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Glass Stories Comics

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EDITORIAL

HI, HOW ARE YOU?

THIS IS THE FIRST IN A COMICS SERIES ABOUT “GLASS STORIES”! IN OTHER WORDS, THESE COMICS ARE GOING TO DISCUSS THIS VERY INTERESTING MATERIAL, WHICH ONE SEES IN LOTS OF EVERYDAY STUFF! WANT AN EXAMPLE? LOOK AT YOUR FRIEND’S EYEGlasses, OR THE WINDSHIELD OF YOUR FATHER’S CAR. SEE?

IN THIS FIRST ISSUE, WE’RE GOING TO MEET A BOY CALLED Vinnie AND HIS FRIEND LOUISE, WHO ARE HAVING TROUBLE WRITING A SCHOOL ASSIGNMENT.

Vinnie’s brother, Matthew, is a glass science researcher WHO WORKS AT CERTEV (CENTER FOR RESEARCH, TECHNOLOGY AND EDUCATION IN VITREOUS MATERIALS). TO HELP THE KIDS WITH THEIR SCHOOL ASSIGNMENT, HE DECIDES TO EXPLAIN, IN A FUN WAY, WHAT GLASS IS, HOW IT WAS DISCOVERED, THE TYPES OF GLASS AND THEIR APPLICATIONS IN DAILY LIFE.

WILL THE KIDS MANAGE TO COMPLETE THEIR SCHOOL ASSIGNMENT? DO YOU WANT TO FIND OUT? THEN READ ON!
Hey, Vinnie ... shouldn't we get back to work?

The teacher told us to do research on some sort of important material that's found in everyday items, but I can't think of anything...

Calm down, I'm finishing this phase! There!! I got it!!

Gosh, I'm so hungry! Let's grab something to eat.

You're a really hopeless case...

Check it out... there's cake...

Great, there's even some juice!!
Vinnie! What's up??

A disaster! Mom'll be angry with me... a week without video games!!

Let's clean up this mess right away, before your parents or brother arrive!

Hi guys!! I'm home!

Oh no!!
Hey... what's going on here?

Oh, it's really nothing, bro! Just a glass jug that fell and broke!

Oh, are you still doing that assignment? About materials?

Uhh... yes, but we're out of ideas.

Why don't you write about glass?

That's too complex!

How am I going to clean up this stuff scattered all over the floor?

Oh, so that's how you see glass?

Well, let me tell you something. Glass is actually quite complex.

There! Didn't I just say so?!
I DON'T GET IT... DON'T YOU DO RESEARCH ON GLASS AT THE UNIVERSITY, MATTHEW? WHY DO YOU THINK IT'S COMPLEX?

BECAUSE IT'S HARD TO UNDERSTAND WHAT IT IS, BUT THAT'S WHAT'S SO COOL ABOUT GLASS.

YOU'VE ALREADY LEARNED ABOUT THE THREE KINDS OF PHYSICAL STATES, RIGHT?

YES! SOLIDS, LIQUIDS AND GASES!

SO LET ME ASK YOU... WHAT IS THE PHYSICAL STATE OF GLASS?

WELL, THAT'S EASY! IT'S A SOLID!

OK, VINNIE GOT PART OF THE ANSWER RIGHT, IT IS A SOLID BUT THERE'S SOMETHING MORE IN IT...

SEE THIS JAR?

WHAT'S ITS SHAPE?

CAN YOU SEE THAT IT HAS A DEFINITE SHAPE? IT'S WELL-ORDERED, RIGHT?

IT'S A CUBE!

NOW LOOK AT THIS COTTON CANDY. WHAT SHAPE DOES IT HAVE?

AS YOU CAN SEE, ALL ITS SIDES ARE IDENTICAL, WHICH IS CALLED A CRYSTALLINE, AN ORDERED SHAPE.
I don't know. It looks kind of shapeless...

One can't really tell...

Yes, that's right, Luisa! It's impossible to tell the shape of cotton.

So we call it amorphous, without a clearly defined shape. The same goes for the glass structure.

So, in short, glass is an amorphous solid!

Now do you see why I said that glass is rather complex?

I think I get it a little now...

Do you know who discovered glass?
Sure! It was Pedro Álvares Cabral, right? Our teacher said so in class!!

Hey, no fighting, you two! (I'm also not sure that Cabral discovered Brazil.)

Actually, the fact is that glass wasn't discovered by one particular person.

No way, Vinnie. He discovered Brazil!! Not glass!

Wasn't it?!
GLASS HAS BEEN USED SINCE PREHISTORIC TIMES TO MAKE WEAPONS!

PREHISTORIC AGE

BUT WHAT HUMANS USED IN THIS CASE WAS NATURAL GLASS, CALLED OBSIDIAN.

OBSI- WHAT ?!

WHERE ARE WE NOW?

THERE ARE RECORDS CLAIMING THAT THE PHOENICIANS WERE THE FIRST TO PRODUCE SYNTHETIC GLASS, THE KIND ONE SEES NOWADAYS. AND THEN CAME...

WOW, BRO, WHAT A DIFFICULT WORD!

