

Grade / Age: Class 6

Topic: structure and formation of snowflakes, **STEAM**

Subject area: The structure of water

Keywords: symmetry, rotation

Single/ team work: both

Language: (English or Local) English

Duration: 2,5 hours

Description of the Task:

1. Do some research on the Internet. How are snowflakes formed? What is their structure and symmetry? Even though no two snowflakes are identical, do they have anything in common?

Listen to the song "The Snowman" from Vilmos Gryllus' Masquerade song series.

What mistake do you see in the drawing of the snowflakes?

<https://www.youtube.com/watch?v=U91rCFLv2Fk&t=23s>

2 Make a variety of beautiful snowflake patterns by folding and cutting paper. The following video will help:

<https://www.youtube.com/watch?v=7J2FcmWnMA4>

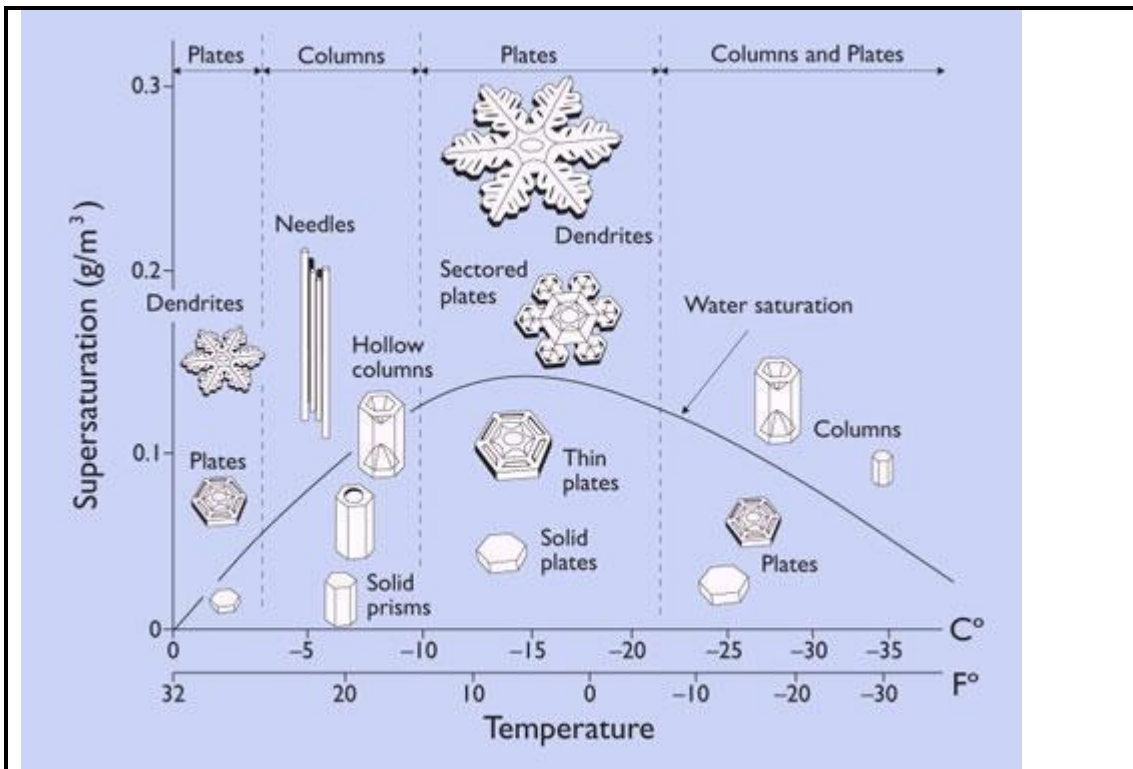
3. Draw snowflakes in a drawing program like GeoGebra.

Solutions of the Task:

1. As a first step, they can look for snowflakes as part of their homework. Interestingly, although there are "innumerable" snowflakes falling from the snow clouds, no two are alike, although each snowflake has a hexagonal structure. Unfortunately, many illustrations on the Internet do not take this into account. This is an excellent motivator to get them interested in the topic and the task.

The background to the formation of snowflakes:

<https://earthsky.org/earth/how-do-snowflakes-get-their-shape/>



2. For the manual activity, the snowflake's laceability must be planned. Similar lace patterns and tablecloths were already made in lower school, so this should not be a problem. Next, the second step is the implementation. They use scissors to create their own snowflakes.

3. You can also draw snowflakes on the computer. For example in GeoGebra. First draw a broken line or a polygon, then rotate the pattern five times per 60° . It's worth setting some kind of coloured background to colour the snowflake white. GeoGebra has a Background command.

<https://www.geogebra.org/classic/u3yxeagw>

Prior knowledge:

symmetry, rotation

Comments:

In class 6, we can do this activity in real time. We can plan to work on the geometry part of the curriculum in early December. It can be done in relation to the season (winter).

It is advisable to do the computer editing in class, as the use of these programs can still cause some problems for the pupils. Both activities develop pupils' attention, concentration and creativity. The finished works of art/snowflakes can also be a decoration in the classroom.

In the assessment, we can also watch some videos together on IT design and other similar forms/fractals. In addition to developing different individual competences, the use of ICT tools also plays an important role in this activity. It is important to

strive for precision and accuracy. They develop their planning and creative skills, critical thinking.

Connection to other subjects/topics/areas:

physics, chemistry, engineering, IT, art