

Lesson 25: A Frosty Morning

Morning comes very early in the day. Sometimes it is still dark when morning comes. Sometimes you have to leave your house when it is still cold outside.

"Okay children," said Auntie Mary on a early frosty morning. "Everyone get in the car." The children hurried across the porch and all got inside of Auntie Mary's car and shut the doors behind them.

"Brr..." said Tyler. "It's colder inside the car."

"I can't make my teeth stop ccchhhaatttterrinnng," said Lindsay as she shivered.

"Hurry, Auntie Mary," said Ethan. "Start the car, please."

"I will in just a minute," said Auntie Mary. "But first, I want you all to look at the windshield. It's covered in frost and it is beautiful!"

The children crowded closer to the windshield. It was covered in a beautiful, delicate, lacy pattern of ice.

"Oh Auntie Mary," said Lindsay. "It is so pretty!"

"That looks like trees or ferns," said Tyler.

"Look over here, mom," said Parker. "There are some hexagon shaped ones along the edge."

Ethan was sitting in the third row. He called their attention to his window. "I've got some back here too," said Ethan. "These look like snowflakes."

"What causes this, besides cold temperatures?" asked Parker.

"Well, besides the cold air," said Auntie Mary. "You have to have moisture in the air."

"What makes it so pretty?" said Lindsay. "I mean the shape."

"The shape is from whatever is on the surface. These frost crystals grow as more moisture freezes to them," said Auntie Mary.

"So, if the windshield is dirty, the frost crystal will turn to go around it?" asked Tyler.

"Yes," said Auntie Mary. "That's right, Tyler."

"So, the windshield is like a road, and the frost is kind of driving across it?" asked Ethan.

"Yes," said Auntie Mary with a big smile. "You all are so smart!"

"So, why the hexagon instead of the feather-type crystal," asked Parker.

"I would say that there was probably more moisture trapped in that corner," said Auntie Mary. "Those ice crystals grew up instead of out because of the edge of the window. The ice crystals that are more delicate have less moisture to work with and more space to expand."

"Okay, I'm freezing," said Lindsay. "Can we please start the car?"

"No," said Tyler. "That will melt the ice crystals."

"I bet we will find more on the windows of the cabins," said Auntie Mary.

"Okay," said Tyler. "Then, let's hurry before it warms up too much and they all melt away."

Driving down the Natchez Trace Parkway they decided to stop at Rock Springs to check out the ice along the creek. As the road dipped down into the hollow where the creek was located, they drove into fog. It was a freezing fog. "This should make things interesting," said Auntie Mary.

"Why do you say that?" asked Parker as they were turning into the parking lot.

"Because with freezing fog, we may find a different type of ice crystal called rime ice," said Auntie Mary parking the car.

Auntie Mary didn't have to tell them twice to get out of the car. Everyone piled out quickly. Every door on the car was opened and closed before she got her seat belt unbuckled. This was quite surprising considering how unseasonably cold it was outside.

They stopped first at the Rock Springs sign. "Is this rime ice?" asked Lindsay.

"No," said Auntie Mary. "See how it looks like snowflakes? That is frost."

Walking towards the tree-line Tyler stopped to look at the grass, "Is this rime ice on the grass?" he asked.

"No, we will find rime ice on the tree branches," said Auntie Mary.

As they entered the woodland around the creek, every branch and twig was searched. When they got closer to the creek they found what they were looking for, rime ice. "Auntie Mary, come and see," said an excited Ethan. "Is this rime ice?"

"Yes, it is," said Auntie Mary. "See how the ice crystals seem to be growing off the branch but they don't go all the way around?"

"Yes, it looks like a comb," said Lindsay.

"The crystals look like needles to me," said Tyler touching the rime ice. "It is kind of sharp, but they melt as soon as I touch them."

"That's because they are not very thick," said Auntie Mary. "They are very delicate."

"Can we look along the creek for ice?" asked Parker.

"Sure," said Auntie Mary. "Just don't get wet please. It would be very easy to get too cold."

The children searched along the creek banks for ice formations, oohing and aahing over everything they found. The temperatures were still very cold so Auntie Mary soon called them to come back to the car.

As they drove further down the Natchez Trace Parkway, they came to the Tennessee River. Auntie Mary drove slowly as they crossed the bridge over the river. On the opposite side of the river they could see ice cycles hanging from the rocky bluff.