PHOENICIANS
"The Egyptians!" They also developed techniques such as glass-making, but they went further! They mixed glass with ceramics!

That's beautiful! Look how pretty this blue glass vase is!

Yeah, and they also did interesting things, like mixing compounds containing copper and cobalt to produce that pretty blue color!

But so far I've only seen tinted glass... What about colorless glass, didn't that exist yet?

Ok, let's go on to the next place!

Colorless glass appeared only later in Alexandria, after the glassmakers improved the production process.

Besides, some transition metals, such as iron, have to be removed because they act as impurities in glass.
The glass production process became increasingly sophisticated over time, until the present day.

What?! Shall we go back?

Yeah, let's play.

OK.

Hey, what do you guys think you're doing?

Hey, you two are just hopeless! Stop playing video games and listen up!

Hahaha I'm gonna beat you!

No you're not!!

The armored superhero? Who is that?

Zup!

Noo!!
HE WEARS A GLASS SUIT THAT PROTECTS HIM, AND WHEN HE GETS HIT BY BULLETS, HIS SUIT GETS A SPIDER WEB DESIGN, BUT HE'S PROTECTED!

LIKE LAMINATED GLASS. IT'S A KIND OF SAFETY GLASS.

EVEN IF IT BREAKS, ITS PIECES STICK TOGETHER BECAUSE OF THE LAYER OF POLYVINYL BUTYRAL, CALLED PVB, WHICH IS A TYPE OF RESIN.

THAT'S WHY ITS SHARDS DON'T SCATTER!

AND THERE ARE OTHER TYPES OF GLASS, TOO! FOR INSTANCE, MIRROR GLASS.

OH, I THOUGHT THEY WERE MIRRORS... SO THAT'S GLASS?

YES IT IS. THOSE WINDOW PANES ARE COVERED WITH A REFLECTIVE METALLIC COATING.

WOW, THEY LOOK REALLY NICE IN THE BUILDINGS!
Oh, and look at this door, which is made of tempered glass.

Tempered? Is it in a bad mood?

Of course not! "Tempered" has nothing to do with moods!

It means that this type of glass underwent a heat treatment called tempering, and that's why it's called tempered glass.

That glass looks normal to me...

It may look normal but it isn't - it's much stronger.

When tempered glass breaks,

shards

It breaks up into small fragments, so there's less risk of someone getting hurt.

By the way, do you guys realize we're talking about stronger types of glass?

Such as glass-ceramics, for example?

Let's enter!

Glass what?!
IT'S CALLED GLASS-CERAMICS BECAUSE IT'S A MIXTURE OF GLASS WITH COMPOUNDS SUCH AS TITANIUM OXIDE, PHOSPHORUS OXIDE...

THese COMPOUNDS MAKE GLASS-CERAMICS MORE BREAK RESISTANT AND INCREASE ITS ABILITY TO WITHSTAND HIGH TEMPERATURES.

AND WHERE CAN WE SEE THESE GLASS-CERAMICS?

RIGHT HERE.

A STOVE?

YES! SOME MORE MODERN STOVES ALREADY USE THIS TYPE OF MATERIAL.

WOW, THAT'S COOL!

I THINK MOM WOULD LIKE THIS STOVE, IT LOOKS EASY TO CLEAN!

PRECISELY!

MATTHEW, WHAT ARE THESE THIN STRANDS?

AH, THAT'S OPTICAL FIBER.

"OPTICAL"? DOES IT HAVE ANYTHING TO DO WITH EYEGlasses?
Optical fibers are used to transmit data through the telephone network and on cable TV. They're also used as a kind of sensor in medical surgeries.

This fiber is composed of two glass layers (core and shell) and an inner layer of polymer.

Wow, and to think that such a thin strand can do that...

Oh, darn it, my glasses keep getting foggy...

Hey, wait a minute!

What material are your glasses made of, Louise?

I thought glass was normally used in windows and decorative vases, but I'd forgotten about my glasses!

And these lenses are made of real glass!

Yes, so as you can see, glass is everywhere!
Glass is used not only in windows and vases but also in eyeglasses, CDs, optical fibers and fiber optic products, lenses, and cell phone and TV screens. Glass is increasingly present in our lives.

Wow, this glass stuff is actually quite cool, bro!

That's why I like to study glass, so I can understand better why it's so complex.

And understanding about glass enables me to do research where I work to find alternatives that improve our daily lives!

Louise! Let's do our assignment on glass?

I was going to do that even if you didn't want to.

OK then! Let's begin!!
SO, FIRST LET'S TALK ABOUT WHAT GLASS IS...

RIGHT! AND THEN WE'LL GIVE SOME EXAMPLES! WE COULD TALK ABOUT GLASS, CERAMICS AND FIBER OPTICS...

CRÉC

HUH?!

HEY! WAIT A MINUTE, YOU TWO!

WHAT ABOUT THIS MESS HERE?

SORRY!! WE FORGOT ABOUT THAT!
I haven't changed my mind about this, bro...

What? About what?

About glass!! Glass is really complex!

Look at this mess! So many pieces...

Don't forget to separate the glass for recycling later, ok?

Ha ha ha ha

End