

Didactic Unit. AICLE STRUCTURES 2º ESO

Teacher: *MARÍA JOSÉ GONZÁLEZ GUTIÉRREZ* **Course/ Level:** 2º ESO

Subject: TECHNOLOGY

U.D. STRUCTURES



LEARNING OUTCOMES / Evaluation criteria

1. To recognise different structures and why they are necessary.
2. To learn different functions of structures and what the necessary conditions are so that these functions are possible.
3. To understand how forces act on a body and how they affect it.
4. To know how structure elements are called.
5. To identify types of stress that act on each element in a structure.
6. To design and build a structure for a specific purpose.

SUBJECT CONTENTS:

1. STRUCTURES: Definitions, including functions of structure elements and types of structures.
2. FORCES AND LOADS: Concepts. Types of loads.
3. STRUCTURAL ELEMENTS: Including element classification by its function.
4. STRESS: Definition. Types of stress.
5. TYPES OF MAN - MADE STRUCTURE. Characteristics and specific vocabulary of each of them.
6. STRUCTURAL CONDITIONS. Key concepts.

LANGUAGE CONTENTS / COMMUNICATION CONTENTS:

VOCABULARY:

Nouns: beam=viga, column=columna, force= fuerza, load= carga, stress= esfuerzo, length=longitud, weight= peso, width= anchura, breadth= amplitud, strength = fuerza, scaffolds= andamios.

Adjectives: stronger= más fuerte, equal= igual, different= diferente, thicker= más grueso, light= ligero, upright= vertical, curved= curvado

Verbs: deform= deformar, act on= efecto sobre, solve= resolver, hold= sostener, tighten= apretar, fasten= sujetar, bend= doblar, stretch= estirar..

Adverbs: near, always, under, normally , tiny, easily, slightly, common...

Class fixed routines: Try to be punctual. Today is..Any volunteer to write the date on board. Ready to start?

Class open routines: Have you ever seen a scaffold? What does it use for? Surely, everybody has ever seen a bridge, what materials does it make of?

STRUCTURES:

ROUTINES:

What did you get on with your homework?

The first thing to do ...

Today, we're going to divide our lesson into two parts.

Have a look at this picture!

GRAMMAR CONTENTS:

Infinitives: To draw, to design, to do, to make..

Imperatives: Let's hear, let's start, revise, repeat,

Prepositions: Before reading

Have to, must do...

CLASSROOM MANAGEMENT:

Open your book on page.. Be wise and revise, Try to listen carefully. Pay attention please! Could I have a copy? Any doubt? If you want to ask me, please raise your hand. Do you understand me? Could you give me an example? Organize your notes. To conclusion. In the last minute.

DISCOURSE TYPE:

Narrative: To place us in context , using elements around us, the daily issues..

Descriptive: To introduce new vocabulary using images like help

Give instructions: about how to ..

Comparing objects and functions

Analysis and conclusions

LANGUAGE SKILLS:

Listening, speaking, writing and social interaction.

COGNITIVE (thinking) PROCESSES:

Watching, analysing, listening carefully, understanding, applying, testing stress, evaluating.

TASKS:

1. Analysis of structures: to decide what structures have been used in particular constructions and to recognise what elements they are formed.
2. First, listen to different concepts and then, choose the right answer.
3. Apply different forces to different bodies.
4. Watching a video to learn how a structure is built.
5. Analyse the different conditions of a structure to serve its purpose and to resist loads without collapsing
6. Work in group to make a project.
7. Building a bridge.

ACTIVITIES:

1. Identify the structures of different objects
2. Write a definition to key concepts
3. Draw sketches and name the elements that form them
4. Look at the photos to guess what kind of stress the structures are bearing.
5. Find out which materials we use nowadays to build bridges and list the advantages over other times.
6. Complete a table with elements, shapes, materials, functions and stresses matched to different structures.
7. Experiment with laminated structures using a sheet of paper.

PROCEDURES

Now, I want to show you an example about how some of those activities could be developed.

Please, touch the following link:

<https://docs.google.com/presentation/d/1R6WY6NlnBpKSpAJ0OffwhQJXF0tPXb7YVAznK7h3ck/edit>

At the end of the text, in the **ACTIVITIES SECTION** , you will find a vast collection of them.

