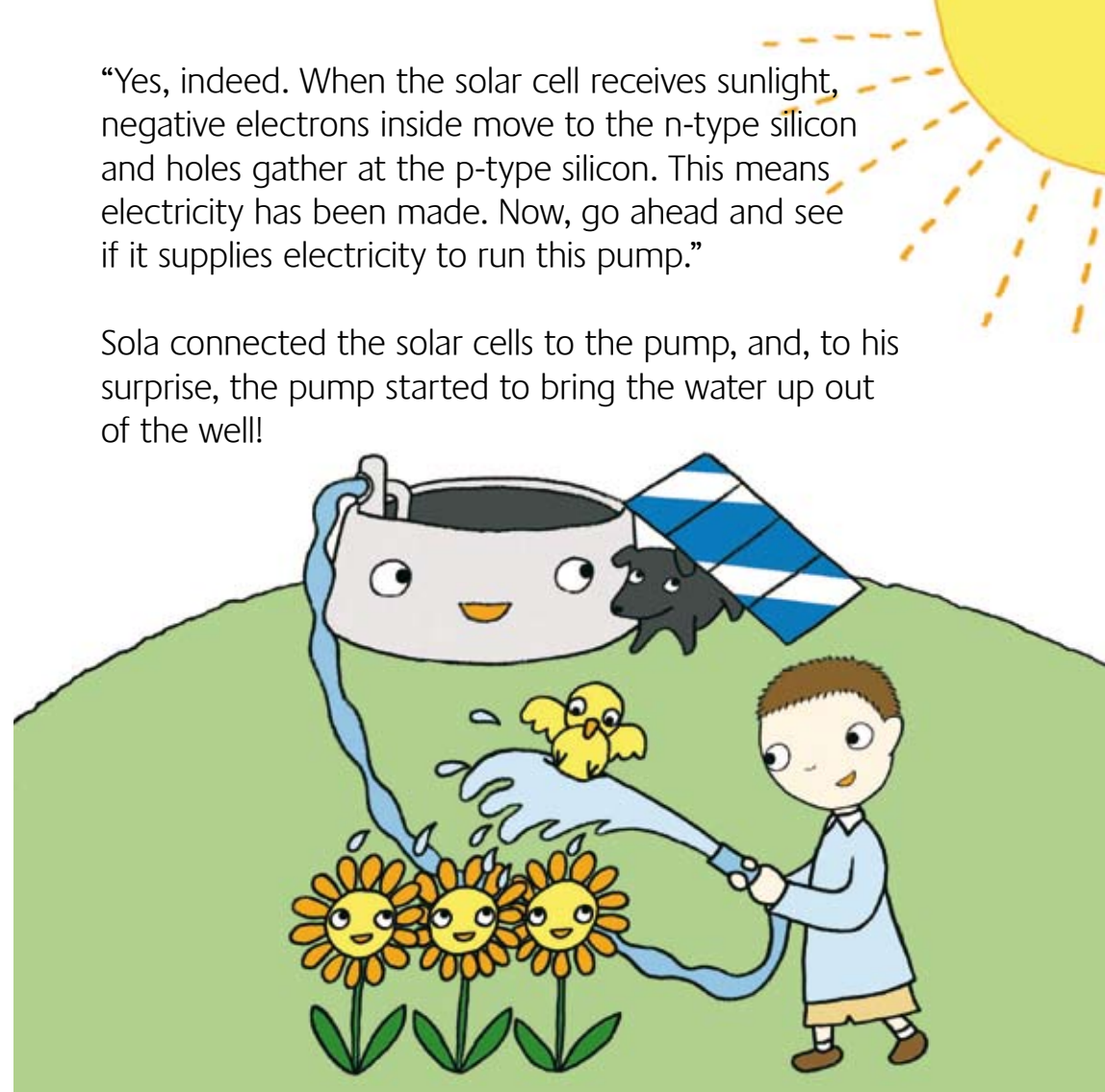
The principle of the solar cell

When sunlight hits the solar cell, negative electrons are collected at the n-type silicon and holes at the p-type silicon, resulting in the generation of electricity.



“Yes, indeed. When the solar cell receives sunlight, negative electrons inside move to the n-type silicon and holes gather at the p-type silicon. This means electricity has been made. Now, go ahead and see if it supplies electricity to run this pump.”

Sola connected the solar cells to the pump, and, to his surprise, the pump started to bring the water up out of the well!



Let's learn about solar cells and solar panels ③

Now Sola and his friends were told by Mr. Well how to find the materials for a solar cell. Walking in the woods they found some stones by the river.

“This is it! This stone contains silicon, a material needed to make a solar cell. Mr. Well said that this stone is called ‘silica rock’ and was used to make a fire in olden times.”

“To make a solar cell you melt the silicon and then let it harden, slice it, place positive and negative electrodes on it, and apply a coating to absorb lots of sunlight.”



