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LESSON PLANS

1) Arts Lesson Plan

2) Biology Lesson Plan

3) Chemistry Lesson Plan

4) Economics Business Lesson Plan

5) English Languages Lesson Plan

6) Geography Lesson Plan

7) History Lesson Plan

8) Physics Earth Science Lesson Plan

9) Sports Lesson Plan

10) Technology Lesson Plan

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The ARTS lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)– THE ARTS

LESSON- Renaissance Italy - Florence and Venice: a virtual tour

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *Renaissance Italy* using digital games' web 2.0 tools. Thus, the students will be able to learn about *Renaissance Italy* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:

Upon completion of this lesson, students will be able to:

- **understand the key events, locations, and figures of the Renaissance**
- **explain the differences of the different social classes in Renaissance Italy**
- **identify Renaissance Italy art and architecture figures**
- **analyze the Renaissance Italy economy**

Learning outcomes and environmental awareness and climate change implications - The environmental issues suggested by the game are represented, are those referring to the contrast between the wellbeing, welfare and good life the people of Florence and Venice started having when the beautiful buildings with great architecture were being constructed, and painted with majestic paintings, when Murano glass makers pioneered many glass technologies, when prosperity and well fare were at their most, the huge amount of deforestation and irreversible changes made to the environment due to these huge constructions which polluted the air, which also needed space to be built, meaning natural ecosystem would be altered, and entire forms of

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relief would be destroyed, alongside with the Murano factories, who also, due to huge temperatures needed to melt and mold the glass, polluted the air, the waters and caused damage to the entire nature.

Description of the game and activities and technical specs: The digital game provides background on the times, artists and advancements of the Renaissance Italy. The students are required to identify masterpieces and artists from that epoque, belonging to painting, architecture, literature and music from the most flourishing historical period of Venice and Florence.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 - What factors helped make Italy the birthplace of the Renaissance?

Students will take a virtual field trip to some of the places that were crucial during the Renaissance, and will identify why these locations experienced a growth of cities and trade along with an increased focus on learning and human achievement, so that they ended themselves to the changes experienced during the Renaissance („ rebirth'').

Activity 1

After the virtual tour, teacher concludes by playing a first part of the digital game related to the idea above: ask the students to label the following in the game: birthplace of the Renaissance, Florence, Venice, Milano and Rome.

Web 2.0 tool digital game model: – matching pairs - https://learningapps.org/20159152

Teacher – Question 2 - What groups made up the different social classes in Renaissance Italy?

The teacher explains why The Renaissance benefited mainly the upper class (The upper class wanted bigger houses and mansions etc, what the upper class consisted of, what kind of life

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did the majority of people in Renaissance Italy have (poor workers, uneducated, low income, living in small houses).

Teacher - Question 3 - In what areas did Renaissance figures make notable accomplishments?

The teacher explains how Renaissance artists focused on portraying humans in realistic ways, how Renaissance writers and painters experimented with new styles and techniques that resulted in unique works.

Activity 2

After the information presented, teacher concludes by playing a second part of the digital game related to the ideas above: to identify the leading figures that dominated the Italian Renaissance and match them with their works, in the field or art, writing, architecture: Michelangelo and his masterpieces, Michelangelo and his sculptures, Filippo Brunelleschi and the domes, Dante Alighieri and his poems, Machiavelli and his works.

Web 2.0 tool digital game model: matching pairs https://learningapps.org/46117

Teacher – Question 4 – Why did the trade and commerce grow in Renaissance Italy?

The teacher explain how the Italy's states became wealthy and powerful: they sat on the Mediterranean Sea, they were independent, they became rich by trade. They bought Chinese Silk and Indian spices to sell to Western Europe. They also sold good to the Middle East. The guilds and Murano factories became popular worldwide.

Activity 3

After the information presented teacher concludes by playing the third part of the digital game related to the idea above: what is the Silk Road in Renaissance, what is a Florentine, what is the House of Medici, what is Murano, What are guilds, what are Venetian canals and waterways.

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Web 2.0 tool model game –, matching pairs - https://learningapps.org/20159152

Follow –up discussion

Discussion Questions

How did the list of facts known about the Renaissance change after completion of the unit study?

What lasting effects of the Renaissance remain visible in modern society?

Assessment/ Evaluation

Upon completion of the three activities, ask students to write a report on the Renaissance.

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The SCIENCES / BIOLOGY lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)– THE SCIENCES / BIOLOGY

LESSON- Characteristics of water

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *Characteristics of water* using digital games' web 2.0 tools. Thus, the students will be able to learn about *Characteristics of water*, consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:
Upon completion of this lesson, students will be able to:
- recognise various sources of water;
- relate water to other liquids;
- appreciate the importance of water;
- understand the dangers associated with polluting water.

Learning outcomes and environmental awareness and climate change implications - The environmental issues suggested by the game allow students understand how human actions modify the physical environment. The outcome is to assess the impact of water pollution on a local environment.

Description of the game and activities and technical specs: The digital game is e represented by sources and uses of water, properties, effects and consequences of water pollution, measures

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to prevent water pollution. The purpose of the game is to enable students to understand the importance of water in our lives, in nature, and the environmental impact of inappropriate use of water.

