

THE SCIENCE OF STUFF

ALL

WELL HI, HELLO, HOW ARE YOU?
AND WELCOME TO THE SHOW
WE JUST CAN'T WAIT TO TELL YOU
ABOUT THE STUFF WE KNOW.

'CAUSE WE ALL LOVE TO CHATTER
'BOUT THE PROPERTIES OF MATTER
WE JUST CAN'T GET ENOUGH
OF THE SCIENCE OF STUFF.

WE LOVE OBSERVING LIQUIDS
WHEN THEY EVAPORATE.
LET'S CRANK THE HEAT UP HIGHER
AND WATCH THE CHANGE OF STATE.
OR WHAT GREAT SATISFACTION
FROM A CHEMICAL REACTION
WE'VE ALL BECOME A BUFF
OF THE SCIENCE OF STUFF.

WE'LL PUT ON THIS SHOW FOR YOU
AND WE WON'T EVEN SWEAT
BUT IF WE DO
YOU CAN BET
IT'LL BE THE BEST CONDENSATION YET.

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FLOOR DIRECTOR

And we're on in 5-4-3-2-1!

CHAD

Hello and welcome to *The Morning Mishmash with Chad...*

NINA

... and Nina. All this week on *The Morning Mishmash* we're exploring a topic near and dear to my heart...the science of stuff.

(CHAD makes a face)

Chad!! You agreed to stop making that face on the air!

CHAD

I know. Sorry. But I just want to get back to the things we usually do, like talking to movie stars and making brownies with retired racehorses.

NINA

And we will, Chad. But this one week is dedicated to SCIENCE. And the audience can't wait to get started, am I right? See? Just give it a chance, will you?

CHAD

Fine.

NINA

Great. Well, now that we have that over with, let's get on with today's show. We're going to start by talking about a little thing called matter.

CHAD

Matter? Sounds important.

NINA

Oh, it is, Chad. And our first guests today are very concerned that it's also dangerous. Let's welcome them to hear their story.

GUEST #1

Thank you, it's great to be here.

CHAD

And it's great to have you. Tell us why you're so worried.

GUEST #2

Well, most people have no idea, but this stuff called matter? It's EVERYWHERE.

CHAD

Is that *true*?

GUEST #3

Yes! Matter's in our food, in our drinking water, even in the air we breathe!

NINA

Can we back up just a minute? I'm not sure everyone in our audience knows what matter even IS. Could you explain it?

GUEST #4

Well..it's...you know...small particles of...It's kind of hard to explain.

NINA

Let's bring on some physicists to help us out.

PHYSICIST #1

Thank you, Nina. And thank YOU for bringing up these concerns.

PHYSICIST #2

Yes, it's important that we address scientific misconceptions before they spread and make people panic.

PHYSICIST #3

Exactly! You are right that matter IS in everything.

PHYSICIST #1

But matter is not dangerous. It's simply the "stuff " that's makes up everything in the whole universe. It's making us what we are!

TIMES ARE PRETTY CRAZY

ALL

TIMES ARE PRETTY CRAZY
THERE'S MATTER EVERYWHERE
IT'S IN THE FOOD YOU EAT
IT'S IN THE CLOTHES YOU WEAR
TAKE AN EVENING BATH AND YOU'LL FIND MATTER ON YOUR TOE
THAT SNEAKY MATTER FOLLOWS YOU NO MATTER WHERE YOU GO.

TIMES ARE PRETTY CRAZY
THERE'S MATTER EVERYWHERE
IT'S IN YOUR UNCLE'S BEARD
THOUGH PLEASE TRY NOT TO STARE
MATTER'S IN THE AIR YOU BREATHE AND IN THE KISS YOU BLEW
DON'T LOOK NOW BUT THERE IS MATTER STANDING NEXT TO YOU!

BUT IT'S OK, IT'S OK, IT'S OK YOU KNOW!

EVERYTHING IS MADE OF MATTER
MATTER'S IN EVERYTHING
CAN'T GET ENOUGH OF THAT PHYSICAL STUFF
THAT GIVES THE WORLD ITS ZING.