METHODOLOGY

ORGANISATION AND CLASS DISTRIBUTION / TIMING

Individual activities. Work in pairs to practise vocabulary. Work in group to make a project.

An image is used to introduce the didactic unit (UD). The teacher asks students about it in an oral way to practise conversation and to know the students ' previous knowledge at the same time.

This U.D is developed in 15 hours and 3 hours per week. Of the total hours, at least 6 will take place in the technology workshop classroom.

To get started every lesson, a slight revise about the contents viewed the day before is done. Besides, checking activities and resolving doubts.

The timing is not closed and will depend on the diversity of the group of students.

Thinking about students with difficulties, a series of templates with the minimum contents are prepared.

RESOURCES AND MATERIALS:

RESOURCES ON LINE

<http://popplet.com/> it is used to think and learn visually how to create relationships between thoughts and images.

<https://quizizz.com/> to do interactive activities

<http://www.technologystudent.com/> this side provides a wealth of technology information sheets for pupils and teachers.

<https://areatecnologia.com/> to do exercises and watch interesting videos

<https://technovicar2.weebly.com/unit-4.html> to watch interesting videos

<https://bubbl.us/> to learn how to create mind maps and share them with others.

MATERIALS:

Notebooks, drawing materials, personal computers. Necessary materials in the technology workshop to make the project, such as cardboard, string, glue and sheet of recycled paper.

KEY COMPETENCES:

Linguistic competence : use appropriate technological language.

Science and technology competence: use objects carefully and safety

Digital competence: use verbal information, symbols and graphics appropriately

Learn to learn competence: tolerance and respect in conflict resolution

Initiative and entrepreneurial spirit : use creativity autonomously to create solutions. Perseverance in the face of difficulties.

EVALUATION

The observation in a systematic way is necessary to judge the development of the training process.

PROCEDURES:

At the end of the unit there is a written test to evaluate the learned contents.

The homework and the delivery of tasks on schedule are also valuable.

Aptitude for group work

Perseverance to overcome difficulties.

INSTRUMENTS:

Oral checking

Notebook revisions

Class activities

Behaviour and respect for the rules.

Short conversation with the language auxiliary about different points of the unit

Final task: to build a structure and write a report made on a computer.

Notas bibliográficas y créditos:

Plantilla: Pérez Torres, I. 2009

Apuntes sobre los principios y características de la metodología AICLE, en V. Pavón. J. Ávila (eds)

Aplicaciones didácticas para la enseñanza integradora de la Lengua y Contenidos. Sevilla.

Consejería de Educación de la Junta de Andalucía. Universidad de Córdoba. 171-180.

También se ha tenido en cuenta la teoría de las 4 Cs de Do. Coyle.

Para la sección de actividades, además de los enlaces a las diferentes páginas webs que se incluyen, también he consultado el libro: TECHNOLOGY Secondary. Oxford Education. ISBN: 978-84-673-9394-1. D.L:M-26042-2015.

ACTIVITIES SECTION

Session 1

START UP ACTIVITY: To test previous knowledge.

Small conversation

Touching the link below you'll find this activity in the first slide.

What to do?

In order to recognise different **STRUCTURES** , students can see some of them in the second slide

<https://docs.google.com/presentation/d/1R6WY6NlnBpKSpAJ0OffwhQJXFo0tPXb7YVAznK7h3ck/edit>

How to do?

Teacher will write down the name of those structures and will name them aloud. Each of the students will repeat it twice.

Session 2

Oral activity: Let's start revising vocabulary

Filling the gaps (this activity can be seen in the third slide attached in the link above)

Short introduction of the unit concepts using the books.

After reading a text, students will try to explain the meaning of the words in bold. For example: beam, force, load, structure..

To understand: Name and write down three natural structures and four man-made structures.

Session 3

STRUCTURAL ELEMENTS Teacher starts drawing a sketchy bridge.

Then, he asks students for what elements are missing so that structures don't collapse.

Practical activities to work with vocabulary and the concepts of the unit.

