# GEOSCIENCE FOR LEAVING CERTIFICATE GEOGRAPHY

**Continuing Professional Development Course 2021** 



## VOLCANIC ACTIVITY IN THE IRISH CONTEXT LESSON PLAN

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#### About the programme

The aim of this resource is to encourage the teaching and inclusion of geology in Leaving Certificate Geography classrooms. To achieve this, iCRAG and Geological Survey Ireland developed this CPD course which partnered up 6 Leaving Certificate teachers with 12 geoscience practitioners across Ireland. The course involved a series of talks by the geoscience practitioners which informed the teachers of current and ongoing geoscience research happening in Ireland. They then worked together to create either a classroom-based or field-based lesson or module plan for a particular subject area, complete with presentation and teacher and student notes. The teachers brought in their expertise and experience with teaching Leaving Certificate Geography and how the various aspects of geoscience can be linked to the curriculum, and the geoscience practitioners contributed their knowledge and relevant applications of geoscience at a classroom level.

The subjects covered by these 6 resources include a Glendalough field study, geothermal energy, an introduction to geology, Irish geohazards, seismic activity, and volcanoes.

The CPD course was led by Elspeth Sinclair and Fergus McAuliffe, from iCRAG, and Siobhán Power and Amrine Dubois Gafar, from Geological Survey Ireland. We would like to thank Peter Lydon for his help in recruiting our wonderful teachers.













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#### About us

**Geological Survey Ireland**, a division of the Department of Environment, Climate and Communications, has been mapping Ireland since 1845. They continue to map the Irish land and marine territories, as well as mineral and groundwater resources. They have responsibility for actions in the current Climate Action Plan including monitoring coastal change, the Just Transition in the midland counties, and providing data for de-risking offshore renewable energy. Irish geoscience research, particularly as it contributes to the development of government policy, is an important part of their work and they fund and co-fund many research projects, including some of the iCRAG research work. Their data and maps are freely available to all at <u>www.gsi.ie</u>.

**iCRAG**, the Science Foundation Ireland (SFI) Research Centre in Applied Geosciences, are a team of researchers creating solutions for a sustainable society. They develop innovative science and technologies to better understand Earth's past, present, and future and how people are connected to it. iCRAG drives research into areas that are critical to society, including:

- The minerals and metals we need for decarbonisation and sustainable energy.
- Securing and protecting groundwater and marine resources.
- Protecting society from Earth's hazards, such as floods and landslides.

Further information is available at: <u>www.icrag-centre.org</u>

#### About this resource

#### Volcanic Activity in the Irish Context

This resource has been developed by Geraldine O'Brien, a teacher from Carrigallen Vocational School and Drs Hilde Koch and Maurice Brodbeck from iCRAG at UCD and TCD respectively. This resource is a lesson plan for at least a double lesson that investigates volcanic activity from the Irish context. It has been designed for Leaving Certificate Students.

#### Disclaimer

Every effort has been made to ensure that the information in this book is accurate. Data, links, and maps are accurate as of January 2022. The publishers cannot accept responsibility for any consequences arising from the use of this book. The publishers are in no way liable or responsible for any injury or loss to any person using this book.





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## Lesson plan: Getting to know volcanoes and looking at volcanic activity in the Irish Context

#### Links to curriculum

#### Core unit 1: Patterns and Processes in the Physical Environment

• Statement 1.3 examines landforms influenced by the operation of the tectonic cycle. Students will study volcanic activity, sedimentary processes and the impact of folding, faulting and doming.

#### Learning Outcomes

#### Students should know:

- The positive and negative effects of volcanoes on society and planet.
- The different volcanic cone structures.
- The two types of lava emitted from a volcano.
- All materials emitted from a volcano.
- The different parts of a volcano
- How to identify rocks (basalt) by appearance?
- Ireland's tectonic journey



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### Keywords and definitions

Cinder volcano A volcano made of cinders with steep sides formed violent eruptions.				
Composite volcano	A volcano made of layers of ash and acidic lava formed by explosive eruptions; sides are not as steep as a cinder cone Also known as a stratovolcano, strato means layers.			
Dome volcano	A volcano made of acid lava with steep sides formed by violent eruptions, looks like an upside-down bowl.			
Shield volcano	A volcano made of basic lava with gentle slopes and a wide/broad base.			
Cinders	Small volcanic bombs - the size of peas.			
Bombs	Huge rocks from a volcano.			
Pumice	Lava mixed with air causing it to fill up with air bubbles.			
Basic lava	Low in silica and very runny.			
Acidic lava	High in silica and is pasty.			
Pyroclastic flows	A mixture of hot lava, ash and volcanic gases that travel down a volcano at great speeds			
Lahar	A volcanic mudflow. Suirbhéireacht Gheolaíoch			
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## Learning activities *Students will:*

- Complete the retrieval exercise on previous knowledge.
- Learn about volcanoes and volcanic activity in Ireland through a PowerPoint presentation.
- Participate in a group activity to construct models of the volcanic cones.
- Engage in talk and discussion on the different types of volcanic cones.
- Present their models to the class.
- Participate in a group activity to identify rocks.
- Engage in talk and discussion on the appearance of rocks.
- Evaluate their work by completing 3-2-1 Exit ticket.

