INSPIRE STEAM

Social Sciences

3D Print a volcano

Grade 7 Term 2

This lesson forms part of an inter-disciplinary learning experience to fly drones over volcanoes to read the carbon emissions to determine eminent eruption.

Incorporates:
3D Printing
Drones
DataBot

(i)Think
Subject Specific Lesson

WWW.INSPIRE.AFRICA/

CREATED
for teachers,
by teachers

Exit Learning Outcome	**Recall what volcanoes are and design and build/print a volcano.**	**Suggested timeframe**	**2 hours**	**Resources & Equipment**
Learning Outcomes	**LO1: Recall knowledge and facts about volcanoes** **LO2: Report why there are so many volcanoes in the Ring of Fire** **LO3: Identify noticeable changes that volcanoes make to predetermine an eruption** **LO4: Analyse the anatomy and appearance of a volcano** **LO5: Choose a volcano to design and create** **LO6: Design and print / build a volcano**			○ 3DPrinter and design app **Or** ○ Materials to build a volcano
STEAM Skills & Other	• **Design a volcano** • **3D print of a volcano** * *Conducting a Scientific experiment* * *Drone flying* * *Reading Carbon emissions from a DataBot* * ***These skills can be included by collaborating with Natural Sciences and Mathematics by using Tello drones and the DataBot.***			
Content & Concepts	• **Social Sciences Grade 7 Term 2** • **Volcanoes**			

Teacher's Notes for Lesson

Introduction to Lesson

A volcano is an opening in the Earth's crust and is usually found in mountains. It allows hot gasses and melted rock called magma to escape from beneath the Earth's crust. When a volcano erupts, gases and lava find their way up to the surface. Lava may flow slowly out of a fissure or crack in the ground, or it may explode suddenly, erupting into the air. The word Volcano derives from the word Vulcan who was the Roman god of fire.
Volcanic eruptions can create new landforms although they can be very destructive. Over time, lava and ash break down to produce nutrient-rich soil, which is great for farming. This is the reason why some people like to set up homes or farms on the slopes of a volcano.

This lesson serves as an introduction to an interdisciplinary learning experience, whereby learners study and build a volcano. Furthermore, learners conduct a scientific experiment which releases Carbon Dioxide (such as bicarbonate and vinegar) from their volcano. Learners then fly the drones over the volcanoes as they erupt and record the Carbon Dioxide emissions of the erupting volcano by attaching the DataBot to the drone.

Introduction to content

- Recall knowledge of volcanoes with learners.
  - Review the links and watch the videos listed to the right.
- **Research**
- Instruct learners to research the Ring of Fire and why there are so many volcanoes in this area.
- List noticeable changes that volcanoes make to predetermine an eruption.
  - Ask learners to guess what Vog is.
    - ❖ *Vog (Volcanic gases) is a form of air pollution that results when sulphur dioxide and other gases and particles emitted by an erupting volcano react with oxygen and moisture in the presence of sunlight.*

Navigate to the Inspire Campus for additional content and videos on volcanoes.

	Procedure	

1	• Study the anatomy of a volcano.
	  ○ Ask learners to research volcanoes and share their images.
	  ○ Compare the differences and similarities between the volcanoes that the learners found.
		The anatomy of a volcano can be found on the Inspire Campus.

2	• Collaboration effort:
	  ○ Split learners into 4-6 groups depending on the number of learners in a class. A total of 4-6 volcanoes is needed for the mission.
	  ○ Provide learners time to share their volcano ideas and design their own volcano.
	
	• For 3-D Printing:
	  ○ Learners can design their volcano in a 3Dprinting design app such as:
	  ❖ Tinkercad
	  ❖ Fusion 360
	  ○ Use the template provided should a teacher wish to do so.
	
	<u>OR</u>
	
	• For built volcanoes:
	  ○ Learners can design their volcano using materials available to them such as:
	  ❖ Paper Mache
	  ❖ Clay
	  ❖ Recycled plastic
		
		Find the 3D modelling instruction and template on the Inspire Campus.

3	• Allocate sufficient time for learners to collaborate / design and build their volcanoes.	
4	• Once all the volcanoes have been designed and printed or built, provide an opportunity for show and tell. • Teachers can collaborate with the Natural Science Teacher to conduct a volcanic experiment using household materials to create a reaction. ***Note: These built volcanoes will be used in the (i)Mission challenge: Eruption Technology.***	***Use the Drones to fly over the chemical reactions. Attach the DataBot to read the Carbon Dioxide emissions.***
Closing	• Consolidate all main concepts and their meaning. • Navigate to the LMS and let the learner complete their activities.	