

- PROFESSOR EINSTEIN:** Hello, dear students. I'm very happy to welcome you to today's lecture in which we will explain to you how a railroad crossing gate functions... Hang on.
- MS. SCHLAU:** What's going on, Professor?
- PROFESSOR EINSTEIN:** Do you smell that? Something stinks terribly!
- MS. SCHLAU:** You're right. Yuck. Ugh.
- PROFESSOR EINSTEIN:** Did you...uh...shower today?
- MS. SCHLAU:** Professor, I hope you're joking. I smell like a springtime meadow.
- PROFESSOR EINSTEIN:** Oh, indeed. Hm. Sorry. Could it be my socks?!
- MS. SCHLAU:** Your socks?
- PROFESSOR EINSTEIN:** Wait a second. Smells great. Here
- MS. SCHLAU:** I believe you, I believe you. Umm, before you bring up anything else, maybe we should get started.
- PROFESSOR EINSTEIN:** Ah, yes! The lecture. Fortunately the students can't smell what we can. Ha! JOWO, are you ready? Then start the film, please. This is a **railroad crossing (BAHNÜBERGANG)**. The gates regularly go down and a **train (ZUG)** passes by. And then the gates go up again. We want to take a look at how that works.
- MS. SCHLAU:** In front of the railroad crossing there is a cross. It means that the trains have the right of way here. Above it is a type of **signal (AMPEL)** - except instead of green, it has a red light. The red light means: Stop, and don't move. A train is coming. But who turns the light to red? How does the signal know that a train is coming?
- PROFESSOR EINSTEIN:** Could the conductor have a switch? No. The secret is hidden here: in the tracks. This is a type of **switch (SCHALTER)**. And these are the cables that connect it to the red light at the railroad crossing. When a train passes over it, the switch is activated. It's similar to a doorbell: You press it, it rings, and you know that a train is about to come.
- MS. SCHLAU:** In reality, it's of course not ringing at just any door, but at little houses such as this. If you open such a house and look inside, you see many grey boxes - among other things, there are computers inside. There are also batteries in case the power should go out so that the computers keep working no matter what since they are important. They ensure that the **railroad crossing gate (BAHNSCHRANKE)** is closed when a train arrives.

- PROFESSOR EINSTEIN:** The train passes over the switch, the computer notices and ensures that the railroad crossing closes. First, there's a yellow light. But look, it's about to turn red. All the cars and pedestrians have to wait because the train is approaching. The gates go down, but at first only two of them. This way, cars that are still on the tracks can drive off of them.
- MS. SCHLAU:** It's not done so that **pedestrians (FUßGÄNGER)** can run across. What this girl is doing is very dangerous. So, quick, quick, go back.
- PROFESSOR EINSTEIN:** Now, the other two gates are lowered as well. The train keeps getting closer and closer. And the pedestrians wait. The **bicyclists (FAHRRADFAHRER)** wait. And the **drivers (AUTOFAHRER)** wait.
- MS. SCHLAU:** The **conductor (LOKFÜHRER)** proceeds. He pays close attention to the signals on the tracks. There are quite a few different ones. This is an advance signal. And this a main signal. This isn't a signal, but rather the signal box house. And this is where Mr. Tischer works. Because before the train can go over the crossing, Mr. Tischer has to do something.
- PROFESSOR EINSTEIN:** These red lines indicate the train's current location. Here comes the train. Now Mr. Tischer has to check if the railroad crossing is clear. Only a person – not a computer – can do this. And only when the railroad crossing is clear does Mr. Tischer change the signal to green. The pre-signal turns green. This tells the conductor that he can proceed. And the main signal turns green.
- MS. SCHLAU:** The conductor may now pass here as well. And then the train goes through the railroad crossing. Once the train passes, it doesn't take long before the gates lift again. Then the pedestrians can walk across, the bicyclists proceed, and the cars as well.
- The opening of the gates happening so quickly is because of these things in the tracks. They can do something very special – they can **count (ZÄHLEN)**. And what do they count? Axles! Here is a model of the train. This type of train has many wheels.
- PROFESSOR EINSTEIN:** If you look at it from below, you see that two wheels are always connected by these rods. This is the axle. And these axles are counted. Twice, in fact. Once before the crossing. And once after the crossing. In this example. 40 axles are counted each time.

- MS. SCHLAU:** And if the number of axles counted before the crossing matches the number counted after the crossing, then the computer knows: The train has crossed - I can open the gates again.
- PROFESSOR EINSTEIN:** So, when a train passes over the railroad crossing, the computer counts the axles before and after the crossing. If the numbers are equal, the computer knows that the train has passed.
- MS. SCHLAU:** And then the computer can open the gates again. All pedestrians can cross. The cars go over the railroad crossing, and the bicyclists as well. Until the next train announces itself.
- PROFESSOR EINSTEIN:** By the way, in places where train travel very fast, there aren't any railroad crossings. There are only tunnels and bridges. Railroad crossings are such a great invention. Don't you think so?
- MS. SCHLAU:** Very interesting, indeed. But... I think we should finally open a window and let some fresh air in. The stench is getting worse.
- PROFESSOR EINSTEIN:** You're right, Ms. Schlau. But... what could it be? What could it be? Ms. Schlau, I now know where that stink is coming from. My wife made me a sandwich with smelly cheese.
- MS. SCHLAU:** What, really?
- PROFESSOR EINSTEIN:** But if you hold your nose like this, it does taste really delicious.
- MS. SCHLAU:** For heaven's sake, don't open it. That is... utterly disgusting. I'm getting really dizzy... Aaah!
- PROFESSOR EINSTEIN:** Uhh... and... what about you? Would anyone like to... uh... try a bite?