

Title

TELECOMMUNICATIONS
TELEKOMUNIKACIJE

Short description/ main idea

Thanks to a very extensive processing of information content in the first half, not only in the 8th grade, but in all four years of studying this subject, the concepts of data and information discussed are just revision lessons. It's good to have spontaneous conversation and to give students some real life examples.

Blagodareći veoma opsežnoj obradi informatičkih sadržaja u prvom polugodištu, ne samo u 8. razredu, već u sve četiri godine izučavanja ovog predmeta, o pojmovima podatka i informacije razgovaralo se i treba se samo podsetiti. Dobro je da to bude spontano, kroz razgovor i da učenici daju neke primere iz života, učionice, razreda.

Learning objectives

Cognitive - Knowledge: Factual, Meta □ cognitive

Cognitive - Process: To understand, To think critically and creatively

Affective: To pay attention, To respond and participate

Psychomotor: To perform confidentially following instructions, To adapt and perform creatively

Language

English

Serbian

Grade & Age

Grade: primary education

Domain

Science>Physics>Technological applications>Telecommunications

Keywords/subject

Digital Electronics, information, data, communication, electromagnetic waves, AF signal

Digitalna elektronika, informacija, podatak, komunikacija, electromagnetski talasi, NF signal

Phases

1.TELECOMMUNICATIONS

1.TELEKOMUNIKACIJE

Description of phase

It is said that good preparation is half the work done. A good introduction to the teaching content is what determines how the following lessons will develop, how many students will be interested, what the outcome will ultimately be. The unit about telecommunications is at the very end of the syllabus of Technical and IT primary education. It is also the end of a four-year long friendship between those teachers and pupils, because the subject itself does not exist in high schools. It is a time when everything is in the frame of the subconscious thoughts about the upcoming final exam and one should be "the wizard" in order to make it interesting. But a long time ago John Dewey said, "Teachers are professional thinkers

who create a theory out of practice." Indeed, that is why we have selected only one lesson, one key introductory lesson in the final topic of "Digital Electronics". However, it is not all aggravating; moreover, it should be taken into account that in the previous physics lessons all the contents had been presented: oscillations, optics, electricity, electrical resistance and capacitance. In last year chemistry we covered the structure of matter and the topics in the areas of physical chemistry and elementary particles. Then biology gave knowledge of the senses, history of communication through the ages. This lesson is just an important link in these points - school subjects correlated.

Thanks to a very extensive processing of information content in the first half, not only in the 8th grade, but in all four years of studying this subject, the concepts of data and information discussed are just revision lessons. It's good to have spontaneous conversation and to give students some real life examples. It is effective to observe the original photographs taken under the loop at the Pančevo bridge where the driver did not understand the indicated maximum height as information, but as data. To have a vivid lesson, the teacher can use a usual Power Point presentation, but it is far more attractive to use Prezi. The whole presentation is "hidden" among the letters of the title with the constant "flyover" from side to side. This it is interesting to students. Then a cute clip "A brief history of communications" taken from YouTube appears. After an unpleasant experience last school year, when in the the middle of my lesson, I got a notice that there is no signal (in a school covered by ADSL), this short cartoon is downloaded and "embedded" in the presentation.

This is followed by an introduction to communication – a class teacher tells a story to first graders while they listen carefully. How is their communication achieved? How do children learn what the teacher tells them? She tells them, they listen to her words, and this leads us to the senses, the sense of hearing which in this case is crucial. This was the 7th grade subject content - we are reminded by "scrolling" photo books from last year because Prezi allows that. We continue with insight into the essence of the sound, which is treated in physics at the beginning of the school year. And the answer to the question what the sound is, comes in the same way by "viewing" the tutorial on Prezi presentation. We effectly demonstrate the wave and its characteristics: instead of stories about how extending the range of low frequencies is, we simply activate the application Audio SweepGen, which replaces the tone – generator. Together we listen to the sound from 20 Hz to 20 kHz. Students listen and comment from the lowest to the highest frequencies heard. The range at the end of the higher value is very irritating and by looking at the intersection of man's ear one can easily figure out why the silencing effect occurs even though the same amplitude. Surely AF signal is not only a sine or square, as this application shows. After that, we listen to some short music using Media Player with a selection of visualizations that shows a waveform. This is clearly how we delimited string of high frequency.

Now we establish the existence of silent electromagnetic HF signals. They are everywhere, otherwise it would not be possible to use mobile phones that every student has. How can we clearly show the existence of HF fields? By simply displaying his absence. As the barriers preventing the transition times outside the pedestrian crossing, there are also "fence" of electromagnetic waves - Faraday cage. Students know that in some places (theaters, cinemas) prevents the operation of mobile phones. A simple view of the attractive assets to good shows. Ordinary kitchen saucepan with lid, from the school kitchen will be the armor. With two mobile phones trying to connect. They are available in the field of electromagnetic waves, and the first call will be quite conventionally been realized, as established by activating the speakerphone - one ring , while the second sound is heard calling . Now put one of the phones in the not coincident pan and repeat . No difference, the connection is possible. It matches the pot in which he remains the phone and try to call it now. As expected, HF electromagnetic waves do not manage to get inside, so there is no connection - we get a notification that the mobile subscriber is currently not available.

