As the polar sunset begins, Rosie and Gibbs are excited to learn about the very first extension of the IceCube Neutrino Observatory, called the IceCube Upgrade, with a new award from the National Science Foundation, and contributions from international partners in Germany and Japan, IceCube will become an even more precise detector than before!

I’ve seen these before. They’re reproduced in separate labs. Both are testing new technology with the larger IceCube-Gen2 in mind.

Sure! I’m really curious how the IceCube Upgrade will look.

Ah, so the plan now is to study neutrinos much better and not just the universe!

Low-Energy Neutrinos

New Hot Water Drill

Bigger is for extragalactic neutrinos, but to study neutrinos, we need lower energy.

So why add more strings to the middle of the detector itself?

Bigger is for extragalactic neutrinos, but to study neutrinos, we need lower energy.

And in the center, larger neutrinos, a denser detector works better?

You get it?

It’s like a candy bar, but there is so much inside, we need new sensors and a new hole, too.

Rosie, put on our special goggles. I want to show you what I learned!

It may seem like a long time, but there is so much to do. We need new sensors and a new hole, too.

Can’t we start today?

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**Rosie’s Discoveries**

IceCube Upgrade

This IceCube extension will deploy 7 new strings in the middle of the current array and will have a total of 760 new sensors. Strings will go even deeper than before, down to 2600 meters. And the plan is to drill the 7 holes in one season. There’s a second extension of IceCube planned, called IceCube-Gen 2. This one is to build a 10-times-larger detector and to look for very high energy neutrinos from outer space. I’m amazed but if there’s a team that can build it, it’s the IceCubers.

New hot water drill.
The drill is the most critical piece of equipment for this new project. It will use near boiling water to efficiently make holes in which to put the new sensors.

Low-energy neutrinos
What IceCube calls low-energy neutrinos are in fact high-energy for other detectors. These are neutrinos created in Earth’s atmosphere that can be used to study the properties of neutrinos themselves.

IceCube sensors
These are all light sensors that can detect the blue light produced by neutrino and other particle interactions in the ice.

**Adventure 6: New excitement on the horizon**