COMUNICACIÓN EN INGLÉS DE LOS ALUMNOS DE BIOLOGÍA Y GEOLOGÍA DE 4º ESO DEL IES COSTA TEGUISE "KNOW MY ISLAND", EN EL CONGRESO INTERNACIONAL VOLCANDPARK 2 ORGANIZADO POR EL EXMO. CABILDO INSULAR DE LANZAROTE.

Dentro de la estrecha colaboración que mantiene el IES Costa Teguise desde su apertura con el Exmo. Cabildo Insular de Lanzarote, se nos dio la oportunidad de participar en un encuentro científico al más alto nivel, con la asistencia de más de 70 vulcanólogos de reconocido prestigio y de decenas de nacionalidades diferentes. Nuestra propuesta fue hacer una presentación en inglés para dar a conocer a los participantes en el congreso Volcandpark 2 a celebrar en Noviembre de 2015, la historia geológica de Lanzarote, poco conocida para la mayoría de ellos y ellas.

El reto era ambicioso, pero el entusiasmo de los alumnos y alumnas nos hizo superarlo muy satisfactoriamente. Como proyecto, el resultado fue brillante, tanto es así que varios participantes, profesores en universidades de varios continentes, solicitaron a la organización los materiales elaborados por los alumnos/as para su utilización en sus centros educativos.

Es labor del docente guiar al alumno en su construcción como persona, creando retos que aunque parezcan inalcanzables por su magnitud, le hagan crecer hasta tocarlos con la punta de los dedos, y, al final del trayecto, poderlos agarrar con firmeza y hacer de ellos un logro. Nuestros alumnos y alumnas jamás olvidarán esta experiencia: con sus quince años, transmitir a un gran grupo de científicos de todo el mundo su pasión por la ciencia y el respeto por el territorio volcánico al que todos y todas, sea cual sea su procedencia, están unidos. La mayor recompensa, más aún que una buena calificación, fue el gran aplauso al finalizar su exposición.

DESCRIPCIÓN DE LA ELABORACIÓN DEL PROYECTO.

El trabajo se pautó de la siguiente manera:

1.Reparto de las tareas y contenidos entre los alumnos. Los bloques de seleccionados fueron:

-Localización geográfica.

-Edad de Lanzarote.

-Contexto geodinámico.

-Fases en la formación de la Isla.

-Tipos de rocas y productos volcánicos de Lanzarote.

-Lanzarote: Geoparque Mundial de la UNESCO.

-Puntos de Interés Geológico de nuestra Isla.

-Fotografías de los alumnos.

Se formaron grupos de dos alumnos cada uno, y se distribuyeron ellos mismo las tareas.

2.Búsqueda de información de cada apartado.

Para ello se usaron diversas fuentes bibliográficas escritas, y se extrajo material de diferentes páginas web.

3. Resúmenes y traducciones.

Se hicieron extractos de la información relevante, y se tradujeron, siendo un grupo de alumnos y alumnas bilingües el encargado de supervisar la corrección sintáctica y ortográfica de los mismos, y revisando el rigor científico de los mismos la profesora del grupo, con el inestimable asesoramiento de Elena Mateo Mederos, geóloga de Medio Ambiente del Cabildo de Lanzarote.

4.Búsqueda de imágenes y toma de fotos de lugares de interés geológico.

Un grupo de cuatro alumnos realizó una ruta por ellos mismo diseñada, para obtener fotografías en diversos puntos de Lanzarote.

5.Elaboración de una presentación en formato powerpoint.

Se ordenó el material y se pasó a formato de presentación.

6.Exposición oral en la sesión inaugural del Congreso, bajo el título “Know my Island”.

El grupo completo se dispuso en el escenario del salón de actos del Exmo. Cabildo Insular de Lanzarote, y ocho alumnos y alumnas expusieron su trabajo en inglés en la sesión inaugural del Congreso Volcandpark2.

DESARROLLO DE COMPETENCIAS BÁSICAS (LOE).

Las competencias básicas y las dimensiones de las mismas desarrolladas a través de este proyecto son:

·Competencia lingüística: la redacción de resúmenes y su traducción al inglés, exposición oral

en el salón de actos del Cabildo.