Soon, they reached the cabin and hurried inside to look for ice crystals on the windows. "I really like these lacy ones," said Lindsay. "I think they are the prettiest."

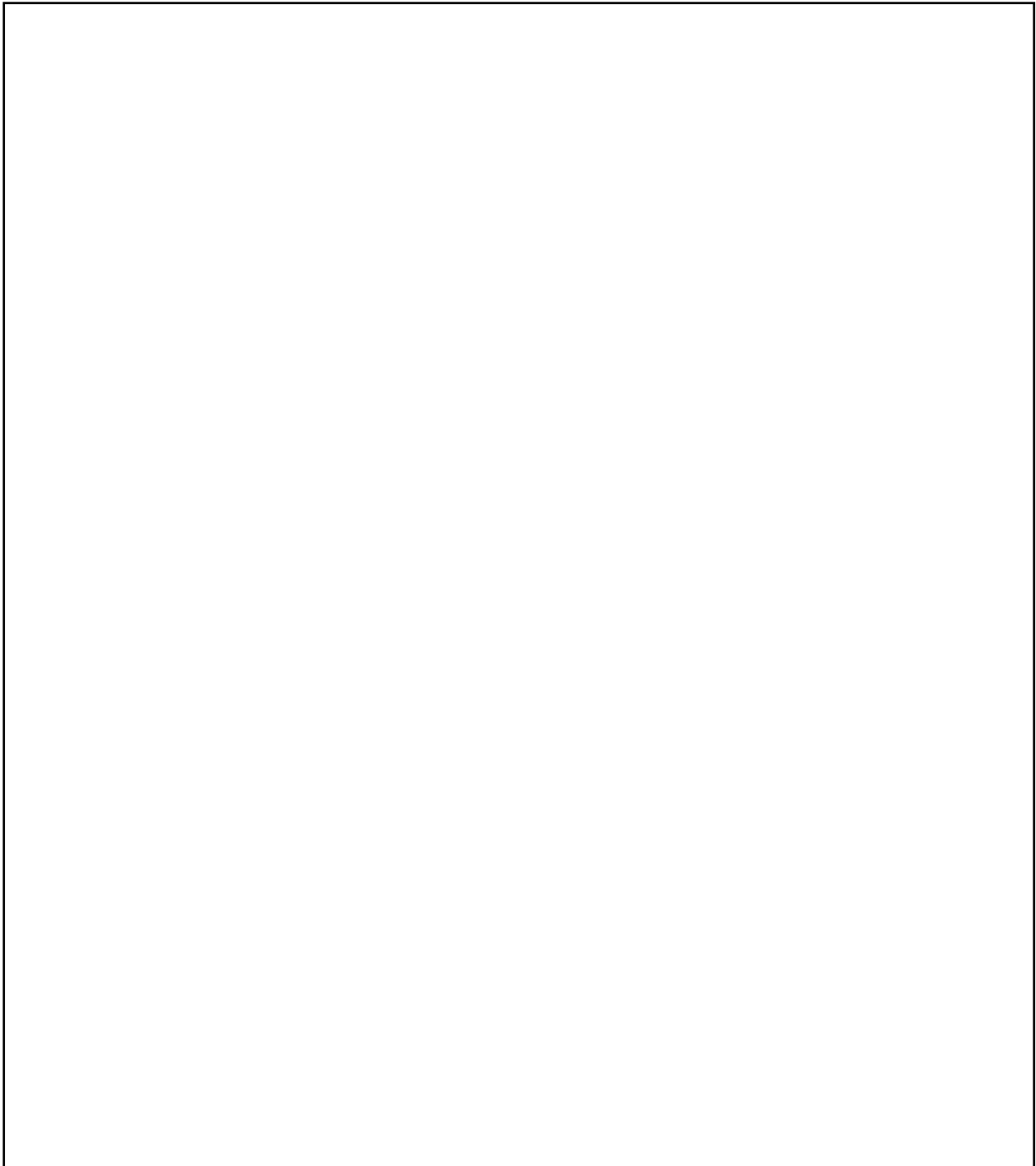
"Okay, I'm turning on some heat now," said Auntie Mary. "The ice crystals will probably go away."

"That's okay," said Lindsay. "I like frosty mornings, but that heat is going to feel really good."