Key points for the teacher to underline: water, as a source of life, water in the natural cycle of life, structure, composition, properties, characteristics, functions and uses of water, corelating these knowledge with their ecological implications.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 – What is water: sources, uses, properties are the characteristics of water

Teacher will introduce students the term of water (e.g. Water is a colorless and tasteless substance composed of one oxygen and two hydrogen atoms, as reflected by its chemical formula etc), the importance of water; the sources of water (e.g. Water covers about 71% of the Earth's surface—96.5% of it is found in oceans, seas, and bays, while the rest is stored in ice caps, glaciers, groundwater, and other water sources), the critical functions of water, (e.g. Liquid water makes Earth unique and habitable compared to other planets) the uses of water (e.g. it provides food, habitat, and protection to countless plant and animal species, it regulates the Earth's temperature through the hydrologic cycle).

Activity 1

The digital game is designed as a multiple choice quiz, meant to enable students to classify the sources of water according to their location, water utilization, water characteristics and functions.

Web 2.0 tool digital game model: multiple choice quiz https://learningapps.org/display?v=pv3rc1auj23

Teacher – Question 2 – What are the properties of water ?

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The teacher makes an introduction to the functions of the water there are possible due to the unique thermal properties of water: thermal conductivity, specific heat capacity, and melting and boiling point, density of water, density of ice.

Activity 2

This digital game is designed to challenge students to developed a virtual water cycle in the nature to demonstrate the impact and importance it has for the environment and for life.

Web 2.0 tool digital game model: map quiz https://www.educaplay.com/learning-resources/7908707-2_water_carbon_cycle.html

Teacher - Question 3 – How

The teacher explains the human effect upon irrational and improper use of water; what the most frequent water pollutants are; demonstrate how to identify ways to prevent and reduce water pollution.

Activity 3

The teacher will describe the following digital game – students are required to fill in the blanks with the missing words in order complete and article with information about the water pollution sources

Web 2.0 tool digital game model: fill in the blanks https://www.educaplay.com/learning-resources/2487943-water_pollution.html

Assessment/ Evaluation

Upon completion of the three activities, ask students create a comprehensive and detailed presentation showing an evaluation of the consequences of their own behaviour with water upon their own state of health and upon the environment.

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The ENVIRONMENTAL SCIENCE / THE CHEMISTRY lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)– THE ENVIRONMENTAL SCIENCE / THE CHEMISTRY

LESSON- Environmental Chemistry and chemical reactions – virtual laboratory

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *Environmental Chemistry* using digital games' web 2.0 tools. Thus, the students will be able to learn about *Environmental Chemistry* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:

Upon completion of this lesson, students will be able to:

- **understand the meaning of environmental chemistry**
- **collect, analyze, and interpret reactions on environmental quality**
- **categorize chemical reactions;**
- **identify chemical compounds;**
- **understand strategies for reducing waste;**

Learning outcomes and environmental awareness and climate change implications - The environmental issues suggested by the game are represented by the identification of the chemical reactions that are important in the environment, and also their effect upon climate change and environment. The outcome is to assess the impact of chemical pollution on a local environment.

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Description of the game and activities and technical specs: The digital game will allow to combine the substances correctly, label them correctly and add them to the correct column / bubble; this virtual laboratory is designed to challenge students to identify types of chemical reactions and distinguish between those that use safer, less hazardous chemicals and those that are more dangerous. Students will make a choice as to which reaction they will perform using the 12 Principles of Environmental Chemistry.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 - What is Environmental Chemistry or Green Chemistry?

Teacher will introduce students to the term of environmental chemistry or green chemistry. Environmental chemistry deals with the study of the origin, transport, reactions, effects and fates of chemical species in the environment. Explain to the students that they will be exploring reactions through a series of virtual labs. Chemists developing products or procedures in the lab constantly have to evaluate reactions and decide which ones will meet a specific need.

Activity 1

In the digital game, the students will be combining and labeling chemical substances, will be evaluating reactions and looking at them through the perspective of green chemistry.

Web 2.0 tool digital game model: app matrix https://learningapps.org/13673184

Teacher – Question 2 – How can we use Green Chemistry to understand Types of Chemical Reactions ?

The principles of Environmental Chemistry can be used to diminish the amount of waste created and lower the environmental impact factor of a particular chemical process. It is the design of chemical products and processes that reduce or eliminate the use and formation of pollution at its source. Among the principles and guidelines of Environmental Chemistry intended to fulfill goals for any chemical process, whether industrial or laboratory scale, the teacher mentions:

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Make better use of available resources for the development of a chemical process.

Reduce waste generated in any preparation or handling of chemicals.

Materials should be prepared by improved processes that reduce unwanted effects on the environment.

Replace toxic reagents and products with others that have the same properties and applications but have less impact on the environment.

Activity 2

This virtual lab digital game is designed to challenge students to identify types of chemical reactions and distinguish between those that use safer, less hazardous chemicals and those that are more dangerous. Students will make a choice as to which reaction they will perform using the 12 Principles of Green Chemistry.

Web 2.0 tool digital game model: group assignment https://learningapps.org/20728212

Teacher - Question 3 – What are the chemical reactions categorized?

There are five types of chemical reactions: composition (also called synthesis or combination), decomposition, single replacement, double replacement, and combustion.

Composition is the combining of two or more substances to make a single more complex compound. It can be depicted as:

$A + B \rightarrow AB$

Decomposition is the breaking down of a more complex compound into simpler substances. Decomposition and composition are opposites. Decomposition can be depicted as:

$AB \rightarrow A + B$

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Single replacement is a reaction where an element replaces a similar element in a compound. It is also called single displacement. Single replacement can be depicted as:

$A + BC \rightarrow AC + B$

Double replacement is a reaction where the positive and negative ions in two ionic compounds switch places to form two new compounds. It is also called double displacement. Double replacement can be depicted as:

$AB+CD \rightarrow AD+CB$

In green chemistry a set of twelve principles guide chemists to choose reactants that result in the safest, most economical, and environmentally sound reactions to create a product with the desired properties.

