

STEM LESSON

Hail in the Andes of Peru

Grade 7 – Grade 12

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ABSTRACT

This STEM lesson is intended for students to learn about hail and rain in the Andes. These meteorological phenomena represent a great impact and loss of money in all agricultural activity, due to the fact that the crops are mistreated and many resources are wasted. In this STEM session we seek that students can learn that hail is a type of precipitation, solid, that forms when water droplets freeze in the highest regions and with low temperatures of the clouds. In addition, it is not only seeking to understand the phenomenon, but to create a system that can protect crops and avoid significant losses of money and resources. Students will explore the phenomenon, understand its causes and consequences, in order to devise the best way to preserve agricultural activity when it occurs.

They will learn about science, technology, engineering, math, and even art and design. We seek to devise a creative and viable solution for farming communities.



LEARNING ABOUT HAIL IN THE ANDES OF PERU

LESSON 1.1

Grade level: Grade 7 – Grade 12

Suggested Time: 50 minutes

Overview

Students will learn about the Andes, the climate, and the importance of the economic activities that are carried out. Then, they will investigate various concepts of weather phenomena, especially hail. Once they understand the context and the phenomenon of hail, they will collect information on the impact of this phenomenon on agriculture and finally devise an action plan to reduce the damage and loss of resources after hail in the Andes.

Vocabulary

- Andes
- Hail
- Farming
- Economic activity
- Precipitation
- Weather phenomenon
- Resources
- Land preparation
- Sowing
- Harvest

Objectives

- Students will learn about the Andes and the importance of its economic activities.
- Students will learn about hail, how it forms, the seasons in which it happens, and the basics of this phenomenon.
- The students will practice the analysis of cases, they will understand the problems of the area and the effect that hail causes on the residents' resources.
- Students will devise action plans and solutions to the problem, considering its viability according to the area and the resources of the inhabitants.
- Students will go through the engineering design process

Required Project Materials

- Internet and research sources
- Cardboard box, soil, leaves from a garden, grated ice
- Cards and materials to draw and devise an action plan
- Recycled materials to build the project to scale

Part 0: Previous investigation

1. Students will be asked to make a first approach to different topics: Hail, The Andes, the economic activities of the Andes area in Peru. Each one should bring what most caught their attention on the given topics.

Part 1: Knowledge, Brainstorming and experimentation

1. There will be a brainstorming with the whole class about the information that most caught their attention in the topics delivered.
2. It will be sought that the answers begin to have a certain relationship, they will be invited to imagine what would happen if you were in the situation of a farmer.
3. We will talk about the theory: what is hail, why did we choose the Andes to talk about this phenomenon, what is an economic activity and why are they important.
4. We will experiment: we will use a box, soil, some plants and grated ice. A kind of small-scale garden will be built simulating the farmer's lands. Then ice will start to pour on it. In the end, the students will be able to see with their eyes how this phenomenon spoils many lands.
5. We will reflect: why hail affects communities so much.

Part 2: Sharing ideas and solutions

1. We will separate the students into groups and they will conclude joining all the concepts that were discussed. The idea is to encourage the generation of a solution proposal.
2. Students will choose how to approach the problem by choosing criteria that they must consider before proposing a project.
3. Students will do a group brainstorming and propose 1 or 2 solution ideas to the problem.
4. Students will think about the materials they must collect to build a first pilot of their proposal.
5. Students will be asked to bring recycled materials to the next lesson, to prototype their proposals and share them with the class.

LESSON 1.2

Suggested Time: 50 minutes

Part 0: Preparation

1. Students will be asked at the end of the previous class to get recycled materials for a second use in the prototype phase. The idea is that the project can be sustainable and low-budget due to the reality of the populations in the Peruvian Andes.

Part 1: Building our proposal

1. Students come to class with their materials and break into working groups.
2. Each group will have a space to make a prototype with the materials they have obtained.
3. The group will have to experiment with forms, methods and materials.
4. The group will have to propose possible materials for the actual project, considering the needs and resources of the area.

Part 2: Consolidating the proposal

1. The classroom will give feedback on the project. They will make recommendations on what they see and understand about the proposal.
2. Once the feedback has been collected, the group will be able to evaluate all the recommendations and formulate the presentation of the final project.
3. The group will have time in the following sessions to consolidate the proposal and present it.