Lesson 25:

Have you ever been outside in the snow and found ice of some sort?
Icicles or even ice on a pond or creek?

Draw a picture of some different things made of ice:



Lesson 25:

Let's Make Some Frost!

What you will need:

An Adult
A clean tin can
Water
Crushed ice
Salt

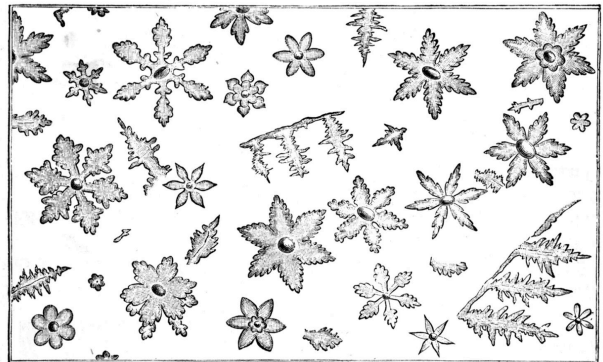
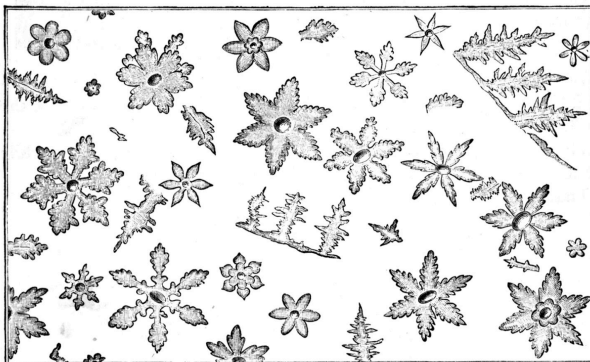
Have an adult carefully fill the tin can about half full with crushed ice and add some salt and water.

Sit back and wait and watch the frost form!

When you put the water into the ice, it makes the water and the can sit at around the freezing point of water and adding the salt makes it get even colder. Salt lowers the melting point of ice and makes it condense and freeze on the outside of the can for you to see the frost.

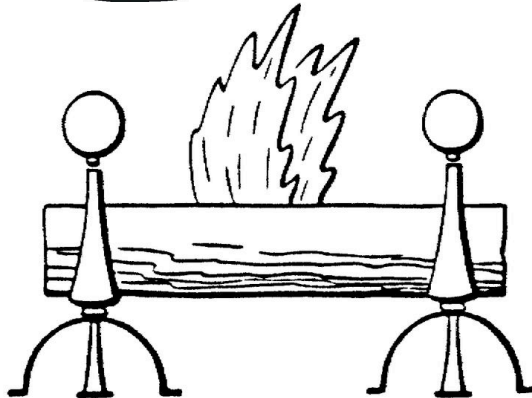
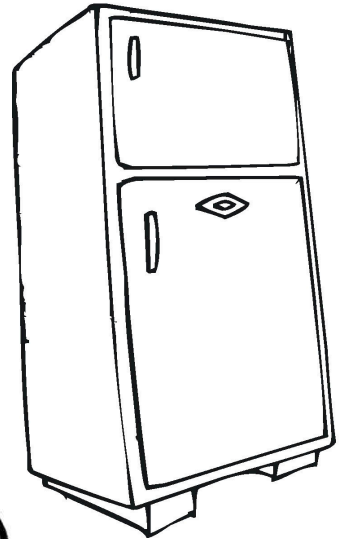
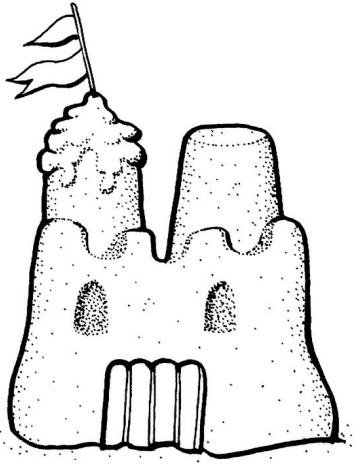
Look closely at the frost and you can see crystals of ice growing on each other!

Next time you see frost outside be sure to get a closer look at how pretty it is!



Lesson 25:

Think about where are some places that you could see Frost Ice or Snow. Cross off the items or places where you wouldn't see any of these! Circle the items where you would see one of them.



Lesson 25:

Color Time!

Color the picture below of the boy that found some icicles!

