



Waves: How do sound and light transmit?

Author: Nuria Murciego Rico

UAB Mentor: Anna Corredera

School Mentor: Montse Jiménez

UAB

Universitat Autònoma
de Barcelona

Màster oficial Formació de Professorat
d'Educació Secundària Obligatòria i Batxillerat,
Formació Professional i Ensenyament d'Idiomes

TEACHER'S BOOK



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Table of contents

Table of contents.....3

Introduction.....4

Unit overview.....5

Session 1.....8

Session 2.....11

Session 3.....13

Session 4.....16

Session 5.....20

Session 6.....25

Session 7.....27



Waves: How do sound and light transmit?



Introduction:

In this unit, we are going to learn how light and sound transmit, and thus, how we see and hear. Being able to see and hear the world around us is great! However, sound and light waves might be dangerous for our health if we are not careful. During this unit, you will work in groups with the goal of finding out the answer to one of the following questions: “Why is radiation from the sun more dangerous than waves from cell phones?” or “In what way can sound waves be dangerous for the human ear?”. You will have to design a triptych giving the answer to the chosen question and also providing some health advice about the topic. Finally, you will perform a role play in which you will use all that information in the context of a visit to the doctor.

Icon Key:



Listening



Reading



Speaking



Writing



Interacting

Assessment:

Short argumentative essay	10%
Summary of jigsaw reading	10%
Triptych	25%
Listening comprehension	5%
Role play	25%
Active participation in all the activities	25%
TOTAL	100%





Unit overview:

Session	Activity	Content-obligatory language	Timing	Skills	Interaction	CMC	Assessment
1	1. Find someone who...	Do you...? Have you...? Loud, frequently, x-ray, microwave, sun protection, cellphone, enjoy, sunburn, radio, nuclear explosion, between, infrared radiation, ultraviolet radiation.	40'	S + I	T-S S-S		Teacher will walk around to help and observe
	2. Introducing topic and project.	Ultraviolet radiation, electromagnetic waves, dangerous.	15'	L	S-S	YES!	
2	3. Choose your topic!	Our group chooses the topic of.... We decided to work on that topic because.... We think this topic is more interesting than the other one because... In our personal experience, we have seen that... We are very interested in and this is why we have chosen this topic. Take into account, state, make sure, be aware of.	20'	S+W+I	S-S		Teacher assessment with checklist
	4. Jigsaw reading.	Electromagnetic spectrum, frequency, electromagnetic waves, visible light, tiny, whole, compose, radio	35'	R + I	T-S S-S		Teacher will walk around to help and observe

Waves: How do sound and light transmit?



		<p>waves, gamma rays, dangerous, penetrate, deeper.</p> <p>Surrounded, noise, safe, damage, hearing, loud, easily, long-term exposure, sirens, noise-induced hearing loss, wind turbine.</p> <p>So, however, such as, but, because.</p>					
3	5. Finishing the jigsaw reading.	Same as in the previous activity.	20'	R + I	S-S		Teacher will walk around to help and observe
	6. Let's write about it!	Same as in the previous activity.	35'	W + I	S-S		Teacher assessment with checklist
4	7. Present the two activities	<p>Cover, counter-cover, inside, appealing tittle.</p> <p>You should... You shouldn't... You could...</p> <p>Vocabulary and connectors used in the jigsaw reading.</p>	20'	L	T-S	YES!	
	8. Let's design the triptych!	Same as in the previous activity	35'	W + I	S-S		Teacher will walk around to help and observe
	9. Let's give some advice!	Same as in the previous activity	35'	S + I	S-S	YES!	Teacher will walk around to help and observe
5	10. It's time to finish the triptych...	Same as in the previous activity	25'	W + I	S-S		Teacher will walk around to help and observe
	11. Listening comprehension	<p>Good morning How are you? I am doing well, thank you. What about you?</p>	30'	L+I	T-S S-S		Teacher assessment

Waves: How do sound and light transmit?



		<p>What have you come in for today?</p> <p>I need your advice.</p> <p>I am worried about...</p> <p>Great, thank you doctor.</p> <p>Have a good day.</p> <p>Around, instead of, nowadays, get rid of, I am sure that, more than enough, consider, maybe, check out, miss, outside.</p>					
6	12. Let's create the script for our role play!	Vocabulary and connectors used in the previous activities.	55'	W + I	S-S		Teacher will walk around to help and observe
7	13. Time to perform!	Vocabulary and connectors used in the previous activities.	55'	S + I	S-S T-S	YES!	Peer assessment with rubric and teacher assessment with rubric



LESSON 1: Introducing the topic...