The class is coming to an end and we are left to summarize the key concepts renewed and learned and announce that after the holidays, because the lesson of technical and IT education still on the block , we continue to research how the transfer is achieved , which is the role of AF, which HF signals.

In preparation for the execution of lessons, you need previously to download video from the following address:
<http://www.youtube.com/watch?v=WfCUxeQ2VSE>

To create a "word cloud" is used <http://www.wordle.net/> or options <http://www.wordle.net/create> (printing options but no printer, and captures the PDF, which is then entered into the win)

Link to download and then install Audio SweepGen with brief instructions, on <http://www.satsignal.eu/software/audio.html>

The presentation can be downloaded directly from the link <http://prezi.com/erbxcgizwlvp/telekomunikacije-uvodni-cas/> or also for the full independence of the flow or connection, download and burn (download a document is zipped, which is not surprising considering that these presentations quite extensive, and the author of these lines tends to use very high resolution photographs which allows the zoom "enter" into the details of recording, causing delight students).

This lesson was realized in Kovin`s Primary school "Jovan Jovanović Zmaj" at the end of this school year. A small school, with only two classes in all grades - some will see this as a weakness; however, to work in a small town, small school, and even the classes that counted twenty students, are a priority and a challenge for a teacher who has more than three decades of work in education. Moreover, he tries to be an ICT teacher to the extent to which his environment and financial support allow.

Dobra priprema je pola urađenog posla, kažu. Dobar uvod u jednu nastavnu oblast je ono od čega zavisi kako će se i ostali časovi odvijati, koliko će učenici biti zainteresovani i kakvi će, na kraju, biti ishodi. Oblast telekomunikacija je na samom kraju programa Tehničkog i informatičkog obrazovanja i nakon nje završava se i četvorogodišnje druženje đaka sa nastavikom, predmetom koji u srednjoj školi više ne postoji pa i samom školom. To je vreme kada se sve odvija na fonu podsvesnog razmišljanja o nastupajućem završnom ispitu i treba biti „čarobnjak“ pa nastavu učiniti zanimljivom. Ali, kako je još davno rekao Džon Džui, „nastavnici su mislioci profesionalci koji stvaraju teoriju iz prakse“. I zaista, zato smo i odabrali samo jedan čas, onaj ključni, uvodni čas u poslednju nastavnu temu „Digitalna elektronika“. Ipak, nije sve otežavajuće, šta više, treba uzeti u obzir da su tada u Fizici obrađeni svi sadržaji od kojih se polazi: oscilacije, optika, električna struja, električni otpor i kapacitet, u Hemiji još prethodne godine struktura materije i teme u zonama fizičke hemije i elementarnih čestica, kada je i Biologija dala znanja o ćulima, a Istorija o komunikacijama kroz vekove. Ovoga časa bitna veza je upravo u tim tačkama - međupredmetnoj korelaciji.

Blagodareći veoma opsežnoj obradi informatičkih sadržaja u prvom polugodištu, ne samo u 8. razredu, već u sve četiri godine izučavanja ovog predmeta, o pojmovima podatka i informacije razgovaralo se i treba se samo podsetiti. Dobro je da to bude spontano, kroz razgovor i da učenici daju neke primere iz života, učionice, razreda. Efektna je autorska fotografija snimljena ispod petlje kod pančevačkog mosta gde vozač označenu maksimalnu visinu nije shvatio kao informaciju, već podatak. Radi dobijanja na živosti časa, može se koristiti klasična Power Point prezentacija, ali je daleko atraktivniji Prezi. Čitava prezentacija „sakrivena“ je među slovima samog naslova uz stalno „preletanje“ sa jedne na drugu stranu, što je učenicima interesantno; a onda se pojavljuje simpatični klip „A brief history of communications“, preuzet sa YouTube . Nakon jednog neprijatnog iskustva prošle školske godine kada se usred časa, u trenutku kada je link trebao da da klip sa interneta, pošto je čitava škola pokrivena ADSL-om, a dobilo samo obaveštenje da signala nema, ovaj kratki crtač preuzet je i „ugrađen“ u prezentaciju.