Activity 3

The teacher will describe the following digital game -Green Chemistry Reaction Lab Game – it will allow students to choose of the two procedures listed under each reaction type. There will be three or four teams; the aim is to use the 12 Principles of Green Chemistry and the supplemental information given by the teacher to decide which one each team will conduct. Each team will analyze each reaction type, then they will fill out the table below with their criteria for choosing those procedures/ or they will record their answers.

	Procedure chosen (1 or 2)	Criteria for choosing the procedure used	Green Chemistry Principle that guided your choice
Reaction A			

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Reaction B			
Reaction C			
Reaction D			

Web 2.0 tool digital game model: fill table https://learningapps.org/285514

Follow –up discussion

Consolidate key points with students and those game results that were not done correctly.

Assessment/ Evaluation

Upon completion of the three activities, ask students to write a project about waste reduction using Environmental Chemistry.

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The ECONOMICS / BUSINESS lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)–The ECONOMICS / BUSINESS

LESSON- Product and Brand Management

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *Product and Brand Management* using digital games' web 2.0 tools. Thus, the students will be able to learn about *Product and Brand Management* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:

Upon completion of this lesson, students will be able to:

- **understand the decisions made by economic agents and their interaction in the markets**
- **confront and understand the business culture and environment**
- **propose real solutions to specific problems in a company**
- **understand brand ethics and social responsibility**
- **understand product management and sustainability**

Learning outcomes and environmental awareness and climate change implications - The environmental issues suggested by the game are represented by the how brands are viewed, built, managed, and measured to ensure firms' superiority and sustainability in profits, the sustainability that is important to the environment, and also their effect upon climate change and environment.

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Description of the game and activities and technical specs: The digital game will allow students to match the words or brand management expressions with their definitions; the matching game is designed to challenge students to correctly identify and main tasks in product and brand management.

Key points for the teacher to underline: develop students' understanding of managing brands from conception and introduction of new brands to managing them throughout their life cycles; Examine brand concepts in real-life setting; Describe the process and methods of brand management, including how to establish brand identity and build brand equity; teach students how to identify brand meaning and to measure brand strength for any particular market offering. understand sustainable development as making and distributing products in a more efficient way, caring about products' lifelong environmental impact, planning for products' recycling and getting suppliers to follow these guidelines.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 - What are brand products?

Teacher will introduce students to the terms ''product'', ''brand'', „marketing'' and ''management'',. Understanding what a brand and branding mean to the marketer and consumer; Formulate strategies to effectively manage a brand; Identifying and establishing brand positioning and values;

Activity 1

In the digital game, the students will be matching tasks and steps for products and the essential stages of brand management. Students will thus have the possibility to Reflect on the main concepts and the purpose of branding.

Web 2.0 tool digital game model: memory game: https://www.educaplay.com/learning-resources/6504121-brand_partnership.html

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Teacher – Question 2 – How can we market a brand product?

The teacher will explain students how a favorable brand and memorable brand experiences can influence a firm's ability to withstand competitive pressures and thrive in dynamic market conditions; students will consider the role of marketing communication vehicles and platforms in effective brand management; show how to apply branding principles and marketing communication concepts and frameworks to achieve brand management goals and improve marketing performance (e.g. the goal of competitive strategy for a brand is to find a position in the industry where the brand can: 1) articulate a compelling value proposition, 2) defend itself against competitive forces and influence them in its favor and 3) leverage communication resources to sell the brand message and build brand equity); the teacher will show students how to identify important issues related to planning and implementing brand strategies for a diverse group of marketing offerings (e.g., products, services, industrial goods, non-profits, etc.).

Activity 2

The teacher will describe the following digital game – students are supposed to play a group puzzle digital game, that will help them consolidate marketing terminology. By identifying the brand elements and brand associations, students are expected to recognize the importance of branding for a successful marketing plan, and also acknowledge the vital role marketing plays in building brands.

Web 2.0 tool digital game model: group puzzle**:**
https://learningapps.org/display?v=p4ivetujj20

Teacher - Question 3 – What is Sustainable Marketing?

Students will explore what it means for a company to have a responsible, sustainable business mission. They will learn about „ Triple Bottom line' - referring to a company's economic, social, and environmental impacts; measures a business' commitment to profits (economic

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impact and value of a company; corporate profit and losses; expenditures and revenue), people (social responsibility to its people and the community/customers it serves; fair and favorable practices, usually in reference to labor and the community in which it does business), and planet (environmental impact and responsibility; use of sustainable practices; resource conservation and environmental impact). Also understand the difference between green marketing and sustainable marketing.

Activity 3

The teacher will describe the following digital game – the students will create a virtual concept that represents the key principles of sustainable marketing; thus, students will become aware of the fact that sustainable marketing is the promotion of socially responsible products, services, and practices.

Web 2.0 tool digital game model: matching game

https://www.educaplay.com/learning-resources/9645020-public_relations.html

Follow –up discussion

Consolidate key points with students and those game results that were not done correctly.

Assessment/ Evaluation

Upon completion of the three activities, ask students to write a project about how to develop a successful brand marketing plan using digital and traditional tools, incorporating sustainability into marketing activities and strategies, in order to respond to opportunities and threats that arise from both social, economic and environmental change – such as climate change.

