



# Waves

Total Unit Running Time: 30-40\* minutes

NGSS Addressed: MS-PS4-1, MS-PS4-3

## FIELD TRIP: **Radio Telescope, North Liberty**



Running Time: 6:22

NGSS: MS-PS4-3

Trek through the woods with VVR Host, Steve Grubbs, for a peek at the Very Long Base Array telescope nestled among the trees. Only 1 of 10 across the nation, this radio scope helps provide the best angular view of the universe. Learn more about analog vs. digital waves and signals as you view this rare device. For more information, please visit [vlba.nrao.edu/sites/northliberty.shtml](http://vlba.nrao.edu/sites/northliberty.shtml)

## INTERACTIVE EXPERIENCE: **Boulder Roll**



Running Time: Self-paced\*

Learners stand atop a snowy peak on the VictoryVR Mountain as ogres charge up toward them. By rolling boulders down the hill, the ogres are vanquished, allowing students to earn more time to make it to the finish. Rolling boulders is easy, but to get enough of them to conquer the ogres, students must correctly respond to rapid-fire questions based on the unit.

## VIRTUAL COMIC BOOK: **Hedy Lamarr & Frequency Hopping**



Running Time: Self-paced\*

NGSS: MS-PS4-3

### Topics Covered

- Biography of Hedy Lamarr
- Concept of frequency hopping and its various applications

### Assessment Answer Key & Critical Thinking Skills

1. B (BT2--comprehension)
2. D (BT5--synthesis)
3. D (BT4--analysis)
4. C (BT1--knowledge)
5. A (BT4--analysis)

## THEATER: **Waves Are Everywhere**



Running Time: 7:07

NGSS: MS-PS4-1, MS-PS4-3

### Topics Covered

- Purpose and types of waves
- Compressional vs. transverse waves
- Concepts of frequency, amplitude, wavelength

### Assessment Answer Key & Critical Thinking Skills

1. B (BT4--analysis)
2. C (BT1--knowledge)
3. D (BT2--comprehension)
4. C (BT3--application)
5. D (BT2--comprehension)

## TEACHER DEMO: **Waving With Wendy**



Running Time: 8:04

NGSS: MS-PS4-3

### Topics Covered

- Analog vs. digital signals
- Mediums that signals travel through
- Bandwidth defined

### Assessment Answer Key & Critical Thinking Skills

1. D (BT4--analysis)
2. B (BT2--comprehension)
3. D (BT1--knowledge)
4. B (BT2--comprehension)
5. A (BT4--analysis)