The scenario

Subject (field/title)	Electromagnetism / Lightning Rod
Length of movie	3:58
Main Goals	The flow of electric charge in the air
Detailed Goals	The principle of operation of the lightning rod.
Structure and description of the experiments	
1. Introduction	Explanation: The video shows the flow of electric charge in a model of the atmosphere at a large difference in electric potential.
2. Main topic	Explanation: How does an electric charge flow during a lightning discharge, and what is a lightning rod used for?
Part 1	
	Tools: Ruhmkorff coil, DC power supply, pin board complete with a model of a cloud, house, kite and lightning rod. **Description:** The pin board is a model of the atmosphere that flows an electric charge during a lightning discharge. The simulation uses a Ruhmkorff coil that generates a high voltage (of the order of several hundred thousand volts). Pins allow the flow of an electric charge, as in the case of a lightning discharge.
1:00	After switching on the electricity, you can see a "lightning bolt" striking the highest point of the environment, which in this case is a man.
1:09	The flow of charge between the cloud and man is presented as the highest point in the environment.
1:34	As you can see, lightning does not strike a bird not in contact with the Earth. Earth is an infinite charge reservoir, and charge flows more readily through objects on Earth than through objects not in contact with it.
1:51	When a hovering object, such as a kite, is in contact (via a wet string and a person) with the Earth, the charge will flow more readily through the object than through the atmosphere because it has a higher electrical resistance than an object in contact with the Earth.
2.14	When we break said contact, the charge will again be more likely to flow towards the highest object in contact with the Earth.
2:44	This is why lightning more often hits the roofs/chimneys of houses that don't have a lightning rod.
3:16	To protect houses against the effects of a lightning strike, a lightning rod is used, i.e. a thick electrical conductor, one end of which is above the highest point of the roof structure, and the other end is buried

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	deep in the ground. In the event of a lightning strike, the post-iron conductor allows the charge to flow towards the Earth without damaging the house's structure and causing a possible fire. However, the lightning rod, as the primary purpose, protects the house from lightning strikes by ionising the air around the spike of the lightning rod above the roof. This allows an electric charge to flow from/to the cloud to/from the Earth without a lightning discharge carrying enormous, destructive energy. **Questions:** What material can a lightning rod be made of? Why should you not stand under a tree during a thunderstorm? How should you behave during a thunderstorm when you are outdoors? What shape of the end of the lightning rod spray ionises the air around it? **Conclusions:** A lightning rod protects a building against a lightning strike in two ways - it prevents lightning discharge over the building by ionising the air and free flow of electric charge between the cloud and the Earth. In the event of an atmospheric discharge, it safely discharges the charge to the Earth or allows it to flow from the Earth to the cloud.
3. Summary and notes	Particular attention should be drawn to the fact that the lightning rod does not "attract" lightning but is supposed to prevent lightning from striking in its immediate vicinity. **Level:** secondary school

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