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The **LANGUAGES (English)** lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)– The LANGUAGES

LESSON- At the mountains – a virtual trip

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *At the mountains – a virtual trip* using digital games' web 2.0 tools. Thus, the students will be able to learn about *At the mountains – a virtual trip* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:

Upon completion of this lesson, students will be able to:

-formulate a short picture description within the context of mountains related vocabulary;

- recycle or extend previous language work on the topic of mountains related vocabulary;

-provide opportunities to use the language in speaking and writing;

-raise learners' awareness of some of the features of mountains related vocabulary and encourage creativity;

-develop planning and teamworking skills;

Learning outcomes and environmental awareness and climate change implications –

Students will gain a broad understanding of nature (trees, mountains and rivers), examining why nature is essentially all the things in the world (and the universe) not created by humans. The lesson will give students the opportunity to understand how humans encroach more and

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more into nature. Students will have the opportunity to discuss and express their opinions on issues such as the importance of nature, how nature is being harmed by humans and how nature can be protected. The outcome is to develop awareness about the need to protect nature.

Description of the game and activities and technical specs: The digital game will consist of identifying and classifying environmental deterioration which involves changes in the natural resources due to human actions rather than some natural cataclysm: land-slides, deforestation, degradation of coastal resources as a result of development without environmental accounting.

Key points for the teacher to underline: acquisition and expansion of knowledge about mountains related vocabulary as well as about natural phenomena, issues, rules and processe**s;** sensitivity towards environmental concerns.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 – How do we prepare for a trip at the mountains?

It is assumed that students already have some familiarity with present tense and past tense. The lesson supports vocabulary development, including mountain collocations with go/come/do/ cross, and listening and speaking skills, An optional activity related to the places where people do various mountain activities could also be included.

Activity 1

The digital game – holidays on the mountain- the game is designed for the students to match words with the pictures in order to consolidate their mountain related vocabulary.

Web 2.0 tool digital game model: group assignment https://learningapps.org/1617707

Teacher – Question 2 –What is International Mountain Day?

The teacher explains what International Mountain Day means (e.g. the day was designated by the United Nations General Assembly to celebrate International Mountain Day on 11 December. According to the UN, "Mountain host about half of the world's biodiversity hotspots

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and 30% of all key Biodiversity Areas.") and about its importance (e.g. International Mountain Day raises awareness about the threats and needs to protect the avalanche. Their conservation is the key factor for sustainable development Due to climate change and overexploitation, mountains are under threat. The conservation of mountains is a crucial factor.

Activity 2

This digital game is designed to challenge students to match columns with information from a previously read text, using the correct words. This will enable students to actively engage in consolidating their mountain related vocabulary and also gain awareness and action for the protection of the environment.

Web 2.0 tool digital game model: matching columns game - https://www.educaplay.com/learning-resources/9841140-past_perfect.html

Teacher - Question 3 – What is the importance of mountains in our lives?

The teacher presents a video/ shows a presentation about the importance of mountains in our lives (e.g. More than half of humanity's everyday life relies on mountain freshwater. 80% of the world's food is supplied by 20 plant species and six of them originated and have been diversified in mountains namely maize, potatoes, barley, sorghum, tomatoes, and apples; Mountains create rain forests and deserts. They store water on snowy peaks and release it in rivers that make valleys green and fertile. The flowing water can be harnessed to manufacture electricity. People climb mountains for recreation. Mountains are not only important for inhabitants but also for millions of people living in lowlands. They are the sources of the world's major rivers and also play a crucial role in the water cycle. People need to understand the role of mountains in the environment and their impact on life.)

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Activity 3

The teacher will describe the following digital game – the mountain story- students use expressions of certainty when discussing events likely to happen in the future, related to mountains and humans.

Web 2.0 tool digital game model: cloze text https://learningapps.org/16403955

Follow -up discussion

To check students' understanding of mountain related vocabulary. To assess their intake of information to ensure they took notes and have an understanding of sustainable mountain tourism and extend their understanding of lexis connected to mountains, climate change and environmental issues, improve understanding of pronunciation information given in a dictionary. Focussing on the lexis in detail will help them recognise and use these terms outside the classroom.

Assessment/ Evaluation

Upon completion of the three activities, ask students to create a PowerPoint presentation to demonstrate the sustainability of mountain tourism.

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The **GEOGRAPHY** lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)–THE GEOGRAPHY

LESSON- Antarctica – a virtual expedition

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *Antarctica – a virtual tour* using digital games' web 2.0 tools. Thus, the students will be able to learn about *Antarctica – a virtual tour,* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:
Upon completion of this lesson, students will be able to:
- describe features of Antarctica
- describe the climate of Antarctica
-understand that food webs represent the complex feeding interactions within an ecosystem
- understand the effect of the tourism affecting Antarctica.

Learning outcomes and environmental awareness and climate change implications - The environmental issues suggested by the game are represented by the tourism and development and describe the human impact on Antarctic life and also their effect upon climate change and environment. The outcome is to assess the impact of climate change, global warming sea level rise.

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Description of the game and activities and technical specs: The digital game will consist of a map quiz of Antarctica, of a food web and a touristic expedition: The purpose of the game is to enable students to track important places and events.

Key points for the teacher to underline: Antarctica is an important part of our ecosystem, a very valuable natural resource; it keeps a balance for the climate and environment.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 – What is Antarctica?