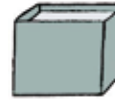
How a solar panel is made

①



The chief material used is silicon. Silicon can be found in whitish stones.

②



The silicon is melted at a high temperature, and poured into a mold to solidify. The solidified silicon is called an “ingot”.

③



Several smaller ingots are cut from the surface.

④



These ingots are cut into thin slices. The slices are called “wafers”.

⑤



Next, n-type and p-type layers are created on this wafer. Antireflective coating is applied, to prevent the reflection of light. Electrodes are printed to carry the electrical current. These units are called “solar cell elements”. Here, test to see if the current is really flowing.

⑥



Then, the cells are wired together, the panel is covered with glass and enclosed with a frame.

⑦



Finally, it is tested to make sure that it really does generate electricity. Now, the solar panel is complete!



Solar cells and solar panels to preserve the Earth

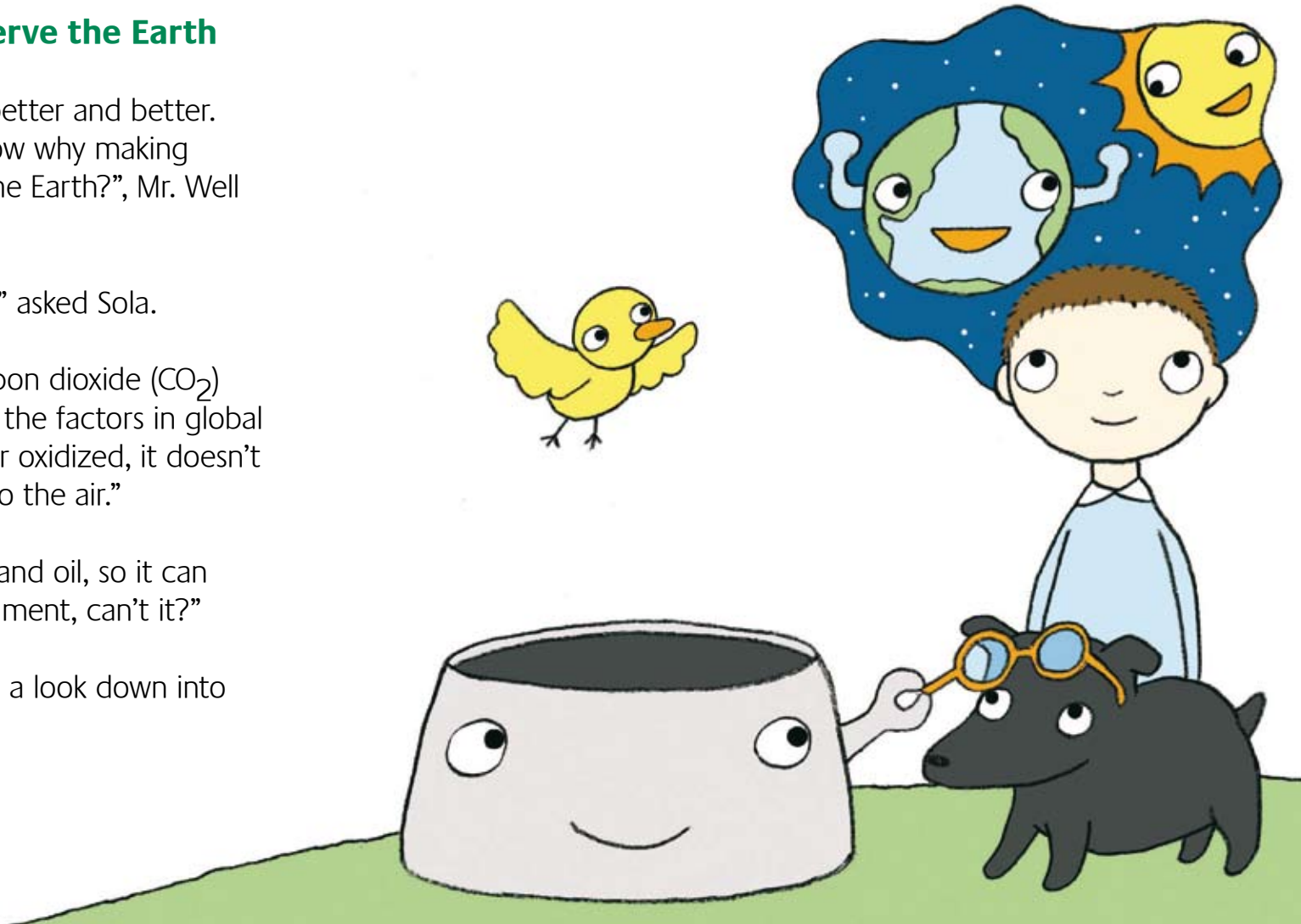
“You seem to be understanding solar cells better and better. Now, let me ask you a question. Do you know why making electricity from sunlight helps to preserve the Earth?”, Mr. Well asked.

