

- PROFESSOR EINSTEIN:** JOWO. JOWO! You need to see this. There... there's a meteorite approaching. It's... it's flying directly at the earth. According to my calculations, it will crash in just a few hours. This could be the end of the world.
- MS. SCHLAU:** Good morning, Professor Einstein. Are you looking forward to this coming weekend as much as I am?
- PROFESSOR EINSTEIN:** Ms. Schlau, there won't be any weekend.
- MS. SCHLAU:** What?
- PROFESSOR EINSTEIN:** A huge meteorite is flying towards the earth. The end is near.
- MS. SCHLAU:** What? And what about today's lecture, during which we want to show how potholes form?
- PROFESSOR EINSTEIN:** Potholes? Ms. Schlau, that is not important anymore.
- MS. SCHLAU:** So what do we do now?
- PROFESSOR EINSTEIN:** I don't know. Perhaps I'll look for a deep cave. Yes, precisely. A deep cave - there, I could - yes! I could survive the meteorite impact. Good luck, Ms. Schlau. It was truly an honor.
- MS. SCHLAU:** So, um... dear students. I am just a bit uneasy now but before the... um... end of the world isn't confirmed by other scientists, I propose that we go ahead and start the lecture as usual. JOWO? Start the film, please!
- Christoph was out on his bike recently when suddenly there was a bump. Whoops, what was that? A **hole (LOCH)** in the road - a pothole.
- Where did that come from? This should be investigated, Christoph thinks. To start, one needs a piece of the road. Here you are: A piece of the road... or more precisely: four of them. We start with two pieces in a very special room. A climate chamber. Here one can create winter weather. You have to dress warmly. After all, potholes primarily form in the winter. We add a ramp, so that a car can drive over our pieces of road. Close the door, because it's about to get **cold (KALT)**. Really cold. Minus 20 degrees Fahrenheit. That's where the cold air is blowing in. Uh, it's freezing. In order to put more weight on the road, helpers load bags of sand into the car. Close the door, and let's begin. The car now drives across our pieces of road several hundred times. Back and forth, and forwards and backwards. Again and again. And once more. And the **result (RESULTAT)**?
- Hm. Rather disappointing. The pieces of the road look exactly like they did before. What should we do? This time all four pieces of the road must be used. This facility actually tests what cars can withstand. But why not see what happens with a road? Endurance test - not only for the car and the suspension, but also for our pieces of road. At first it wiggles. Then it cracks. Huge bangs. It rattles again...

**MS. SCHLAU:**

and what happened? It's true, a crack really did form. A crack that will let water penetrate the road. And in the winter that's particularly bad, because water has a very special quality. You can observe that in this cold room. The water in the bottle is cooled down to minus 40 degrees Fahrenheit. Most matter shrinks when it gets cold. But not water. Water expands. Even when it's not completely frozen yet. A small package - inside are water molecules. Well, models of them. They easily fit inside. But when water freezes, it creates ice **crystals (KRISTALL)**. The molecules are only able to assemble themselves in a certain way. They become bulkier, even while they are still forming.

At the end, our **molecules (MOLEKÜL)** no longer fit in the little box. Not a chance. So water expands when it becomes **ice (EIS)**. Doing so, it can display quite some force - it can even burst a **bottle (FLASCHE)**. Even when it's not completely frozen yet. Here we see it: This was just a bit of water and a bit of ice. When the water penetrates cracks in the road and freezes, it turns to ice and expands - of course - then the road can be damaged. In the winter roads freeze and thaw quite often. And many cars drive over them. A lot of cars. Huge numbers of cars. With help from the frost and many cars, a little crack can become a pothole. The more water that collects, the more damage can be caused when it **freezes (FRIEREN)**. In order to prevent roads from someday being entirely filled with potholes, they are repaired. Here comes the pothole team. First they saw. Then shovel out the old asphalt... and then burn it dry. A layer of glue, then fresh hot **asphalt (ASPHALT)**. Roll it smooth, and a bit of sand and the piece of road is **new (NEU)**. Perfect. And Christoph agrees.

Well. I must say, this scientific theory about the formation of potholes is fairly plausible. What do you think, JOWO?  
Professor? What's going on?

**PROFESSOR EINSTEIN:** Ms. Schlau, I'm finished. It's over. The meteorite...do you remember...? Uh.

**MS. SCHLAU:** Yes. What about it? Will it hit the earth?!

**PROFESSOR EINSTEIN:** No... It was just a speck of dust on the inside of a lens. I was able to wipe it away with a towel. It's still a catastrophe. It's true - the world isn't ending... but it's even worse: I was wrong, Me, a Nobel Prize winner.

**MS. SCHLAU:** But Professor, Professor, there's no need to be sad. Look at it this way: You wiped away the end of the world by simply using a towel.

**PROFESSOR EINSTEIN:** Yes. Of course. How brilliant of me. Ha, Ms. Schlau, if you didn't have me, then, um...

**MS. SCHLAU:** ...then the world would surely end every single day, no question!