Potom sledi uvod u komunikacije - učiteljica priča prvačićima, oni je pažljivo slušaju. Kako se ostvaruje njihova komunikacija? Kako deca saznaju šta im učiteljica saopštava? Ona im govori, slušaju njene reči, a to nas vodi ka ćulima, ćulu sliha koje je u ovom slučaju presudno. Kako je to gradivo 7. razreda, podsećanje vršimo „prelistavanjem“ snimka prošlogodišnjeg udžbenika jer Prezi omogućava zumiranje do u tačku. Nastavljamo sa pronicanjem u suštinu samog zvuka, koji je obrađen u fizici na početku školske godine. I tu do odgovora šta je zvuk dolazimo na isti način, „pogledom“ u udžbenik na Prezi prezentaciji. Talas i njegove karakteristike efektno demonstriramo: umesto priče o tome koliko se prostire opseg niske frekvencije, jednostavnim aktiviranjem aplikacije Audio SweepGen, koja zamenjuje ton-generator, zajedno odslušamo zvuk od 20 Hz do 20 kHz. Učenici slušaju i komentarišu od koje najniže do koje najviše frekvencije čuju. Oblast pri kraju viših vrednosti veoma je iritantna i gledajući presek čovečijeg uha lako mogu da odgonetnu zašto se javlja efekat utišavanja iako je amplituda ista. Naravno NF signal nije samo sinusni ili kvadratni, kakav ova aplikacije daje. Zato poslušamo neku kratku muziku korišćenjem Media Player-a uz izbor visualizations koji nam pokazuje talasni oblik. Time je jasno razgraničena niska od visoke frekvencije.

Sada utvrđujemo postojanje nećujnih VF signala, elektromagnetnih. Njih ima posvuda, inače ne bi bilo moguće koristiti mobilne telefone koje svaki đak ima. Kako oćigledno pokazati postojanje VF polja? Jednostavno prikazivanjem njegovog odsustva. Kao što se ogradama sprećava prelazak puta van pešaćkog prelaza, isto tako postoje i „ograde“ za elektomagnetne talase - Faradejev kavez. Ućenici znaju da se u nekim prostorima (pozorištima, bioskopima) sprećava rad mobilnih telefona. Jednostavan oćled uz atraktivna sredstva to lepo pokazuje. Obićna kuhinjska šerpa sa poklopcem, iz školske kuhinje, biće taj oklop. Sa dva mobilna telefona pokušavamo da uspostavimo vezu. Oni su slobodni, u polju elektromagnetnih talasa, i prvi poziv sasvim uobićejeno će biti ostvaren, što utvrđujemo aktiviranjem spikerfona - jedan zvoni, dok se iz drugog ćuje zvuk pozivanja. Sada stavljamo jedan od telefona u nepoklopljenu šerpu i ponavljamo. Nikakve razlike nema, veza je moguća. Poklapamo šerpu u kojoj ostaje telefon i pokušavamo sada da nazovemo. Kao što je oćekivano, VF elektomagnetni talasi ne uspeavaju da stignu unutra, pa nema ni veze - dobijamo samo obaveštenje da mobilni pretplatnik trenutno nije dostupan.

Ćasu se blići kraj i ostaje nam da rezimiramo koji su ključni pojmovi obnovljeni i naućeni i najavimo da nakon odmora, jer je ćas Tehnićkog i informatićkog obrazovanja uvek u bloku, nastavljamo sa istraćivanjem kako se ostvaruje prenos, koja je uloga NF, a koja VF signala.

Pripremaćuji se za izvođenje ćasa prethodno je potrebno preuzeti video materijal sa adrese:

<http://www.youtube.com/watch?v=WfCUxeQ2VSE>

Za izradu „oblaka reći“ koristi se <http://www.wordle.net/> odnosno opcija <http://www.wordle.net/create> (opcija štampanje, ali bez štampaća, pa snima PDF koji se potom unosi u Prezi)

Link za preuzimanje, a potom i instalaciju Audio SweepGen, sa kratkim uputstvom, je na <http://www.satsignal.eu/software/audio.html>

Prezentacija se može direktno preuzeti sa linka <http://prezi.com/erbxcgizwlvp/telekomunikacije-uvodni-cas/>

ili se, takođe radi potpune nezavisnosti od protoka ili konekcije, preuzeti i snimiti (preuzeti dokument je zipovan, što nije čudno s obzirom da su ovakve prezentacije prilično obimne, a i autor ovih redova je sklon da koristi fotografije prilično velike rezolucije što omogućava da se zumiranjem „uđe“ u detalje snimka izazivajući oduševljenje učenika).

Čas je realizovan u kovinskoj osnovnoj školi „Jovan Jovanović Zmaj“ krajem ove školske godine. Mala škola, sa samo po dva odeljenja u svim razredima - neki će u tome videti slabost, međutim, rad u malom mestu, maloj školi, pa čak i sa odeljenjima koja broje dvadesetak učenika, velika su prednost i izazov za nastavnika koji za sobom ima tri decenije rada u nastavi, a pri tome je IC teacher koliko mu okruženje i materijalna podrška omogućavaju.