Instructions

Puzzle/quiz

Play the “Telephone.”

The students line up or sit in a single file. Whisper a code word to the person sitting at the beginning of the file. He or she is supposed to pass it on to the person right next to them in such a way as not to allow the others to overhear it. Towards the end of the game, the student sitting at the end of the file retells the code word he or she has heard. Check whether it is consistent with the initial version. The last person in the file then replaces the one who was at the beginning of it, and the entire game can be repeated.

The code words can be related to the topic of the lesson, for example “sound,” “phone,” “conversation,” “phone number,” or “network.” During a subsequent attempt, the students can come up with their own code words related to phones.

Ask your students whether the task has been easy for them and whether they have heard well the words being whispered to them each time. During the lesson, the students will learn about the way a phone works and how a conversation is transmitted over long distances.

Constructing

Working in pairs, the students construct a phone from paper cups and then they test its operation.

Materials needed:

- paper cups
- string (it would be best to use jute string)
- ballpoint pens

Instructions:
Cut the string into pieces of equal length – measuring about 120–160 inches each (depending on the size of the classroom).

Each pair of students receives two cups and a piece of string. Using a ballpoint pen, the students pierce the bottom of each cup to create a hole through which they will then thread the string. The task of your students is to connect the cups using the string – by threading it through the holes in the bottoms of the cups, and then knotting the piece of string at each end. In this way, a model of a simple phone is created. Working in pairs, the students test their phones.

Ask your students the following questions:
What did the voice you heard on your phone sound like? In what way did you have to position yourself in order to hear the sound coming from the cup well enough? In what way does such a phone work? Which part of this phone transmits sounds?

Instructions

Movement game

The students participate in a game that allows them to understand the way the GSM network operates.

Materials needed:

- chairs (one chair for each foursome),
- phone numbers cut out of a sheet of paper (one for each student),
- a complete list of phone numbers,
- small cards (one for each student),
- string or masking tape,
- adhesive tape.

Push the desks away and place the chairs all around the classroom – they will serve as base radio stations. Using tape or string, mark a circle with a diameter of about 1.5 m around each chair. Assign students to sit on the base stations (one on each chair). The rest of your students draw phone numbers and attach them to their backs with adhesive tape. Hang the complete list of phone numbers somewhere in the classroom and assign particular students to the appropriate numbers. Next, each student chooses another student whom they wish to forward a message; they write it down or draw it on a blank card and address it using an appropriate phone number. Once your students have finished preparing their messages, take the list down.
Play back the record of a Nokia phone ringing: https://www.youtube.com/watch?v=ck7g5uu1cMA; as it plays, the students freely move around the classroom. Once the melody stops, the students come to a halt and enter the area of the base station nearest to them. Next, the person sitting on the chair receives their messages and passes them on to the appropriate persons as fast as possible. The person sitting on the chair can hold only one card at a time. At the end, check whether the messages have reached the appropriate persons.

Ask your students about the role of the persons who have been sitting on the chairs.
They acted as radio waves emitted by the station. Base stations make up the GSM network (Global System for Mobile Communications). Each station emits numerous radio waves at different frequencies (if your students do not know what a frequency is, you can tell them the radio waves have different lengths – there is a direct correlation here), on which the signal (phone call) is transmitted.
Each station has a limited number of frequencies to use – if there are too many persons within the area of the same station, who want to make a phone call at the same time (just as it has been during the exercise), some of them will not be able to establish a connection until one of the frequencies becomes available.

> Ask your students whether they have ever had troubles making a phone call using a cell phone. Such complications often occur during large events, when many people who have gathered in one place attempt to call their relatives at the same time.

Creative expression

The students design and present a phone of the future.

Materials needed:
sheets of paper and crayons for each student.

The students create (draw) a design of a phone they imagine to be in use 20 years from now. The phone should be designed in such a way as to enable its user to make a call – it should be equipped with a speaker, a microphone and an antenna. However, the way these components are arranged and operated should be innovative, and the device itself should have additional features that have not been invented yet.

Next, the students present their designs to the rest of the class and tell them about the places on the device in which all the necessary elements of their phone – a speaker, a microphone and an antenna – are located, as well as about the additional functions their phone offers.