Teacher will introduce students Antarctica: the landscape- rivers, mountains, lakes and seas, the weather, living conditions, famous explorers, animals and plants (e.g. has the highest average altitude of all continents; comprises numerous massifs and mountain chains is covered with a thick ice cap (2000m-5000m max.); the hydrographic network is mostly represented by the water in solid state (ice cap) to which are added the Onyx River and Vanda Lake; comprises the largest freshwater reservoir in the world; is forever winter - 89.2 degrees C – world record at Vostok Station). In Antarctica was formed the largest glacier in the world, lambert glacier 402 km long and 62 km wide; the maximum temperature ever recorded was +15 degrees C on January 5, 1974; fauna and flora is represented in the shore areas. Emil Racovita, a famous Romanian explorer and the founder of biospeology, studied in Antarctida over 1200 species of animals and about 400 types of plants; he publishes in 1903 a book called „ Cetaceans'', about whales. In Antarctica there is the largest marine reserve in the world! etc.)

Activity 1

The digital game is designed to identify some important locations on the map of Antarctica (e.g. the following 14 locations: the four ices shelves; the four seas; the peninsula; the Ellsworth Mountains; Vinson Massif; Lake Vostok; the Antarctic Ocean (Southern Ocean);the South Pole.

Web 2.0 tool digital game model: map quiz - https://www.educaplay.com/learning-resources/11705414-antarctica_quiz.html

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Teacher – Question 2 – What is the Antarctic food web?

The teacher makes an introduction to the animals of Antarctica. Then explains the impact of one animal on the rest of the food chain, how pollution such as a fuel spill, affect this food chain, how humans can minimise the impact on this food chain, what effect global warming has on food chain etc.

Activity 2

This digital game is designed to challenge students to developed a virtual food network to demonstrate the impact of overfishing/pollution and climate change to the Antarctic marine environment.

Web 2.0 tool digital game model: matching column game - https://www.educaplay.com/learning-resources/9476709-vocabulary.html

Teacher - Question 3 – How did the development of Tourism and people impact on Antarctica ?

The teacher explains the human impact on Antarctica (the positive effects as well as the negative ones), then explains why it is important to preserve Antarctica. Further, discusses main aspects of global measures taken to ensure preservation of Antarctica (e.g. name organisations created to ensure preservation of Antarctica; identify one specific problem and describe briefly measures taken to combat this problem

Activity 3

The teacher will describe the following digital game – to complete a short journal entry to describe what they discovered about Antarctica in a hypothetical journey and explore their feelings and hardships they may have endured, using the missing words.

Web 2.0 tool digital game model: fill in the blanks https://www.educaplay.com/learning-resources/7287100-relief_oceania_and_antartica.html

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Assessment/ Evaluation

Upon completion of the three activities, ask students create a comprehensive and detailed PowerPoint presentation showing a deep understanding of Antarctica and its issues.

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The HISTORY lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)– THE HISTORY

LESSON- The Industrial Revolution – changes and consequences

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *The Industrial Revolution – changes and consequences* using digital games' web 2.0 tools. Thus, the students will be able to learn about *The Industrial Revolution – changes and consequences,* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:

Upon completion of this lesson, students will be able to:

- **Understand the major achievements of the Industrial Revolution**
- **Identify the changes in life brought by the Industrial Revolution**
- **Understand the different interpretations of the impact of the Industrial Revolution**
- **Make an imaginative reconstruction of the life in the past**

Learning outcomes and environmental awareness and climate change implications - The environmental issues suggested by the game are represented by the new inventions and transportation methods created during the Industrial Revolution and describe their impact on life and history and also their effect upon climate change and environment. The outcome is to assess the impact of climate change, pollution on a local environment.

Description of the game and activities and technical specs: The digital game will consist of a timeline made up of ten individual images depicting significant inventions and individuals related to the Industrial Revolution; the timeline must be constructed by identifying the

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inventions and naming the respective inventors. The purpose of the game is to enable students to track important themes and events as they occurred within this time period.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 – What is „Industrial Revolution ‘’ and where it started?

Teacher will introduce students to the term of „Industrial Revolution’’- the term refers to a period in history during which significant changes took place in industry in a relatively short time. Students will find out that The Industrial Revolution brought about fundamental changes in the way goods are made. It introduced mass production and the use of new sources of energy to meet human needs. People started making goods in factories instead of at home, and they began to use steam power to run machinery. Science also became more closely linked to technology, resulting in a stream of constant innovations. The first Industrial Revolution started in the 1700s in England, and later appear in other countries too, thanks to shared economic relations.

Activity 1

Students are required to write down a few notes in a personal diary, about what life was like for a peasant before the Industrial Revolution. They are given some images as guidance points.

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Key points students should cite include: refer to villagers, yeomen, and gentry; focus on having sufficient food to eat all year long, either by farming and/or trading at village markets; the impact of the seasons and the weather; the threat of malnutrition and illness; the hard work and simple living conditions that characterized rural life; poor people's lack of power to change their living conditions.

Web 2.0 tool digital game model: cloze text https://learningapps.org/index.php?page=3&s=industrial%20revolution

Teacher – Question 2 – What were the greatest achievements of the Industrial Revolution

The teacher asks students to share to the class their favourite form of technology, or their favourite modern day invention. Then, the teacher discusses the origin of the invention / innovation or technology from the industrial era, and makes a parallel between what life was like before the respective invention / innovation and how the respective invention / innovation improved industry.

