

Copyright © 2010

Laura and Grandpa

Discovering Science Together

LOOK
INSIDE



By Award-Winning Author
Dr. Robert H. Krupp



Laura and Grandpa—Discovering Science Together

Book 2

Table of Contents

Clouds

Pg. 5

Time for Slime

Pg. 25

Hail

Pg. 35

You can download and read a story
from this book!

Buy the book to read the
additional chapters-

We hope you enjoy reading
together!

Please take a moment to leave a review
on [Amazon.com](https://www.amazon.com)!

We appreciate the review and hope
you enjoy your free chapter!

CLOUDS



Clouds



It was a beautiful summer day.

Laura and her
cousin Kailey
were lying in the
shade of an elm
tree.

Looking up, they
saw puffy white
clouds floating by.



Laura's Grandpa sat on the porch reading a book.

"Papa, where do clouds come from?" called out Laura.

"Now that's a very good question," answered Papa.

"To answer you I could simply say a cloud is a form of water.

However, I would like to tell you a bit more—OK?"

She laughed and said, "Sure, Papa."

"You and Kailey come and sit on the porch while I collect a few things."

Papa walked around the garden picking up different objects.

When he returned to the porch, he placed them on a small table.

“To begin, I want you to look at the things I have put here,” he said. “What are they?”

“Leaves,” said Kailey.



“Some sticks and stones,” Laura answered.

“Good! I picked these things because they are examples of what is called a **solid**.

I could have chosen other objects—the book I am reading, Laura’s shoes, or Kailey’s bracelet.

All these things are **solids**.

Think about that while I go into the house to get some other things.”

When he came back, Papa carried
a tray holding three glasses . . .

one with water,



another with
milk,

and the third
contained orange
juice.



There were also some bottles of,

. . .



vinegar,

Coca Cola,



and a can of 7-Up.

He set the tray on the table.

“What’s in each glass, Laura?”

“Milk, water, and orange juice are in the glasses,” she answered.

“Kailey, what’s in the bottles and can?”

“Vinegar in one, Coke in the other, and the can has 7-Up in it,” she replied.

“Excellent! Now think back to what I said earlier.

The glasses, the bottle, the can are all **solids**.

What is inside them is not a **solid**.

What do we call what's inside those containers?" Papa asked.

Both children frowned and looked at each other.

Then Laura said, "Are they called **liquids**?"

"Right you are!

"To get the water, milk, or juice into a glass, what did I do, Kailey?" asked Papa.

“You poured those **liquids** into each glass,” she answered.

“Correct. This is a feature of things called **liquids**.”

A **liquid** can be poured from one container into another.

The **liquid** then takes the shape of its new container.

Notice the shape of the Coke in the bottle compared to the soda in the can, or milk in the glass,

or coffee poured into a cup.



Any **liquid** poured into a container takes the shape of the container even if it's a spoon," explained Papa.

"Do you think you see the difference between things that are a **solid** and those that are a **liquid**?"



"Yes," said Laura as both girls nodded.

"Good! Now, let's look at something else."

Papa took a balloon out of his pocket, blew it up, and tied it tightly with a string.



He let go of it and said to Kailey,
“Sit back and take a nice deep
breath.”

When you took that breath of air,
did you breathe in a **solid** or a
liquid?”

“Neither, I took in a breath of air,”
answered Kailey.

“Did I fill my balloon with a **solid** or a **liquid**?”

“You filled it with your breath, which is not a **solid** or a **liquid**,” answered Laura.

“Kailey, where is my balloon?” asked Papa.

“It’s lying on the porch floor,” she answered.

“Have either of you ever seen a balloon rise up in the air?”

“Maybe you’ve seen large, colored balloons carrying people up in a basket.”

“Yes, I saw balloons float up in the sky at my birthday party,” answered Kailey.



“Last summer mom, dad, and I went to New Mexico,” replied Laura.

“There we saw large balloons with people in them.”



“Mom said these were **hot-air** balloons, but I don’t know what that means.”

“Very good! Kailey, when you took a deep breath, you were breathing in a **gas** called air.

I blew up the balloon with a different **gas**, my breath.

The **gas** in the balloon is heavier than air and that’s why it sank to the floor.