Act1. Find someone who...



In this activity, you will ask questions to your classmates and you will try to find out who has been in these situations!

Use the following structures:

Do you...?
Have you...?

For example:

Do you listen to very loud music frequently?
Have you had an x-ray done?

Loud: At a high volume

Frequently: Very often

X-ray: Radiography

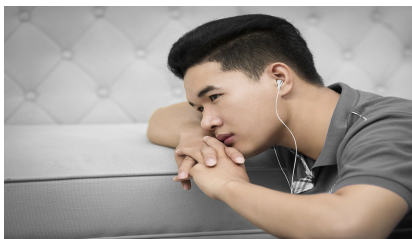
Sunblock: Cream that protects from the radiations of the sun

Sunburn: To be burnt by the sun

Between: "Entre"

Find someone who...

... listens to very **loud** music **frequently**.



... has had an **x-ray** done.

... doesn't have a cellphone.

... uses the microwave everyday.

Waves: How do sound and light transmit?



... has gone to the beach without using **sun protection**.

... has had more than two x-ray done.



... uses the cellphone to play games every night.

... always uses sunblock when he/she goes to the beach.



... had his/her first cellphone before the age of 10.

... doesn't enjoy going to concerts or discos.



... has **sunburnt** more than three times.

Waves: How do sound and light transmit?



- ... uses his/her cellphone more than 6 hours per day.
- ... listens to the radio at home.
- ... knows something about the nuclear explosion in Hiroshima.
- ... knows the difference **between** infrared radiation and ultraviolet radiation from the sun.

Act2. Introducing topic and project



Now, listen carefully to your teacher, she is going to present the project of this unit.

There are two possible driving questions in this unit, and you will have to work in just one of them. It's your choice!

The two possibilities are:

Why is ultraviolet radiation from the sun more dangerous than electromagnetic waves from cell phones?

and

In what way can sound waves be dangerous for the human ear?

And you will have to create two products from those questions:

A triptych and **a video of a role-play**



LESSON 2: Time to choose a topic and find out more about it!

Act3. Choose your topic (short argumentative essay):



In this unit, you can choose the question that you want to work on. You have two options:

Why is ultraviolet radiation from the sun more dangerous than electromagnetic waves from cell phones?

or

In what way can sound waves be dangerous for the human ear?

Within your group, discuss what question you prefer, **taking into account** the answers that you gave to the “find someone who” activity.

Once you have decided the topic that you want to work on, write 4-5 sentences **stating** your choice and justifying it.

When doing so, please, **make sure** that you use the following structures:

Our group chooses the topic of...

We decided to work on that topic because...

We believe that it is important to learn about...

In our opinion, this topic...

We think that this topic is more interesting than the other one because...

In our personal experience, we have seen that...

We are very interested in... and this is why we have chosen this topic

Waves: How do sound and light transmit?



For example:

*Our group chooses the topic of x-rays. We decided to work on that topic because all the members of the group have had x-rays done. We believe that it is important to learn about the consequences of x-rays for our health. We think that this topic is more interesting than the other one because it can affect our everyday life. In our personal experience, we have seen that people **are not aware of** the dangers of x-rays.*

Take into account: Consider
State: Tell
Make sure: Verify
Be aware of: Comprehend /know

Check-list for assessment:

1. There are at least 4 sentences.
2. You have used the given structures.
3. Your justification is logical.
4. Sentences are simple and grammatically correct.
5. All the group participated in the creation of the essay.

Act4. Jigsaw reading:



In this activity, you will form several groups of experts (each member of the base group will go to a different group of experts) and each group of experts will be given a paragraph of a text.

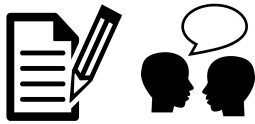
Then, in your group, you have to read the paragraph, make sure you understand it, make sure everyone in the group understands it and make a mind map or schema of it.

Finally, you will go back to your base group and each member of it has to explain his/her paragraph to the others so that you all understand the whole text.



LESSON 3: Let's write about it!

Act6. Let's write about it!



You have read, discussed and made a mind map from a text about the electromagnetic spectrum or the dangers of sound waves. Now, in your groups, you will have to write your version of this text, as accurate as possible.

Please, make sure that you use all the appropriate vocabulary and express the same ideas than in the original text!

