LN2 Cloud Lesson Plan

Amount of time Demo takes: (10 min)
Don’t try this at home!

Materials
- Bucket for LN2 (Clear bucket at LN2 Ice Cream is preferred).
- Bucket for hot water (Bucket labeled “LN2 Explosion) is preferred).
- LN2 Dewar, full.
- Safety Goggles
- Pair of Safety Gloves

Set-up instructions
1. Gather all supplies and place bucket in an open area with good viewing potential and the possibility of keeping people 10-15m away.
2. Fill bucket with hot water and place by the empty bucket that will be used to hold the LN2.

Safety!
- It is extremely important to keep crowd back and warn them not to rush towards the cloud. Set up barricades if possible.
- Take all electronics off before performing the demonstration. The volunteer will be getting wet.
- Wear all appropriate PPE while working with LN2

Lesson’s Big Ideas
- You need three things to make a cloud: particulate matter (dust in the air), a change in temperature or pressure, and moisture.
- The change in temperature will be due to adding the warm water to the liquid nitrogen.

Background Information
- The boiling point of liquid nitrogen is -321 degrees Fahrenheit.
- The temperature difference created between the liquid nitrogen and the
warm water is over 400 degrees!

**Instructional Procedure**
1. Pour the dewar of LN2 into the clear bucket.
2. Pour the bucket of warm water quickly into the clear bucket.
3. Get ready! The cloud will come up instantly!

**Assessment/Sample Questions You Can Ask**
- What is the boiling point of liquid nitrogen?
- What three things are needed for a cloud?

**Clean Up**
- Drain any excess water and get safety supplies back to LN2 station

**References**
- [https://www.youtube.com/watch?v=9-1kGMmfUdQ](https://www.youtube.com/watch?v=9-1kGMmfUdQ)

**Next Generation Science Standards**
- K-5
  - K-ESS2-1/2
  - 3-ESS2-1