The gas that filled the balloons on your birthday was **helium**, which is lighter than air, and that's why they floated upwards. Laura, the **gas** filling the balloons you saw in New Mexico was **hot-air**.

Hot-air, like **helium**, is lighter than air.

That's why those big balloons floated upwards," explained Papa.

All right girls, let's go over this again.

What are the three forms things may have?" asked Papa.

Do you mean that they are either a **solid**, **liquid**, or **gas**?" asked Laura.

"That's it! One final point I would like to make.

Laura, look at the front door into your house.

Could you walk through that door without opening it?"

"No," she answered.

"Why not?"

"It's a **solid** and I can't walk through it."



“Good! Kailey, can you walk through a **liquid** like water?”

“Yes, I can.

When I go to the beach I play on the sand and walk in the water,” she replied.

“Very good!



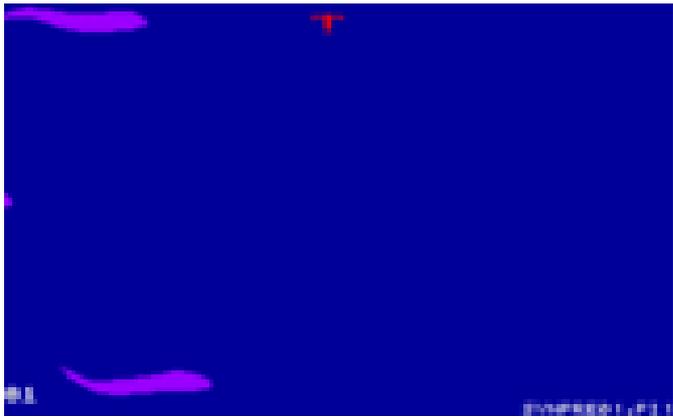
Can either of you tell me if you can walk through a **gas**?"

"Of course," said Laura.

I walk and run through air all the time—and it is a **gas**."

"Absolutely right," smiled Papa.

“In fact some scientists say that we live in a sea of air—just like fish live in a sea of **liquid** water.



Now I would like to talk about something different.

It will be still be about these three forms of objects, but at this time we'll talk about **changing** them.

Do you know what it means to **change** something?"

"Oh, yes! I know my mom has to **change** my baby brother's diaper when it stinks," said Kailey.

“Good example!

Things are always **changing** around us.



Look at the sky, see the clouds—
they are different than the ones
we saw earlier.

Look at the leaves.

Had they stayed on the tree, they would **change** from green to brown in the fall.

Some **changes** happen but don't vary things too much.



A cloud in the sky could **change** its shape, but it is still a cloud.

I could drop this **solid** glass of **liquid** milk onto the floor of the porch.

The glass might break into bits of **solid** glass.

The milk would spill out, but still be small drops of **liquid** milk."

"I think I understand," said Kailey as Laura nodded her head.

“Let’s now talk about a very different kind of **change**.

Have you ever seen something that is a **liquid**, **change** into a **solid**?”

The girls thought for a moment.

“I think so,” said Kailey.

“I’ve seen my dad take an ice cube tray and fill it with **liquid** water.

He put it into the freezer part of the fridge.

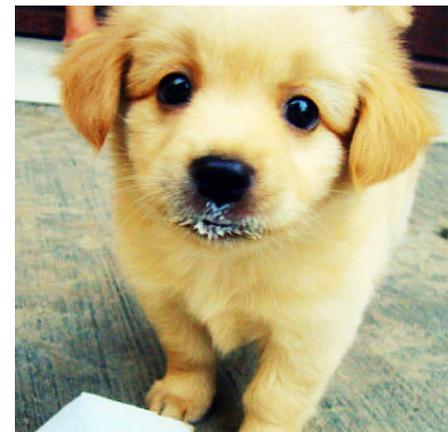
Later, when he took it out, it was frozen into **solid** ice."

"Excellent example, Kailey.



Yes, the **liquid** water became **solid** water, which we call ice.

Another example you could have mentioned is to change **liquid** cream into **solid** ice cream," said Papa.



“Is this the same kind of **change** that happens when the pond in the park freezes over in winter?” asked Laura.



“My dad takes me ice skating when that happens.”