·Competencia de conocimiento e interacción con el mundo físico: el conocimiento de las fases de formación de la Isla y de los procesos y productos del vulcanismo lanzaroteño.

·Competencia de tratamiento de la información y competencia digital: búsqueda de información en fuentes impresas y en la web, elaboración de presentación power point.

·Competencia de aprender a aprender: el proceso de construcción de su propio conocimiento. Desarrollo de la capacidad de exponer oralmente en público.

·Competencia social y ciudadana: la toma de conciencia de la importancia de las figuras de protección geológica, ecológica y paisajística, como Geoparques, Parques Nacionales, Reservas Integrales y Lugares de Interés Geológico.

·Competencia de autonomía e iniciativa personal: el reparto de tareas, la toma de decisiones, la puntualidad en la entrega de los trabajos asignados, la responsabilidad en el trabajo en equipo.

·Competencia cultural y artística: el detalle y el cuidado en la presentación, la selección de fotografías tomadas por el propio alumnado en diferentes puntos de la Isla.

CRITERIOS DE EVALUACIÓN DE BIOLOGÍA Y GEOLOGÍA DE 4º ESO RELACIONADOS.

1. Trabajar con orden, limpieza, exactitud, precisión y seguridad, en las diferentes tareas propias del aprendizaje de las ciencias, entre otras aquellas que se desarrollan de forma experimental.
2. Buscar, seleccionar e interpretar crítica y ordenadamente la información de tipo científico, usando las tecnologías de la información y comunicación y otras fuentes de información para manejarla adecuadamente en la realización de tareas propias del aprendizaje de la Biología y Geología.
3. Identificar y describir hechos que muestren a la Tierra como un planeta cambiante y registrar alguno de los cambios más notables de su larga historia utilizando modelos temporales a escala y reconocer la importancia de los fósiles como testimonios estratigráficos y paleobióticos.
5. Explicar las principales manifestaciones de la dinámica interna de la Tierra y localizar su ubicación en mapas terrestres, utilizando el modelo dinámico de la estructura interna de la Tierra y la teoría de la Tectónica Global.

13. Valorar la Naturaleza, así como conocer, respetar y proteger el patrimonio natural de Canarias, señalando los medios para su protección y conservación.

MATERIALES ELABORADOS POR LOS ALUMNOS Y ALUMNAS DE BIOLOGÍA Y GEOLOGÍA DE 4º DE ESO DEL IES COSTA TEGUISE.

"KNOW MY ISLAND". VOLCANDPARK 2 MEETING – LANZAROTE 2015

MADE BY 4TH DEGREE STUDENTS OF COSTA TEGUISE HIGH SCHOOL

## 1. LOCATION

*Lanzarote and Chinijo Island Geopark* is located on the island of Lanzarote including its associated islets, in the most north-easterly sector of the Canary Islands. Lanzarote is the northernmost island in the archipelago, between 28º 50' and 29º 25' North and 13º 20' and 14º 57' West. The distance to Cape Juby, on the African coast, is about 140 km, while the distance to the Iberian Peninsula, the closest point on the European mainland, is 1,000 kilometres. The islets are located to the north of the island, separated from it by the strait Estrecho del Río, making up the Chinijo Archipelago which includes La Graciosa, Alegranza, Montaña Clara, and Roque del Este together with Roque del Oeste.

Lanzarote, "the island of the volcanoes", is located in the northeast of the Canary Islands 125 km from the coast of Africa and only 7 km from Fuerteventura. It has an irregular, elongated shape running NE to SW, an area of 845 km2 and a maximum altitude of 671 m above sea level at the Macizo de Famara. To the north of the island there is a group of five islets known as the "Chinijo Archipelago": La Graciosa, Montaña Clara, Alegranza, Roque del Este and Roque del Oeste. The topography of Lanzarote is varied, with the more rugged relief confined to the northern (Famara) and southern (Ajaches) areas, where the deepest and most highly developed gullies and the steepest cliffs are found. The rest of the island is low-lying with well-developed beaches.

## 2. GEODYNAMIC CONTEXT OF OUR ISLAND

-Passive Borders: Geological Faults.