1. Marie Curie: Radioactivity
2. Thomas Edison: Light bulb; phonograph
3. Albert Einstein: Theory of relativity
4. Louis Pasteur: Pasteurization (killed germs with heat; milk)
5. James Watt: Improved steam engine
6. James Hargreaves: spinning jenny
7. Robert Fulton; steamship
8. George Stephenson: steam locomotive
9. Eli Whitney: Cotton Gin

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10. Alexander Graham Bell: telephone

Activity 2

This digital game is designed to challenge students to create the timeline of the Industrial Revolution, by placing the pictures of the invention / innovation and its inventor under the correct name of the respective invention/ innovation.

Web 2.0 tool digital game model: matching pairs https://learningapps.org/20159497

Teacher - Question 3 – What were the impacts of the Industrial Revolution?

The teacher explains the positive effects as well as the negative ones.

One of the major impacts of the Industrial Revolution was the improvement in the agriculture sector. Machines were introduced and replaced human labor. Machines increased the production capacity of products like wool and cotton. One of the positive effects of the Industrial Revolution was an increase in food production: farmers used scientific methods to boost productivity, such as enclosing common lands, rotating crops, and careful animal breeding. Fewer people were needed to work on farms.

A new large and powerful middle class emerged. They participated in government and promoted free enterprise and economic improvement. The Industrial Revolution also led to the growth of cities and towns which improved the economy of Europe.

There were many Scientific Advances. Inventors and business owners took a “scientific approach” to solving problems. Because of scientific advances, manufacturers had technical skills to build new machines.

The negative impact was that the Industrial Revolution polluted the environment due to chemicals released by factories.

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Activity 3

The teacher will describe the following digital game –My timeline diary– it will allow students to summarize and memorize the Industrial Revolution main events, inventions and developments. They will fill in the gaps with a suitable word from the grid, so as to complete the diary of a time traveler back to the industrialization era.

Web 2.0 tool digital game model: fill in the blanks game https://www.educaplay.com/learning-resources/11257137-child_labour_during_the_industrial_revolution.html

Follow –up discussion

Discuss the main advantages and disadvantages of the industrial era (on the impact of the Industrial Revolution, there were two different views: the optimistic point of view and the pessimistic point of view)

Assessment/ Evaluation

Upon completion of the three activities, ask students to write a project about one inventor of the Industrial revolution, whose entrepreneurship they appreciate the most.

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The PHYSICS / EARTH SCIENCE lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)– The PHYSICS / EARTH SCIENCE

LESSON- Energetic resources of the planet – renewable vs non renewable

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *Energetic resources of the planet – renewable vs non renewable* using digital games' web 2.0 tools. Thus, the students will be able to learn about *Energetic resources of the planet – renewable vs non renewable,* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:

Upon completion of this lesson, students will be able to:

- Know how to differentiate between renewable and non-renewable energy resources

- Classify resources as renewable or non-renewable

- Explore the advantages of renewable energy

-Understand the origins and uses of different energy resources

- Develop innovative solutions for renewable energy.

Learning outcomes and environmental awareness and climate change implications - understand how human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems by the identification of renewable and non-renewable energy resources that are

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important in the environment, and also their effect upon climate change and environment. The outcome is to assess their impact on a local environment.

Description of the game and activities and technical specs: The digital game will consist of identifying and classifying types of energy resources, used to supply electricity, fuel, and heat needed to live day to day, as each source comes with environmental and sustainability issues. The purpose of the game is to enable students to discuss ethical and social issues on environment and climate.

Key points for the teacher to underline: the process of attaining energy from a resource, and how this affects the environment; teach students how to contrast the impacts of certain energy sources; how to identify energy sources and describe how they are used; how to convert sources of energy to useful forms; how to identify renewable and non – renewable resources (definitions and differences).

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 – How do we get our energy ?

The teacher explains the term ,,energy''- the capacity or ability to perform work, which is significant in causing anything to move within nature; and also what types of energy are there, where it comes from, why it is necessary, and how it is important in natural systems (e.g. students are introduced to the five types of renewable energy resources by engaging in various activities to help them understand the transformation of energy (solar, water and wind) into electricity); explain about the many sources of energy human rely upon and how we convert them into forms that we can use for practical purposes.

Activity 1

The digital game is designed for the students to identify and match the names of the sources of energy: the Sun, water, biomass, fuels, wind etc.

Web 2.0 tool digital game model: word puzzle https://learningapps.org/display?v=p6fi4ydok21

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Teacher – Question 2 –What are renewable and non – renewable energy resources?

The teacher explains the difference between renewable and non-renewable sources, ways they use energy in everyday lives, and ways to conserve energy; explains how to assess the impact on society and the environment of the use of various renewable and non-renewable energy sources, and propose a plan to reduce energy consumption (e.g.

Activity 2

This digital game is designed to challenge students to categorize a list of sources of energy (water, wind, coal, natural gas, etc.) into the correct categories of renewable and non-renewable energy.

Web 2.0 tool digital game model: group assignment https://learningapps.org/display?v=pjywwvdpj22

Teacher - Question 3 – What are the advantages and disadvantages of using renewable and non – renewable resources?

The teacher explains positive and negative aspects of each energy resource (environmental, social, economical, such as whether they are expensive to build, reliant on certain weather conditions or whether they have negative impacts on local wildlife (e.g. for the renewable source solar energy the environmental advantages are: no carbon emission, no pollution or dirty air, the social / cultural advantages are: people can go in control of their own energy supply; the economic advantages are: becoming less expensive with better technology, while disadvantages can be: environmental- can be intermittent and unreliable; social / cultural – not every one; economic – storing energy from solar can also be expensive.)