TIMES ARE NOT THAT CRAZY
MATTER'S JUST THE SAME
IT'S ALWAYS BEEN AROUND
THE WORLD'S CLAIM TO FAME.
THE UNIVERSE IS MADE OF IT; THANK GOODNESS THIS IS TRUE
WITHOUT IT THERE WOULD BE NO ME AND THERE WOULD BE NO YOU!

YEAH IT'S OK, IT'S OK, IT'S OK YOU KNOW!

EVERYTHING IS MADE OF MATTER
MATTER'S IN EVERYTHING
CAN'T GET ENOUGH OF THAT PHYSICAL STUFF
THAT GIVES THE WORLD ITS ZING.

YEAH IT'S OK, IT'S OK, IT'S OK YOU KNOW!
YEAH IT'S OK, IT'S OK, IT'S OK YOU KNOW!

CHAD

Phew! Well that's good news. I was definitely heading into panic mode.

NINA

Next, let's take a question from the audience.

AUDIENCE #1

If matter is in everything, why isn't everything the same? Are there different kinds of matter or something?

NINA

To explore that excellent question, let's bring out our next guests.

ARCHITECT #1

Thanks, Nina. I never thought small-town architects like us would get to go on a famous talk show!

CHAD

Architects? I thought today's show was about science?

ARCHITECT #2

It turns out that building houses has a lot to do with science. In fact different kinds of matter have different properties.

CHAD

I've always wanted to have a lot of different properties.

ARCHITECT #3

Actually, Chad, what we mean is that matter comes in different shapes and sizes and has different qualities.

ARCHITECT #1

Some things are soft; some are hard. Some things are flexible; some are rigid.

ARCHITECT #2

And you have to consider the properties of an object before you know how to use it.

ARCHITECT #3

We learned this the hard way.

PROPERTIES OF MATTER

ARCHITECTS

BRIDGES MADE OF METAL, BUILDINGS MADE OF WOOD
WHAT A LACK OF VISION IN MY NEIGHBORHOOD!
NO ONE'S TRYING GUMDROPS, NO ONE'S USING HATS
NO ONE'S STACKING WEASELS TO USE AS ROOFING SLATS.

SO I WENT TO CITY COUNCIL AND I SHOWED MY BLUEPRINTS THERE
COMPLETE WITH LIQUID SIDEWALKS AND HIGHWAYS MADE OF HAIR
THEY TOOK A LOOK AND PRAISED ME FOR MY CREATIVITY
AND THEN THEY ROLLED MY BLUEPRINTS UP AND GAVE THEM BACK TO ME.

ALL

PROPERTIES OF MATTER!
PROPERTIES OF MATTER!
HELP US FIGURE OUT WHAT AN OBJECT CAN DO.
PROPERTIES OF MATTER, WILL IT BEND, ABSORB OR SHATTER?
PROPERTIES WILL TELL US WHAT AN OBJECT CAN DO.

NOW I'VE LEARNED MY LESSON PROPERTIES ARE KEY
LIKE HARDNESS, STRENGTH AND TEXTURE AND FLEXIBILITY

SO NOW I BUILD MORE WISELY WITH BRICKS AND BOARDS AND DIRT.
I SAVE THE HATS FOR WEARING, THE GUMDROPS FOR DESSERT.

PROPERTIES OF MATTER!
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HELP US FIGURE OUT WHAT AN OBJECT CAN DO.
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CHAD

Wow. Whoever said “mind over matter” never tried building a gumdrop house, am I right?

NINA

Words of wisdom, Chad. Now let’s move on to today’s Power Question: What are the three states of matter?

AUDIENCE #2

Um, um, um...is it Illinois, Tennessee, and Rhode Island?

NINA

No, I’m sorry, that’s not it.

AUDIENCE #3

How about calm, joyful, and angry?

NINA

I’m afraid not. Anyone else?

SUPERFAN #1

Can we give it a try?