One actual hypothesis defends that the Canary Islands are associated with a fracturated zone that stands from the Atlas Mountain Range in Morocco until our Islands. The geological faults have some phases in which there isn't any magmatic activity and other phases that make the magma more likely to form and increase the volcanic activity of the zone. Scientists that

support this theory have compared this phenomenon to a zipper that opens irregularly on some spots and produces magmatism. Although it's not easy to explain this behaviour the scientists that support this theory base it on the existency of identical volcanoes found in the Atlas Mountain Range.

-Intraplate Vulcanism.

The Canary Islands are an archipelago of magmatic nature produced by volcanism not associated with edges of tectonic plates and, though it is widely studied, geologists don't agree on its origin. This problem is possibly the most important geological controversy that exists nationwide nowadays.

## 3. AGE OF LANZAROTE

Lanzarote is of volcanic origin and was formed more than 22 million years ago, the first subaerial stage began around 15 myr ago. Lanzarote is one of the oldest Canary Islands, along with Fuerteventura.

Here we can see the ages of the main formations of the Island:

| **AGE** | **FORMATION** |
|---|---|
| 15 million years ago | Miocene massif Ajaches |
| 10.06million years ago | Miocene Massif de Famara |
| 3million years ago | Erosion of the two massifs |
| 1-2million years ago | Construction of small stratovolcanoes and cinder cones |
| Historical period. | Historicalvolcanism. |

Ajaches Massifs.

The massifs of los Ajaches, are located in the South of the island of Lanzarote, and they are formed the same as all the other Canary Islands, due to the effect of volcanic processes. They are around 20 million years old, and are in an area of great geological and landscape interest.

In the surrounding area, one of the main touristic attractions of the island is the beach of Papagayo, it has white sand and is overlooking the islet of Lobos and the nearby island of Fuerteventura. One of the eco wonders is the Natural Monument of Los Ajaches, one of the most important ecological points of the island.

Famara Massif.

The current appearance of the cliff of Famara has its origin in volcanic eruptions Series I, which resulted in large dimensions (Famara massif) which it is estimated that today about half of it is preserved. This greatest compartment appears as an arc open to the sea and slightly concave, the result of ancient cliff carved in subhorizontal basaltic lava flows.

Historical volcanism: Timanfaya.

The fire mountains or Timanfaya are part of a large area affected by volcanic eruptions occurred in Lanzarote between 1730-1736, and later in the year 1824. This long eruptive process, one of the most important and spectacular historical volcanic of the Earth, drastically changed the morphology of the island being almost a quarter of it buried under a thick blanket of lava and ash. The landscape produced by volcanic activity comprises a total of 174 Km2 perimeter, although the area protected as a Timanfaya National Park only covers an area of 51 Km2, where the most important eruptions occurred.

## 4. STAGES IN THE CREATION OF LANZAROTE

Lanzarote is formed by almost exclusively basaltic materials grouped in three stages of volcanic construction: the submarine one and two subaerial ones. The first subair stage began around 15 million years ago, with several pulses of emission separated by stages of eruptive calmness that spreads up to 3,8 million years. During this period there were emitted important volumes of basaltic materials, which are piled up to construct big volcanic buildings which deposits can be observed nowadays in Ajaches and Famara; or sets of minor entity, as that of Tías. The materials of this stage are considered to be the framework of the island and represent the period of maximum subair growth.

During the first phase, of age Oligocena, the insular basement was constucted, composed by volcanic submarine materials, plutonic and sedimentary rocks. Both subaerial stages took place during Mio-Pliocene and Pleistocene-Holocene and they were separated by a period of eruptive calmness of at least 2,5 Ma, during which the old Mio-Pliocene structures were subjected to a continue erosion that shaped its original forms.

In the first subaerial phase, North Lanzarote was formed independently from the South, leaving the island middle still submerged. The South was attached at that time to the north of Fuerteventura. Later the two islands were separated and central Lanzarote emerged.

The second subair stage includes the recent activity developed during the Quaternary one (2

million years up to nowadays) and it is characterized by a fissural volcanism that has formed numerous volcanic cones and wide fields of lava covering the materials of the previous stage. The islands of the archipelago Chinijo were generated during the Pleistocene, by means of hydromagmatic eruptions that emitted magmas of mainly basaltic composition . Historically, two eruptions have taken place: Timanfaya's eruption between 1730 and 1736 and the eruption of 1824 that gave place to Tao's, Nuevo del Fuego and Tinguatón volcanoes.

