Ice and Snowflake Activity Booklet

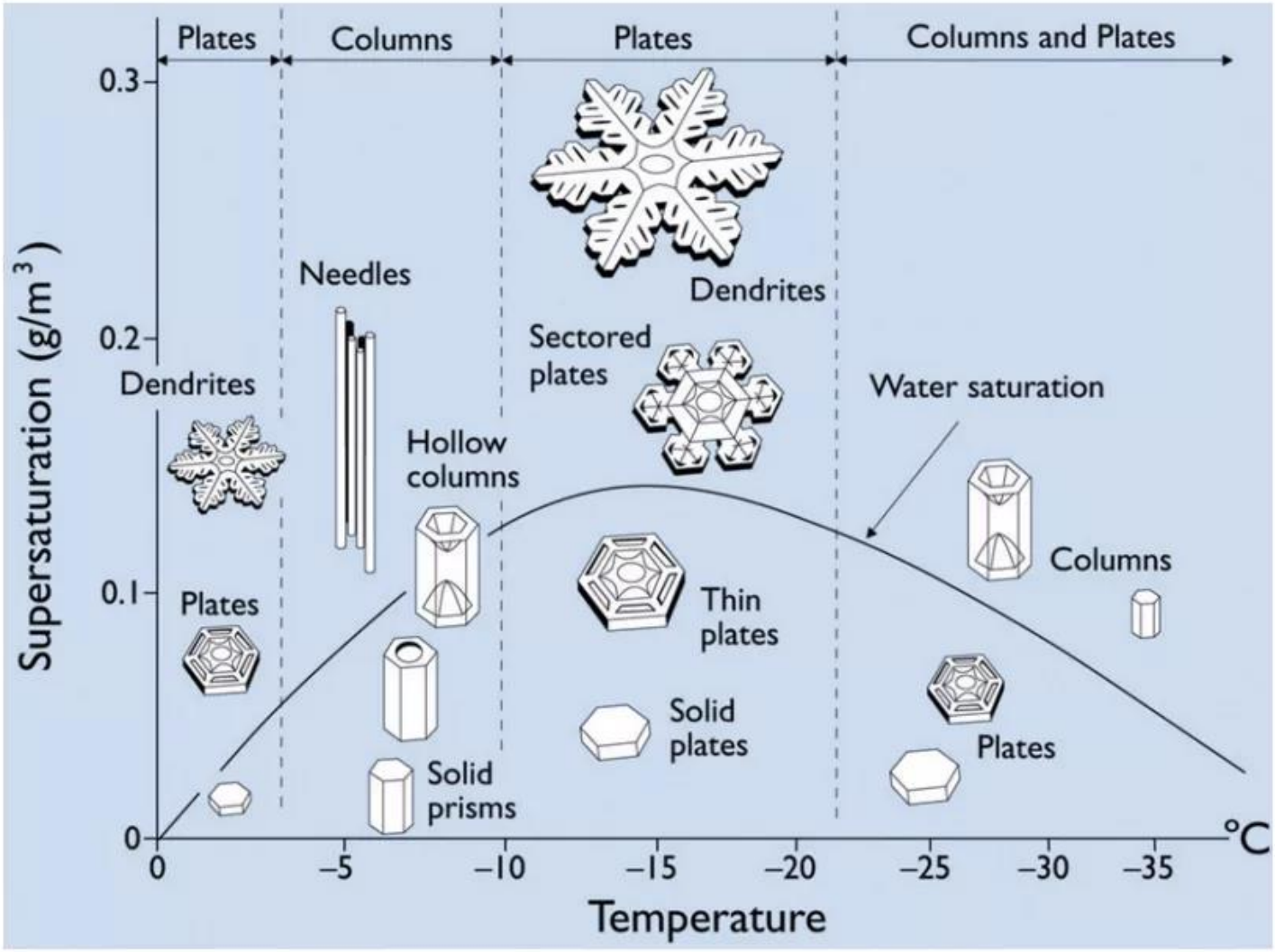
MUSEUM OF THE EARTH

Did you know that ice, the solid form of water, is a mineral? It's true!

Ice is:

- Not made from animals or plants ("inorganic")
- Found in nature ("naturally occurring")
- Is made up of crystals ("crystalline structure")

As a snowflake forms and falls, different air temperatures and humidity makes the ice grow in a unique pattern. The chart below explains this a little bit.



http://www.its.caltech.edu/~atomic/publist/rpp5_4_R03.pdf

Let's compare snowflakes to other minerals in nature. Can you catch snowflakes and try and find a match to some of the pictures below?

	
Snowflakes with "branches"	Manganese Dendrites
	
Column-Shaped Snowflakes	Beryl (red)
	
Long, thin snowflakes	Brochantite

Make a Borax Snowflake

To form a snowflake the air needs to be "supersaturated." This means that the air is holding more water than it normally could because it is at a certain temperature.
You can make your own snowflake at home by supersaturating water with Borax.

You'll need:
-Pipe cleaners
-2 cups (480 mL) of boiling water
-6 tablespoons Borax powder
-Food coloring (optional)
-Fishing line
-A pen or pencil
-A glass jar, large enough to fit your snowflake so that it can be covered entirely by the water-borax solution

Make a Borax Snowflake

1. Start by making your snowflake. Cut and twist your pipe cleaner into the shape you want. Make sure your twists are tight so that the snowflake holds together.
2. Tie one end of your fishing line around the top of your snowflake. Tie the other end to the middle of your pencil/ pen.
3. Before moving forward, make sure that your snowflake fits in your jar. It should hang freely by the pencil/ pen and not touch the sides or bottom of the glass. Put your snowflake aside for now.
4. Boil two cups of water and pour it into your glass jar.
5. Carefully stir in your borax powder so that all of it dissolves. Add in food coloring if you want.
6. Place your snowflake into the borax solution so that the pencil supports the pipe cleaner. Place the jar somewhere where it won't be disturbed.
7. Wait 8-24 hours. The longer you wait, the more/ larger crystals will form.
8. Remove your snowflake and allow it to dry completely.