SUPERFAN #2

We know the answer!

CHAD

For those who don’t know, these Superfans are here for the taping of every episode, and they know a little bit about just about everything.

SUPERFAN #3

Actually we know a LOT about just about everything.

NINA

Okay, Superfans. If no one else wants to try, the question is yours to answer. What are the three states of matter?

SUPERFAN #1

Solid!

SUPERFAN #2

Liquid!

SUPERFAN #3

Gas!

NINA

That's correct! Chad, aren't you dying to get inside all this matter and understand what makes a solid a solid...a liquid a liquid...and a gas a gas?

CHAD

Nope. I know everything I need to know. I've got a SOLID reputation, LIQUID assets, and a truly GASSY...uh, personality.

NINA

Indeed.

CHAD

Come on, Nina! I don't want to talk about stuff that's too small to see. I can't picture it. Aren't we going to have any celebrities on the show today?

NINA

Be patient, Chad!!! Let's allow for our Superfans to tell us a bit more...

SUPERFAN #1

Solid!

SUPERFAN #2

Liquid!

SUPERFAN #3

Gas!

SOLID, LIQUID, GAS

ALL

SOLID, LIQUID, GAS
THESE ARE STATES
YOU CAN'T BYPASS
THEY TAKE UP SPACE
AND ALL HAVE MASS
SOLID, LIQUID, GAS.

SOLID, LIQUID, GAS
YEAH THESE STATES
ARE ALL FIRST CLASS
YOU WANT A STATE
YOU CAN'T SURPASS
SOLID, LIQUID, GAS.

SOLO 1

A SOLID, WELL, IT'S SOLID
IT LIKES TO KEEP ITS SHAPE
YOU WON'T FIND SOLIDS FLOWING
OR TRYING TO ESCAPE.

SOLO 2

A LIQUID THOUGH IS TRICKY
IT CHANGES SHAPES AND FLOWS
IT FITS IN ITS CONTAINER
NO MATTER WHERE IT GOES.

ALL

SOLID, LIQUID, GAS
THESE ARE STATES
YOU CAN'T BYPASS
THEY TAKE UP SPACE
AND ALL HAVE MASS
SOLID, LIQUID, GAS.

SOLID, LIQUID, GAS
YEAH THESE STATES
ARE ALL FIRST CLASS
YOU WANT A STATE
YOU CAN'T SURPASS
SOLID, LIQUID, GAS.

SOLO 3

A GAS IS MIGHTY MELLOW
WITH NO SHAPE OF ITS OWN
IT FLOWS AND FILLS CONTAINERS
WHEREVER IT IS BLOWN.

BUT GASES ARE FREE SPIRITS
THEIR SAILS ARE UNFURLED
LET THEM OUT OF THEIR CONTAINER
AND THEY'RE OFF TO SEE THE WORLD.

ALL

SOLID, LIQUID, GAS
THEY'RE STATES
YOU CAN'T BYPASS
THEY TAKE UP SPACE
AND ALL HAVE MASS
SOLID, LIQUID, GAS.

SOLID, LIQUID, GAS
YEAH THESE STATES
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NINA

Thanks, Superfans. I'm glad someone knows this stuff. And now it's the moment Chad's been waiting for. Please help me welcome Striker and Aria, here to talk about their new superhero movie!

STRIKER

Thank you! We're so excited to be here! Our new movie is called *H-2-WHOA*. Get it?

ARIA

This movie has a bit of everything. Action. Romance. Special effects. And bonus...it's scientifically accurate. Scientists wrote the script...real life ones.

STRIKER

Aria is right. I *insisted* upon it. I'm a very serious actor, you know.

NINA

Wow! Tell us more about the film!

CONDENSATION, EVAPORATION

ARIA

IN THIS AWESOME MOVIE
I PLAY A WATER DROP.
I'M ON A SECRET MISSION
TO MAKE IT TO THE TOP.

I JUMP INTO A STOCKPOT
I'M FIGHTING FROZEN PEAS
THE WATER STARTS TO BOIL
I'M SOARING WITH THE BREEZE!