It so happens that the basement of the island is not visible in any outcrop, but there is evidence of its existence thanks to a drilling with geothermal purposes, made in the area of Timanfaya's National Park. The drilling, perforated the island up to approximately 2.702 m of depth and allowed to cross the bark and to know the geological materials from this one up to Lanzarote's surface. The most ancient materials are formed(trained) by sediments (predominance of clays and clayey marls with abundant marine microfauna of the Paleoceno way - Superior), on that there rest(rely) the first volcanic materials which formation(training) is estimated at the end of the Eocene or beginning of the Oligocene.

## 5.- ROCK TYPES AND VOLCANIC PRODUCTS OF LANZAROTE.

The Canary Islands predominately have erosive forms. We can see in the Canaries the net of good developed ravines in ancient massifs, and that´s the most characteristic element of the islands capes with volcanic cones. Steep coasts are also predominant. But we must remember that the eastern Islands predominatly have sandy forms, for example Corralejo. Here volcanic constructions are transformed by external agents.

By its chemical composition, the most usual volcanic rocks are basalts, trachybasalts and trachites.

In the Canary Islands we can see types of basaltic lava, Pahoe-hoe , AA and Pillow-lava. Pahoe-hoe has a smooth and ondulated surface; AA is a central band of rock densely ridged by a net of joints. In the Canarys, AA is called “malpaís” (from the french word, for badland). Pillow- lava is solidified underwater, and has a characteristic rounded shape.

To end, the Canary Islands have pyroclastic products. They are volcanic materials fragmented when they are expelled from the volcano. In Lanzarote we find huge lapilli cones, ashes layers between lava flows, and volcanic bombzones everywere.Lapilli (here called “rofe” or “arena”) is used for a quirky type of traditional cultivation that preserves moisture and affords nutrients to the soil.

## 6.- GEOLOGICAL INTEREST POINTS IN LANZAROTE

The inventory of geologically interesting points in Lanzarote has a final result of 63 geological attractions (here in after LIG) with high uniqueness and representativeness, as part of the geological heritage of Spain and contribute to sustainable development through the geotourism of Lanzarote. Of these 63, 42 are located in emerged territories (Galindo et al., 2015) and 19 are undersea (Table 1). In most LIG inventoried, the main interest is obviously the volcano, followed by those whose main morphological interest (Figure 2). However, the great variability of constructive and destructive processes that occur on oceanic islands such as Lanzarote and the Chinijo archipelago allows a great geological diversity, being LIG whose main interest is stratigraphic, palaeontological, sedimentary, tectonic and petrological. It is important to note that 13 LIG have been determined with international relevance: LZ23 Channel Chinero Lava, Volcano Tinguatón LZ24, LZ25 Islet of Hilario, LZ26 Pico Mountain Party-pointed LZ27 Lavas TimanfayaTimanfaya cones LZ28, LZ29 Cave of Naturalists, LZ30 César Manrique Foundation, L31 Mountain Rajada, Hervideros LZ32, LZ33 Hornitos of the Echadero of Camels, LZ34 and LZ36 Coranzoncillo La Geria (Figures 3, 4 and 5).

## 7.- LANZAROTE AND CHINIJO ISLANDS GLOBAL GEOPARK

The Geoparks that form this Mundial Network are rich and diverse geological territories. They contribute to the sostainable development of the regions where where they are located.

The Geoparks contribute to make the public aware of the geological risks and in many cases local communities develop strategies to mitigate the effects of disasters caused by natural phaenomena.

This places make us know about the 4.600 million years of our planet.

The Mundial Network actually counts with 120 parks, spread in 33 countries.

This global Geopark covers the entire island of Lanzarote, the Chinijo Archipelago – formed by islets; la Graciosa, Montaña Clara, Roque del Este, Roque del Oeste and all the undersea platform.

The land area of the park is 866 square kilometres, but with the marine platform is about 2500 square kilometres.

The geological materials that form the island are exclusively basaltic.

The area where the Timanfaya eruption took place,the volcano originated the creation of the third largest lava fields existing in the world today.

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