“Yes it is!” smiled Papa.

“A similar, but different type of **change** is to have a **liquid** become a **gas**.”

This may be harder for you to observe.

Have you ever seen an example of this?”

“Maybe,” said Laura.

“One time my mom was boiling water in the kettle to make tea.

She got a phone call and forgot about the boiling water.

When she remembered and went to the stove, she found the water in the kettle was gone.

It was so badly burned, she threw it away."

"That's it!

What happened to the water in the kettle?" Papa asked.

"I'm not sure. Could it have gone into the air," wondered Kailey.



“Right!

The **liquid** water **changed** to a **gas** called **water vapor**.

The **water vapor** then mixed with the air in the kitchen.

Can you think of a **change** where a **solid** goes back to a **liquid**?”

Kailey frowned and said, “I’m sorry, I don’t know.”

“That’s OK!

Think of putting ice cubes in a glass with water.

After you drink the water, some **solid** ice cubes may be left in the glass.

If you leave the ice cubes in the glass, what happens after awhile?”

“I know,” said Laura.

The ice cubes melt and **change** into **liquid** water.”

“Right!

Now look at the can of 7-Up.”

When I brought it to the table, the outside of the can was dry.

Do you see the tiny **liquid** drops of water on the outside?

Where did they come from?"

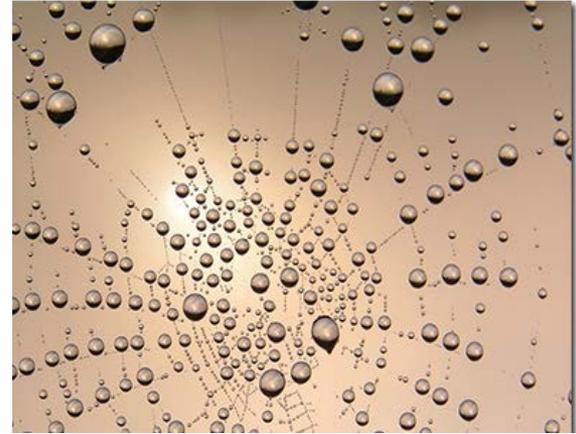
"I don't know," said Laura.



Did the **water vapor**, which is a **gas** in the air, change back to **liquid** water on the can?" asked Kailey.

"Correct!"

This same change occurred when **dew** formed on your dad's car this morning.



The **water vapor** in the air was a **gas**.

Because the metal on the car was cold, the **water vapor** cooled down and **changed** to **liquid** water.

The water **condensed**—
appeared—on the cold metal.

The **liquid** drops of water on the
can or car are called
condensation,” explained Papa.

“Is this the same thing I’ve seen
in winter when it is very cold
outside”? asked Kailey.

"I've found **liquid** water drops on my window."



"Very good!

Yes, that's another example of the same type of **change**," said Papa.

"OK, let's come back to the question Laura asked awhile ago.

She asked me where clouds come from."

Laura laughed. “I remember asking that question.”

“I believe you both will now be able to understand how clouds form.

Let me put it together for you . . .

1. On Earth, we find many bodies of **liquid** water.

There are lakes, rivers, streams, the pond in the park, and large bodies of water called oceans .

2. During the day, sunlight heats these bodies of water.

Due to this heating, some **liquid** water **changes** into **water vapor** which mixes with the air.

3. Because the **water vapor** is warm, it rises above the Earth's surface, just as the **hot-air** helped the balloons float upwards.



4. Air temperatures high above the Earth's surface are very cold.

As this warm **water vapor** rises, it cools and **condenses** into tiny drops of **liquid** water.

We see these **liquid** drops of water as tiny, wispy clouds—like smoke from a chimney.



5. As time passes, more and more **water vapor condenses** and the tiny cloud drops become larger.



6. Finally, the clouds develop thick, dark drops of **condensed** water.

When the drops are heavy enough, they fall to the Earth as rain.



“Any questions?” Papa asked.

“Not about clouds—but what about **hail**?” Laura asked.



Papa smiled and said, "Oh boy, another great question.

Could we leave that for another day?"

"OK, but don't forget!" said Laura and Kailey together.



If you can't explain it **simply**, you
don't understand it well enough.

– Albert Einstein