The electromagnetic spectrum:

Vocabulary:

Electromagnetic spectrum	Infrared radiation
Range	Visible light
Waves	Ultraviolet radiation
Frequency	X-rays
Nine types	Gamma rays
Electromagnetic waves	Cellphones
Visible light	Low frequencies
Tiny part	Not dangerous
Whole	Health
Composing	High frequency
Following	Penetrate deeper
Extremely low frequency	Human body
Very low frequency	
Radio waves	
Microwaves	

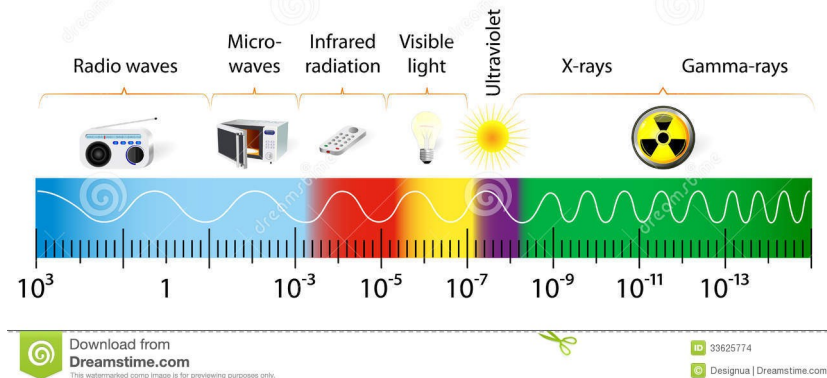
Connectors:

So
However
Such as
Because

Waves: How do sound and light transmit?



THE ELECTROMAGNETIC SPECTRUM



Dangers of sound waves:

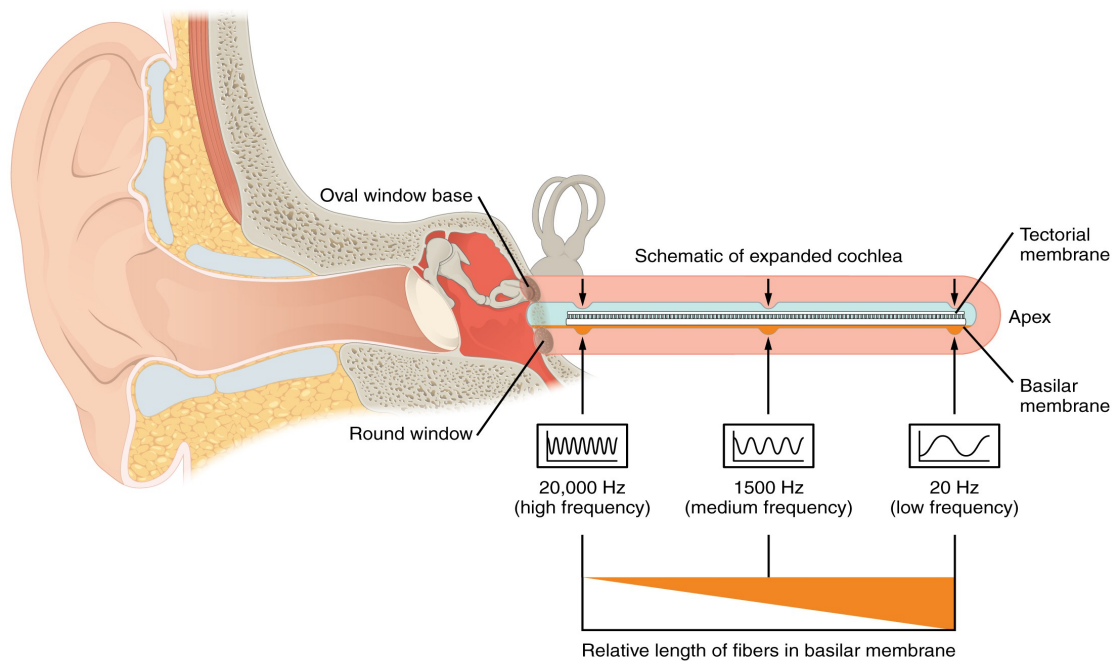
Vocabulary:

Constantly surrounded	Motorcycles
Sounds	MP3 player
Television	Maximum volume
Speaking	Cause
Noise of cars	Noise-induced hearing loss
Normally	Human beings
Safe for our ears	Ear
Cannot	Frequency of 20 to 20,000 Hertz
Damage	Low frequency
Hearing	Cannot hear
Loud noises	Damaging
Easily	Wind turbine
Long-term exposure	Example
Sirens	

Connectors:

Such as
However
But

Waves: How do sound and light transmit?



