

Racquetball

States of Matter

Materials:

- 2 racquetballs (drop one into the LN2 right away)
- Liquid Nitrogen
- cryo gloves
- tongs

Key points:

- **Racquetballs are solid.**
- Even though they are solid, the molecules can flex a little, like the people in our first demo when they were a solid.
- Freezing a racquetball causes the molecules to hold on tighter than usual.
- The racquetball isn't flexible anymore.
- When you try to make something bend that isn't flexible anymore, it breaks.
- Even if the racquetball doesn't break right away it won't bounce as well.

Warnings:

- Use the glove to hold the frozen racquetball. It will protect your hand, and keep the racquetball cold longer.
- Don't throw the racquetball at or over the audience.
- Try to keep kids from picking up pieces of the frozen racquetball. It won't do any serious harm, but it's still cold.

Things to talk about:

- Recap the state transitions we have already shown them.
- Mention that this is a little different than the other demos we have shown them.
- We want to show them what happens when we take something that is already solid and make it really cold.
- Show off the normal racquetball and bounce it to show them how it behaves.
- Talk about why it is flexible.
- Take the frozen racquetball out of the LN₂. You may want to mention that it will act differently when it is cold.
- Toss both racquetballs into the air at the same time.
- After one of them (hopefully) breaks, explain why the racquetball got brittle when it was cold.