#### Extra info and files

	Web Address	Brief
		Description
1.	https://www.nationalgeographic.com/science/article/mass-extinction	5 mass
		extinctions
2.	https://scied.ucar.edu/learning-zone/how-climate-works/mount-tambora-and-year-	Mount Tambora
	without-summer	
3.	https://www.bbc.co.uk/bitesize/guides/z8p9j6f/revision/1	Volcanoes
4.	https://blogs.unimelb.edu.au/sciencecommunication/2020/09/21/fire-and-bikes-	Volcanoes & the
	how-a-volcano-sparked-the-invention-of-the-bicycle/	bike
5.	www.gsi.ie	Maps Spatial
		Resources
6.	www.gsi.ie	Your County

#### **Resources provided**

- Teacher Lesson Plan
- PowerPoint to guide lesson •
- Photocopiable Activity 1 Worksheet
- Photocopiable Activity 2 Worksheet
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- 3-2-1 Exit ticket

## Materials needed

- Play dough 2 colours per student •
- Rock samples •
- GSI Map Bedrock Geology of Ireland
- Wipes and hand sanitiser



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#### Volcanic Activity in the Irish Context: Teacher Notes

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Learning Intentions	At the end of the activity students will:		
	• Know the four types of volcanic cones		
	• Understand the formation and structure of various		
	volcanoes		
	Provide examples		
Materials required	Play dough – 2 colours		
	Photocopiable Worksheet		
Activity explanation	Students get into groups of 4.		
	Students are provided with 2 different colours of play		
	dough – one representing lava, the other cinders.		
	Using this worksheet, student selects one of the volcanic		
	cones and makes their own.		
	Students discuss the differences and similarities between		
	the types of volcanic cones.		
	The class tries to guess what volcanic cone the student has		
	made.		
Composite/stratovolcano	Use 2 different colours of play dough		
	Made of layers of cinders and lava		
	Steep sides		
	Tallest volcanic cone Geological Survey		
Shield	Gentle sides		
	Broad base		
SFI RESEARCH CENT	Largest and flattest volcanic cone		
Cinder IN APPLIED GEOSCIENC	Use 2 different colours of play dough		
	Loosely arranged cinders		
	Not very high		
	Smallest and steepest		
Dome	Steep sides		
	Looks like an upturned bowl		

## Activity one: Guess what type of volcano

#### Methodologies

- Talk and Discussion Q&A
- Active learning
- Investigative approach
- Group Work
- Keywords accompanied by a set of Notes
- Visual examples

#### Assessment

- Teacher observation and discussion on the construction of volcanic cones and completing worksheet on rocks.
- Teacher questioning talk and discussion
- Worksheet
- Review keywords at the end by writing out what they have learned on a new page.
- Self-assessment Exit ticket

## Linkage and Integration

*Linkage* Art- model construction

Maths - statistics

S.P.H.E. – working together co-operatively

English- oral language through talk, discussion, and presenting their work

#### Differentiation

- Teaching style
- Support
- Task





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## Photocopiable

## Activity 1: Constructing a volcanic cone

Materials required	Play dough - 2 colours		
	Worksheet		
Activity explanation	1. Get into groups of 4.		
	2. You are provided with 2 different colours of		
	play dough - one representing lava, the other		
	cinders.		
	3. Discuss in the group and select one of the		
	volcanic cones to make. Make sure that each		
	volcanic cone is selected in the group.		
	4. Using the play dough, make a model of your		
	chosen volcanic cone.		
	5. After completion, discuss the differences		
	and similarities between the types of volcanic		
	cones in your group.		
	6. Then present your model to the class for		
	them to guess what voicanic cone you have		
SFI RESEARCH CENT	7 Continue to make each of the other volcanic		
	cones in your group		
Composito (stratovologno	Use 2 different colours of play dough		
compositerstratovolcano	Use 2 different colours of play dough		
	Steen sides		
	Tellast volcanic cona		
	Fxample:		
Shield	Gentle sides		
	Broad base		
	Largest and flattest volcanic cone		
	Example:		
Cinder	Use 2 different colours of play dough		
	Loosely arranged cinders		
	Not very high		
	Smallest and steepest		
	Example:		
Dome	Steep sides		
	Looks like an upturned bowl		
	Example:		

### Photocopiable

Activity	2:	Identifying	rocks
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Rocks	Basalt	Cinders	Pumice	Ash
Place the rock				
sample into				
the correct				
space				
Type of Dock				
Type of Rock				
Colour				
Density			Caslasias	<b>C</b>
			Geological	Survey
Bubbles			Suirbneireacht G	neolalochta
present SFI	RESEARCH CENTR			
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Hard or soft				
Uses & why				