Checklist for assessment:

1. Your text contains the same ideas in the same order than in the original text.
2. You used all the vocabulary and connectors given in the instructions.
3. The sentences are simple and grammatically correct.
4. The sentences make sense.
5. The tone of the text is formal.



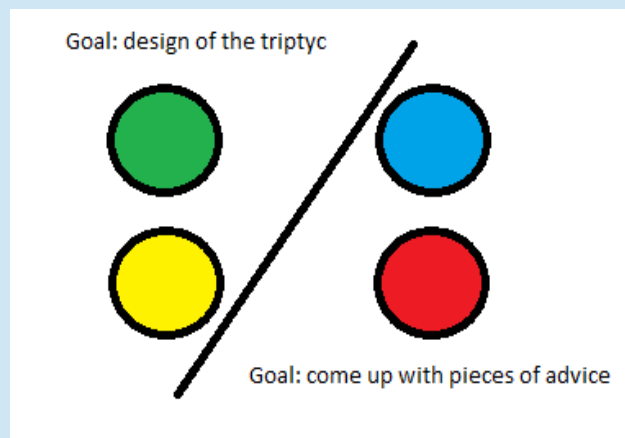
LESSON 4: It's time to split the groups!

Act7. Present the two activities:



In this session, groups will be divided into twos. Two people will be in charge of starting the design of the triptych, while the other twos will get together in a larger group and will start brainstorming about pieces of advice.

Listen carefully to the teacher's instructions.



Act8. Let's design the triptych!



1. Take a piece of paper and fold it in three parts.
2. Identify the three main parts of the triptych: cover, counter-cover and interior.
3. Make sure you use the following structure and include all this information:

Waves: How do sound and light transmit?



Cover: Appealing title or question

Picture

Protect your health,
don't make
unnecessary x-rays!



Counter cover: Names of the members of the group

School

Class

Date

Mark Davis
Alice Johanson
Travis Smith
Lily Scott

School: Les Aimerigues
Class: 2nd of ESO Z

17/02/2018

Inside: Include the following three parts.

Brief information about the different types of waves.

Give the answer to the initial question.

Include at least four pieces of advice.

You have plenty of space so make sure that it looks nice. You can also include other pictures!!!

Waves: How do sound and light transmit?



Act9. Let's give some advice!



1. In the group, brainstorm about advices that you would give to people that don't want to damage their ears or their skin.

Try to think of at least 5 pieces of advice!

If you need it, you can use a laptop to inspire you...



Waves: How do sound and light transmit?



2. Then, you will have to make five grammatically correct sentences with your advice.

To do so, you have to use the following verbs: **You should / You could / You shouldn't**

Examples:

You should spend more time outdoors with your friends.

You shouldn't be playing with your cell phone all day long.

You could switch off your cell phone during the night.



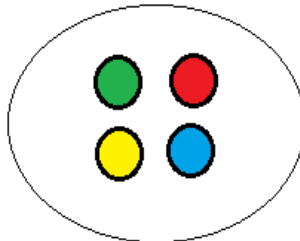
LESSON 5: Let's finish the triptych!

Act10. Finishing the triptych.



1. Once you all have finished your tasks, you will go back to your base group.

Base Group
Goal: Finishing the triptych



2. Add the five pieces of advice in the triptych and finish the design.

Give your personal touch and make it look beautiful!!

Checklist for assessment:

- It respects the given structure.
- It contains all the information that was asked.
- It has pictures.
- It is attractive.
- The information is presented in simple and grammatically correct sentences.
- The information about the types of waves is clear and accurate.
- The answer to the driving question is clear and accurate.
- The pieces of advice are relevant.
- You have used the correct verbs to give advice.
- You have tried to use vocabulary and connectors that you have learned in this unit.



Waves: How do sound and light transmit?



Act11. Listening comprehension



Listen to the role-play performed by your teachers and answer the following questions:

1. What is Mrs.Jiménez's problem?
2. Does the doctor think that Mrs.Jimenez should worry about the electromagnetic waves that cellphones transmit? Why?
3. Mention one piece of advice that the doctor gives to Mrs.Jiménez.
4. Do you agree with the advices that the doctor gives? Briefly justify your answer.



Waves: How do sound and light transmit?



SEEKING FOR ADVICE!

- Good morning Doctor.
- Good morning Mrs.Jiménez. How are you?
- I am doing well, thank you. What about you?
- I am good, thank you! So, what have you come in for today?
- I need your advice, doctor. I am worried about something.



