

Climates of the Past and Future

July 11 – 13, 2017

DAY 1: HOW THE CLIMATE WORKS

9:00 Introductions & Pre-Test

BLOCK 1: ENERGY & RADIATION

9:30 ENGAGE: Energy Toys and Writing with Light

9:40 EXPLORE: Rainbow Glasses, Thermal IR Camera, & EM spectrum

10:00 EXPLAIN: Energy and EM Radiation

10:30 BREAK

BLOCK 2: GREENHOUSE GASES & EARTH'S RADIATION BUDGET

10:45 ENGAGE: Greenhouse molecule dancing

10:55 EXPLORE: Glass plates greenhouse model

11:15 EXPLAIN: Earth's Energy Budget

11:55 EXTEND: People Power

12:15 LUNCH

BLOCK 3: VERTICAL MOTION & MIXING

1:00 ENGAGE: Heat packs & latent heat

1:10 EXPLORE: Trash Bag Hot Air Balloon

1:30 EXPLAIN: Vertical motion, precipitation

2:10 EXTEND: Radiosonde launch

2:30 BREAK

BLOCK 4: WINDS & CURRENTS

2:45 ENGAGE: Coriolis ring toss

2:55 EXPLORE: Tabletop spin tank

3:15 EXPLAIN: Circulation of Atmosphere & Oceans

3:55 EXTEND: Sketch the winds & currents

4:15 EVALUATE: Journaling (reflection questions)

4:30 ADJOURN

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DAY 2: CLIMATES OF THE PAST

BLOCK 1: ORIGINS

- 9:00 ENGAGE: Rocks from Earth & Space**
- 9:10 EXPLORE: Cosmic and Geologic Time**
- 9:30 EXPLAIN: Origin of the Sun, Earth, & Atmosphere**
- 10:10 EXTEND: Plate tectonics**

10:30 BREAK

BLOCK 2: FROM OXYGEN TO IMPACT

- 10:45 ENGAGE: How long can you hold your breath?**
- 10:55 EXPLORE: Sparkling Water & CO₂**
- 11:15 EXPLAIN: Climate change over the past half-billion years**
- 11:55 EXTEND: The rock cycle: mountains to mud**

12:15 LUNCH

BLOCK 3: FROM HOTHOUSE TO ICEHOUSE

- 1:00 ENGAGE: Alley Ice Core movie**
- 1:10 EXPLORE: Catastrophic global warming 55 million years ago (PETM)**
- 1:30 EXPLAIN: Climate Changes over the past 50 million years**
- 2:10 EXTEND: Website Walk-through**

2:30 BREAK

BLOCK 4: FROM HOLOCENE TO ANTHROPOCENE

- 2:45 ENGAGE: Lascaux, Sumer, Egypt, & Rome**
- 2:55 EXPLORE: Ice core CO₂ and temperature plots**
- 3:15 EXPLAIN: Ice Ages & Interglacials**
- 3:55 EXTEND: Tree ring exercise**

4:15 EVALUATE: Journaling (reflection questions)

4:30 ADJOURN

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DAY 3: CLIMATES OF THE FUTURE

BLOCK 1: SIMPLE, SERIOUS, & SOLVABLE

- 9:00 ENGAGE: Carbon Crisis in 90 Seconds**
- 9:10 EXPLORE: Discovery of Global Warming**
- 9:30 EXPLAIN: Simple, Serious, & Solvable**
- 10:10 EXTEND: Climate Sensitivity in the Past 1000 Years (web activity)**

10:30 BREAK

BLOCK 2: SIMPLE – HOW CO₂ WARMS THE CLIMATE

- 10:45 ENGAGE: Dances with Molecules Video**
- 10:55 EXPLORE: How Can We Survive Night?**
- 11:15 EXPLAIN: Simple: How Adding CO₂ Warms the Climate**
- 11:55 EXTEND: Thermal Emission of the Earth (web activity)**

12:15 LUNCH

BLOCK 3: SERIOUS – WHY CLIMATE CHANGE MUST BE STOPPED

- 1:00 ENGAGE: Carbon Footprint Handout & Calculator**
- 1:10 EXPLORE: Emissions & Climate Calculator**
- 1:30 EXPLAIN: Serious: Effects of Climate Change**
- 2:10 EXTEND: Third Millennium Climate Model**

2:30 BREAK

BLOCK 4: SOLVABLE – THE KIDS WILL BE ALRIGHT

- 2:45 ENGAGE: Video – The Solar Power Revolution**
- 2:55 EXPLORE: Drawdown Book and Website**
- 3:15 EXPLAIN: Solvable – Carbon, Energy, and Economics**
- 3:55 EXTEND: Post-Test**

4:15 EVALUATE: Course evaluation, Certificates, Farewell!

4:30 ADJOURN