Activity 3

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The teacher will describe the following digital game – Explore the station labs! – there will be two teams of students, each of them exploring a station lab: one of non renewable energy resources, and the other of renewable energy resources. Each team interacts with labels as they try to identify the types of renewable or non-renewable resources. Students will follow the steps and complete their observations on their lab sheet, using the labels.

Web 2.0 tool digital game model: cloze text https://learningapps.org/display?v=p69j251ra21

Follow -up discussion

To check students' understanding of definitions of renewable and non-renewable resources.: To assess their intake of information to ensure they took notes and have an understanding of energy production, consumption, and conservation with respect to a variety of renewable and non-renewable sources;

Assessment/ Evaluation

Upon completion of the three activities, ask students to create a brochure that persuades people in their community to conserve energy.

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The **PHYSICAL EDUCATION / SPORTS** lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)– The PHYSICAL EDUCATION / SPORTS

LESSON- Athleticism and the Olympics

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *Athleticism and the Olympics* using digital games' web 2.0 tools. Thus, the students will be able to learn about *Athleticism and the Olympics* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:

Upon completion of this lesson, students will be able to:
- assess their perception of athleticism and what it entails
- analyse the role Olympic Games play and their impact on sports and society;
- effectively explain the environmental impact of major sports events;

Learning outcomes and environmental awareness and climate change implications - students will gain a broad understanding of the impact of major sports events on the living planet and the impact of global heating on sports, and explore possible solutions and compromises that the world of sport might need to take to lessen its impact. The outcome is to assess and appreciate the causes and consequences behind these issues as well as to develop possible solutions.

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Description of the game and activities and technical specs: The digital game will consist of using a 'problem tree' to better understand possible causes of and solutions to the environmental impact of sports events and vice versa (a two-way process, and that sports are affecting the climate just as the climate is affecting sport). The purpose of the game is to enable students to develop awareness of and talk about environmental impacts and action that can be taken.

Key points for the teacher to underline: environmental sustainability in sports, physical activity and education, and outdoor life; challenges: how sport affects and, is affected by, climate change and opportunities: the role of sport in combating climate change; criteria for the sustainable development of sport; sustainable major sporting events worldwide.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 – What are the basics of a sprint start in Athleticism?

The teacher explains about the different aspects and its uniqueness of the 400 m sprint compared to 100 m race, the laws that govern a 400 m race and what happens to the body within the race.

Activity 1

The digital game is designed for the students to complete an observation chart about the difference between a 400 m race and a 100 m race, using the words given. This will allow students to critically analyze strengths and weaknesses about the two types of races.

Web 2.0 tool digital game model: fill in the blanks https://www.educaplay.com/learning-resources/8866574-los_deportes.html

Teacher – Question 2 – What is the sport industry at the Olympics?

The teacher explains sport industry and the practice of sports at the Olympics. (e.g. the practice of sports implies a structured organization, sports facilities and equipment, logistics and sponsors, media and athletes; sports industry refers to the creation and production of sport

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products, services, programs, and facilities, and also the fans and athletes travelling to take part in major sporting events, such as the Olympics). Explain that environmental issues such as waste management, mobility, water consumption, lighting, fan environmental awareness during a major sport event can cause damage to nature and the environment. (e.g. Sports facilities, events, activities and the manufacture of sporting goods have an impact on the environment. Energy consumption, air pollution, emissions of greenhouse gases and ozone-depleting substances, waste disposal, wastes use and impacts on biological diversity are all issues for the sporting world to address.)

Activity 2

The teacher will describe the following digital game – the ‘’ problem tree’’ – elicit some major events, such as Olympic Games, divide the students into three or four groups and explain that they are the organising committee of a major sporting championship. They must first agree on a sport and championship they would like to represent. Then, explain that using their problem tree, they should hold a meeting to identify environmental problems and causes of those problems, created by the sport and the event. Then they must identify possible ways of reducing the carbon footprint and environmental impact of the sport and event.The game will enable students acknowledge sport industry’s recognized impact on the natural environment and allow them to develop strategies to address such relevant issues.

Web 2.0 tool digital game model: group assignment https://learningapps.org/23484949

Teacher - Question 3 – Can sports become more environment sustainable ?

The teacher explains the causes that lead to the damage created by sports to the environment (e.g. plastic waste, sports equipment and clothes; stadiums and other large installations with concrete has a high carbon footprint; quantity of water used to maintain golf courses, tennis courts, etc.; motor sports consuming petrol and encouraging people to buy new, faster cars etc) and displays a few possible solutions to the consequences that might occur, such as: global heating, sea levels rising, air and noise pollution, extreme weather events). Explains how to promote and further develop forms of sport which are compatible with nature and the environment (e.g. make sports-related infrastructure more environmentally compatible; reduce

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damage to vulnerable areas; secure and improve opportunities for sport and physical activity outside vulnerable areas; preserve and increase the recreational quality of countryside and its enjoyment value for those doing sport.)

Activity 3

The teacher will describe the following digital game – sustainable sports sport – students pick a sport they know and tick the ways that it could become more sustainable.

Web 2.0 tool digital game model: the millionaire game https://learningapps.org/1238222

Follow -up discussion

To check students' understanding of terms related to athletics, Olympic games, to assess their intake of information to ensure they took notes and have an understanding of sports industry, practice of sports and environmental sustainability.