“Well, let’s see, that’s difficult. Why does it?” asked Sola.

“Because the solar cell doesn’t produce carbon dioxide (CO₂) when it makes electricity and CO₂ is one of the factors in global warming. Also, because nothing is burned or oxidized, it doesn’t put exhaust gasses or harmful pollutants into the air.”

“I see. And sunlight is unlimited, unlike coal and oil, so it can make electricity for our future clean environment, can’t it?”

“Exactly! Now put on these glasses and take a look down into the well.”



What solar panels can do ①

Looking down into the well, wearing the glasses Mr. Well gave them:

“Look! I see a desert. It looks like those camels are carrying something,” said Sola.

“Those camels are carrying refrigerated boxes powered by solar panels, to deliver important things to the desert villages,” explained Mr. Well.



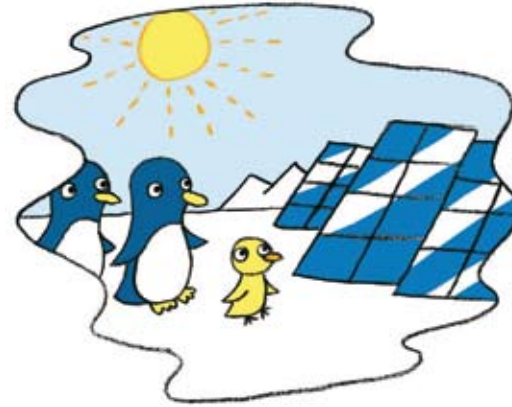
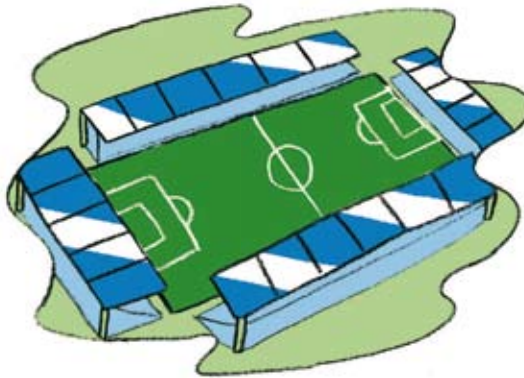
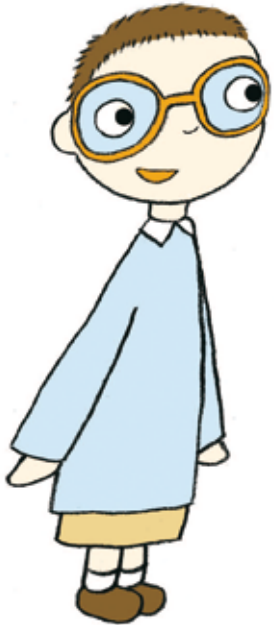
“What kind of important things?”

“The boxes contain medicines to prevent diseases such as polio. The medicines will only work if they are kept cool until they are used.”

“This means that they can help to protect children from disease. Solar panels are really great!”

What solar panels can do ②

“Now, I see a town. People are using solar panels all around town, at lots of places, like on houses, schools, soccer fields, hospitals, and airports. Wow! I didn’t know they were used at the South Pole, too.”



“Here comes a panel delivered to a small village by bicycle. Will the electric lights really come on? Oh, here’s the light! Wow! That’s great!”

“A solar panel is a magic panel that makes life better.”

What else can we do for the Earth?

Let's think together about what each one of us can do to help preserve our precious Earth!

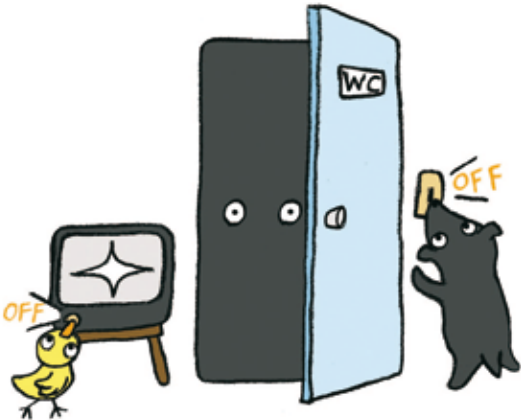
Recycling

Newspapers, bottles, and empty cans all can be reused.



Electricity-savings

Turn off the TV using the main power switch. Don't leave the bathroom light on when you walk out.



Waste reduction

Don't leave the faucet running when you use water. Don't start a new notebook before you've finished the old one.



Reducing exhaust emissions

When you go out, use public transportation, such as trains and buses. It is a good idea to ride your bicycle to get around.

Our Future Earth

All of us, human beings, animals, and trees and plants in the woods, are friends living on the planet Earth.

In order to make the Earth a more friendly planet in the future, it is important for all of us in the world to have consideration for our friends and to act together.

We need to change our way of thinking about using things, and learn to be happy using less. Then we will not find the trees in the woods crying anymore.





THE NEW VALUE FRONTIER



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