ALL

CONDENSATION
EVAPORATION
ITTY BITTY MATTER ON THE BIG BIG SCREEN.
CAPTIVATING
ILLUMINATING
SCIENTIFIC MARVELS IN EVERY SCENE!

STRIKER

YOU DON'T MIND A SPOILER?
THIS PART MAKES ME PROUD.
THE CHILLY AIR SURROUNDS ME
I'M CAUGHT UP IN A CLOUD.

I'M TURNED INTO A RAINDROP
OOOH, IT'S SO INTENSE!
I'M TUMBLING DOWN IN FREEFALL
THIS SCENE IS ALL SUSPENSE.

ARIA & STRIKER

LIKE ANY GOOD CHARACTER,
MINE TRANSFORMS
THE CHANGES ARE PROFOUND
BOILING, FREEZING, MELTING POINTS
TURN MY LIFE AROUND.

ALL

CONDENSATION
EVAPORATION
ITTY BITTY MATTER ON THE BIG BIG SCREEN.
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NINA

Alright it's time to welcome our last guests for today! Please give a hand to the bakers of Sugar Bomb Bakery!

CHAD

Welcome! Tell us your story.

BAKER #1

Well, it all started when we decided to sell our pre-made cake batter.

BAKER #2

We had to make sure the cakes would turn out right. So we baked them and tasted them.

BAKER #3

They were delicious! But when we tried to turn them back into batter, we ran into a huge problem.

CHAD

What happened?

BAKER #1

We couldn't!

BAKER #2

We tried heating them, freezing them, crumbling them up, adding water...nothing worked.

BAKER #3

We learned that some things can't go back to their earlier state once you've changed them.

CAN THE CHANGES BE UNDONE

ALL

IF YOU GIVE AN EGG A CRACK
IT'S NOT EVER GOING BACK
ONCE YOU'VE BAKED OR BOILED IT ON YOUR RANGE.

NOW THAT EGG IS COOKED INSIDE
THERE'S NO WAY IT CAN BE UNFRIED
AND THAT'S CALLED IRREVERSIBLE CHANGE.

TAKE A LUMP OF CANDLE WAX
HEAT IT AND WATCH IT RELAX
SOON IT'S JUST A PUDDLE, AIN'T THAT STRANGE?

LET IT SIT AND COOL AND THEN
LOOK, IT'S CANDLE WAX AGAIN!
AND THAT IS CALLED REVERSIBLE CHANGE.

CAN THE CHANGES BE UNDONE?
THAT'S THE THING TO LEARN
ONCE THE CHANGES HAVE BEGUN
IS THERE NO RETURN?
CAN THE CHANGES BE UNDONE?
OR ONCE YOU SPIN THEM ARE THEY SPUN?
CHANGES CAN BE FUN
BUT CAN THEY BE UNDONE?

SOME THINGS YOU CAN MELT OR FREEZE
CHANGE THEM UP JUST AS YOU PLEASE
THEN TURN THEM BACK TO HOW THEY WERE BEFORE.

OTHER THINGS LIKE BURNING WOOD
ONCE THEY'VE CHANGED THEY'VE CHANGED FOR GOOD
AND THEY'LL BE SOMETHING NEW EVERMORE.

CAN THE CHANGES BE UNDONE?
THAT'S THE THING TO LEARN
ONCE THE CHANGES HAVE BEGUN
IS THERE NO RETURN?
CAN THE CHANGES BE UNDONE?
OR ONCE YOU SPIN THEM ARE THEY SPUN?
CHANGES CAN BE FUN
BUT CAN THEY BE UNDONE?

CHAD

Well that's it for today on The Morning Mismash with Chad...

NINA

...and Nina. We'll be back tomorrow and all this week with more about the Science of Stuff!

CHAD

And this time I'm actually looking forward to it.

CAMERAMAN

That's a rap!

THE SCIENCE OF STUFF REPRISE

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BUT IF WE HAD
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