Assessment/ Evaluation

Upon completion of the three activities, ask students to create a PowerPoint presentation to demonstrate the connection between sports events and climate change.

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The **EDUCATIONAL TECHNOLOGY** lesson plan provides teachers and students with the opportunity to investigate the impact climate change is having on the environment through classroom activities.

SUBJECT MATTER (SCHOOL DISCIPLINE / LEARNING AREA)–The EDUCATIONAL TECHNOLOGY

LESSON- Technologies used to manufacture fibres and textiles

OBJECTIVE - Integrating environment and climate change subconsciously to the learning outcome *Technologies used to manufacture fibres and textiles* using digital games' web 2.0 tools. Thus, the students will be able to learn about *Technologies used to manufacture fibres and textiles* consciously while they are raising awareness on the environment and climate change subconsciously using digital games. These games can be applied to indoor and outdoor learning environments, distance and traditional (face-to-face) classrooms.

Learning Objectives of the lesson:
Upon completion of this lesson, students will be able to:
- define textile and fiber and fabrics ;
- the source and classification of natural textile fibres;
- fibre properties and how they impact on use environmental issues related to natural fibres.

Learning outcomes and environmental awareness and climate change implications - students will gain a broad understanding of the types and sources of different fibres, examining their origins and observing their differences; they will be challenged to transfer knowledge to new situations and projects, building on technical skills and past experiences. Textile projects will give students the opportunity to be creative, independent learners and to explore functional and aesthetic aspects of textiles, demonstrate responsibility in decision-making and encourage

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individuals to express ideas and opinions; students will develop an appreciation of the factors affecting them as textile consumers. Current technologies and innovations that continue to emerge in the textile industry will be addressed with emphasis on their economic, social and environmental consequences. The outcome is to assess and appreciate the dynamic nature of textiles and their use to develop solutions for personal, social and global issues

Description of the game and activities and technical specs: The digital game will consist of identifying and classifying types of fibres, apply knowledge and understanding of the properties and performance of textiles to the development and manufacture of textile items;
The purpose of the game is to enable students to discuss environmental and sustainability issues.

Key points for the teacher to underline: define textiles; explain the correlation between textiles and fiber; discuss the characteristics of fiber; types of fibers (natural, animal, mineral, plant); types of textile, including natural, synthetic, blended, woven, non-woven and knitted textiles; sensitivity towards environmental concerns.

INSTRUCTIONS/ PROCEDURES

Teacher- Question 1 – What are fibers, fabrics, textiles ?

The teacher explains the terms ,, fibre', ,, fabrics'', ,, textiles'' ,, yam''; explain different sources to get fibers, different types of clothing materials, different plants, animal and synthetic fibers, different methods to get fabric from yam, classification of textile fibres and related properties.

Activity 1

The digital game is designed for the students to study a concept map of fabrics, fibres, and then answer some questions related to it.

Web 2.0 tool digital game model: multiple choice quiz https://learningapps.org/20468897

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Teacher – Question 2 –What is the evolution of clothing and fashion ?

The teacher explains the fashion of early civilization, the way fashion and clothes evolved throughout the history. Students will learn about the history of clothing as well as about clothes worn by people around the world (e.g. people learned to make clothing form natural resources as protection form weather. Animal skins and hair, plants, grasses and tree bark were some of the materials used. Clothing was very simple, the daily battle for food and shelter left little time to decorate clothing. In Africa, the South Pacific, and parts of Asia, people needed protection from the sun and rain. In Northern Europe, where the weather is colder people dressed in animal skin. We wear clothes to protect our body against heat, cold, rain, dust and insects. At the same time we wear clothes to look good. That is why many of us want to wear clothes that are in fashion. People in different regions of the world wear different kinds of clothes the kind of clothes people wear mainly depends on the climate of the place. The traditional clothes worn by people in each country vary considerably from region to region.). Give information about the steps and items needed for garment manufacturing.

Activity 2

This digital game is designed to challenge students to fill in the blanks with information about clothing construction, using the correct word. This will enable students to actively engage in learning about the properties and performance of textiles, textile design and the role of textiles in society.

Web 2.0 tool digital game model: fill in the blanks https://www.educaplay.com/learning-resources/7423938-clothing_construction.html

Teacher - Question 3 – What is the future of fabrics and textiles in the context of ?

The teacher explains specific properties each fibre has and how this affects end use. If fibre samples are available, learners should examine them at this point – consolidates understanding. (e.g. positive and negative aspects of all fibres and therefore fabrics have an environmental impact); teacher explains that natural fibres are sustainable but not necessarily environmentally friendly.

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Activity 3

The teacher will describe the following digital game – fashion designer - Learners will need access to a range of products made from natural fibres as discussed during this lesson. This game activity is based on learners identifying / considering the fibre / fabric for each product and making judgements and own notes based on: the fibre's inherent properties; the product's main function; how the properties support function/use. Learners' own classification table supports this activity.

Web 2.0 tool digital game model: matching columns game https://www.educaplay.com/learning-resources/10163531-clothing_fashion.html

Follow -up discussion

To check students' understanding of definitions of fibers, fabrics, textils, yam To assess their intake of information to ensure they took notes and have an understanding of characteristics and classifications of materials, clothing.

Assessment/ Evaluation

Upon completion of the three activities, ask students to create a PowerPoint presentation to demonstrate various ways to recycle clothing and textiles- investigate local opportunities to renew and recycle clothing and textiles (e.g., turn used textiles into new products, identify recycling opportunities such as consignment stores, thrift shops, shelters.

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