- Tell me, Mrs.Jiménez.
- I have five different cellphones at home and I use them all the time. I have heard that the waves that they transmit can have a negative effect for my health. What **should** I do about it?
- I think that you **shouldn't** worry too much about the electromagnetic waves that cellphones transmit **because** the wave frequency is very low, so it is not very dangerous.
- Great, thank you doctor!
- **However**, it is true that having five cellphones can have a negative effect for your health.



Waves: How do sound and light transmit?



- Oh really? Why? I need those cellphones to communicate with all the people around me.
- If you want to communicate with people around you, you **could** go out to have dinner with them, **instead of** using Whatsapp. It is true that having a cellphone nowadays is essential, but you **should** get rid of the other four. I am sure that with one you have more than enough!
- Ok, doctor.
- You **should** also consider that if you are using your cellphone all the time at home, maybe you are not paying enough attention to your family.



- But if I don't check out my Facebook and my Instagram all the time, I will miss important information!
- You **shouldn't** worry too much about all this social media... You **should** be more in contact with the real world **instead**.
- Ok doctor, I understand all your advices. Thank you very much.
- It's all right. Go outside and enjoy the real world **instead** of checking your phone all the time!
- Thank you doctor. Have a good day.
- You too. Bye!
- Good bye!

Waves: How do sound and light transmit?



Worried: concerned
Too much: a lot
True: not false
Nowadays: today / these days
Get rid of: eliminate
Sure: confident
Enough: Sufficient
Pay attention: show interest
Check out: verify
Miss: Loose

Interesting connectors:

Because
However
Instead of

Interesting expressions:

Good morning
How are you?
I am doing well, thank you.
What about you?
What have you come in for today?
I need your advice.
I am worried about...
Great, thank you doctor.
Have a good day.



LESSON 6: Let's ask the doctor for some advice...

Act12. Let's create the script for the role-play!



Now it's your turn to shine!

After having enjoyed this wonderful performance, now it is your turn to create the script for a role-play.

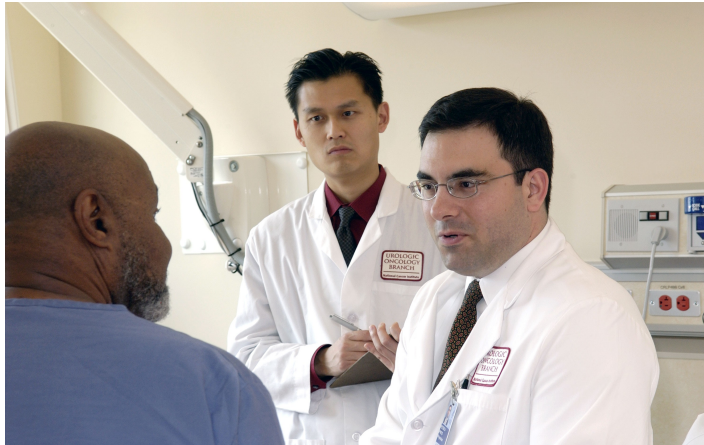


Use the script of the role-play that you have just seen as a model to create your own.

Make sure that your script contains the following:

- Greeting formulas between the patient and the doctor.
- The patient expresses a concern (related to the topic that you are working on!).
- The doctor gives a scientific response to the patient.
- The doctor gives advice to the patient.
- The patient thanks the doctor and leaves.

Waves: How do sound and light transmit?



Once your script is created, two members of each group will have to perform it in front of all the other groups. The other groups will evaluate you with a rubric. Then, when all the groups will have finished their performance, we will discuss the results all together and you will use this feedback to improve your script. Finally, you will have to record yourselves performing the final version of your role-plays and the teacher will evaluate it.



LESSON 7: Time to perform!

Act13. Time to perform!



In this lesson, you will have to perform your role-play in front of your classmates. Your classmates' role is to assess your group with the rubric that you will find below.

Once all the groups have performed, we will discuss the results all together and the feedback that you receive will be very helpful to improve your script or your performance.

The last minutes of the session will be devoted to modifying your script with the feedback that you have received.

Finally, at home, you will have to record the improved version of your role-play and upload it in Canva. Your teacher will give you more information in class!

Rubric for peer assessment and teacher's assessment:

In groups, you will have to complete one of these rubrics per group, including your own.

The RP contained greeting formulas.	1	2	3	4	5
The RP contained a concern and a scientific response.	1	2	3	4	5
The RP contained advice.	1	2	3	4	5
The structure of the RP was coherent.	1	2	3	4	5
The speech was clear and understandable.	1	2	3	4	5
The actors made the role-play engaging and enjoyable.	1	2	3	4	5

Waves: How do sound and light transmit?