Listen and write the structural elements you hear.

https://m.youtube.com/watch?v=4SBVsS9tgPQ&ebc=ANyPxKrB3Zm_rncgPjO16C0X-B8KlchSsrJCIsUVYKbTWUNRaRlgAs-Z05eEQoDuhIE2IZYKaTdEHqvwP13Ynoj3DTvxBADdtA&feature=emb_logo&time_continue=27

To analyse : Find photos of different bridges to guess what parts of each bridge form their structures.

Session 4

To understand **FORCES AND LOADS**

To study how a structure works according to the loads they have to bear.

Social interaction.

How to do?

Hands on activity: Teacher shows students how to build simple structures using sheets of paper.

Work in pairs: students will follow teacher's instructions to build their own structures. Then, each group will apply different loads to see how they act on them.

Learning and revising vocabulary: nouns: weight, length, breadth, load, stress

Verbs: act on, deform, hold, bend...

Session 5

Teacher asks for volunteers to explain others about the task done the day before.

Looking for information about **STRESSES**

Watching this video to learn a bit more:

[STRUCTURES AND STRESS](#)

To understand: Write the answers to these questions:

- What kind of stress do the legs of a chair bear?
- When is the stress greater : when you or someone heavier than you sits on a chair? Why?

Pay close attention to this video and decide what kind of force is applied in each case.

GUESS WHAT STRESS IS BEING PRODUCED IN EACH EXAMPLE.

Session 6

Revising concepts:

Teacher starts by using a practical example to show how stress acts.

Students write down the keys concepts about different kind of stress.

Reading activity: about another concept : **STRUCTURAL CONDITIONS**

To understand: students have to look around to find the right examples about this concept.

Then, they should guess how we can make a structure stable, resistant and rigid.

Session 7

Works in pairs:

Showing a series of photos with different Structures:

A small conversation starts by saying:

- Have you ever seen this structure or similar?

Social interaction.

Students have to choose one of the photos. They partner will try to guess which has been chosen by asking them about it.

To help with this activity, four questions are given to be used.

For example: where is located? or Where can you find it?...

This task will be done several times by each student.

Session 8

Using TICs: Reading and writing activity. Types of structures.

Search the Internet for these famous bridges and aqueducts. For example :

- The Aqueduct in Segovia
- The Roman Bridge in Córdoba
- The Barqueta Bridge in Sevilla.

- The Viaduct in Madrid.

Read the following statements . Are they true or false?

Give reasons for your answers.

- Triangular bar structures can be made of stone.
- Steel is used in solid structures.
- Suspenders are only used to make structures more stable.

Session 9

Revising contents in an oral way.

Let's start by looking around yourselves into our class.

Students have to say aloud the name of some structures they can find and what materials they are made of.

Learning vocabulary about Structural elements.

How to do?

Firstly: Reading and repeating the name of each element.

Then: Listen and write the structural elements you hear.

What to do?

Match the words you can see in the word cloud with these pictures.

(Those pictures can be seen in the first link included in Activity Section)

The rest of the Sessions (10, 11, 12, 13, 14 y 15) will consist of a **PROJECT** as a final task, that will take place at the technology workshop classroom.

How to do? Work in small group . Hands - on activity.

What to do?

Building a bridge using recycling materials and presentations of their work to the rest of the class.

The project must be done within a time limit.

For this task, they will be a class competition where everyone will have to test the resistance by adding weight until it collapses.

Students will follow carefully the next instructions given by the teacher:

What do you have to do?

- Design a bridge according to the specifications:
 - The space between the supports must be 50 m and cannot have any other support in between
 - The width of the bridge must accommodate two lanes of traffic (3 m each) a double cycle lane (1,5 m each) one in each direction and a pavement for pedestrians (3 m wide)
 - It must build a 1/1000 scale model of the bridge.
 - The materials that can be used are : recycled paper , cardboard, thread and glue.
- Test the bridge once it is built. For the purpose of testing, choose a specific load .

3. Make a group presentation.
4. Write a report on a computer with the following sections.
 - a. A general description of the structure
 - b. The specifications : length, width, weight, height
 - c. The parts.
5. Time planning.

SELF ASSESSMENT. (EVALUATION)

Test your own knowledge by this link:

<https://es.educaplay.com/recursos-educativos/4431609-structures.html>

The end.