If you want, repeat the activity with different colors, different lengths of time in the water-borax solution, and different sizes. How do the crystals change?

From Air to Ice

The air around us carries tiny water particles. We can only see these particles when they come together to form clouds or fog, or when they solidify in cold temperatures as frost. Frost is ice crystals that have grown in a thin sheet. Using the steps below, make your own frost and compare its crystals to the ones from the last two experiments.

You'll need:

-An empty metal can
-Ice cubes, crushed ice, or snow
-A little water
-A pinch of salt

Fill the can with your ice, add in your water and salt, give it a stir, and wait. Depending on the humidity, which is the percentage of water vapor in the air, frost will begin to form on the cold can. If you scrape a little bit of the frost onto black paper, you can see the individual ice crystals more clearly.

Glacier Crossword

E R R X O L I C G N N B U F I

A S M E L P C V U I R L R Q F

J N S I K I X I G L I A F M L

F C T A T S B R E M F U A B K

O N R A V R E Z D U S R D X M

K E R X R E I M E R K E S B U

Y R F F N C R M S D V N E H A

E Q T L Y N T C C P W T I I M

Y M A H A N G I N G C I H U X

F N O A H U V O C V I D X T J

D R K R Q J L E E A R E R A T

N O I T A I R T S V Q O W G I

J Q A A R I Z D A Y U Z F E L

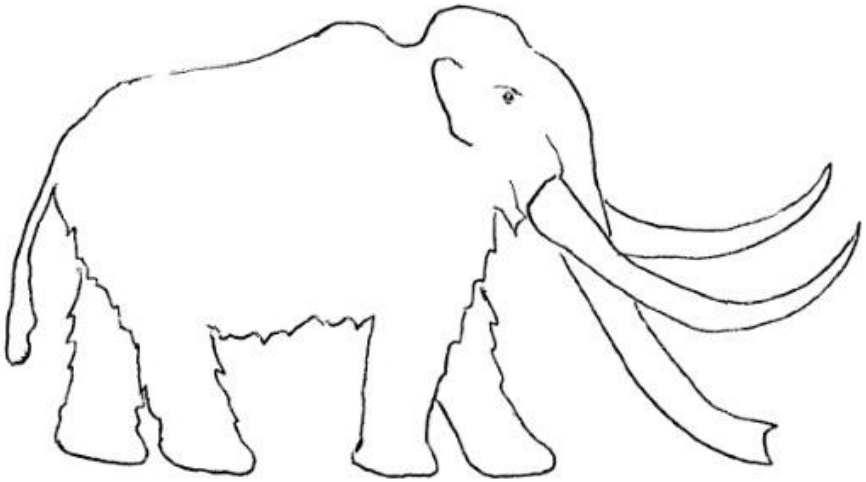
Y E L L A V N V Z G E J X S M

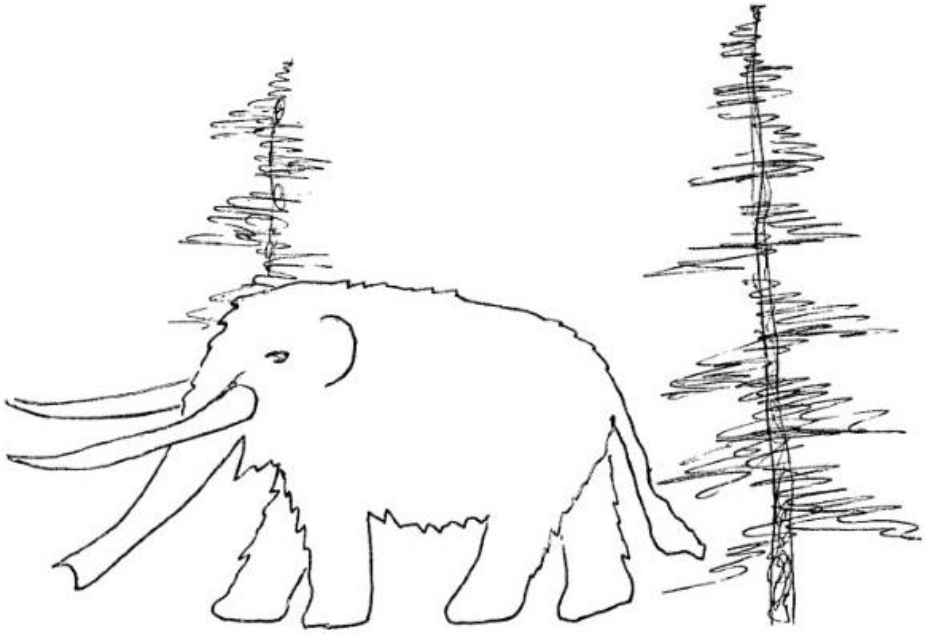
P D F P P H S E H U K E K W R

ANTARCTICA
CIRQUE
CREVASSE
DRUMLIN
ERRATIC
ESKER
FIRN
GREENLAND
HANGING
LAURENTIDE
MORAINE
STRIATION
TILL
TROUGH
VALLEY

Mastodon vs. Mammoth

A lot of people have trouble telling apart the Woolly Mammoth and the American Mastodon. After coloring in the two animals, can you list what makes that alike? What makes them different?





Similarities

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_____

Differences

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_____

_____

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