Cascades to Coast GK-12 Curriculum
Radon and the Missoula Floods

Fellow: Kat Barnard (Geology)
Teacher: Brie Bui (Dexter McCarty Middle School)
Advisor: Dr. Scott Burns (Geology)

Learning goals: After learning about Missoula floods, and their impact on the creation of the Willamette Valley, this lesson ties the science of radon produced from the flood deposits to human health concerns, i.e. lung cancer. This lesson tries to impress the usefulness of the geological sciences to everyday life and how data collection for a government agency, like the Oregon Health Authority, is a community responsibility.

Prior lessons: Willamette Valley crops grown on Missoula Flood sediments like hazelnuts, grass seed, clover, and wheat. Missoula Flood gravels were included in a rock identification lesson about Oregon rocks. Upland Willamette Valley soils were used in a soil horizon and soil color lesson.

Target Grade: 8th grade Integrated Science. Earth and Physical emphasis.

State Standards: 6.1P.1 Describe physical and chemical properties of matter and how they can be measured. 7.2E.4 Explain how landforms change over time at various rates in terms of constructive and destructive forces. 8.2E.2 Describe the processes of Earth’s geosphere and the resulting major geological events.

Activity Summary: Show presentation reviewing the Missoula Floods, watch video from Oregon Public Broadcasting – Oregon Field Guide, and pass out radon kits with Radon brochures from the Oregon Health Authority.

Activity Plan:
30 minutes total -
☐ 5 minutes for first 4 slides

Slide 1
- Question posed to class: What ecoregion was affected by the Missoula Floods? (Willamette Valley)
Question posed to class: How long ago did this occur? (The last ice age, about 15000-18000 years ago)

“An ice dam from the iced sheet blocked and backed up a river that made a huge lake in Montana called Glacial Lake Missoula. When the dam breached, a giant flood came across Washington and caused scouring and erosion. The flood came down the Columbia Gorge, carrying the soil and rock into the Willamette Valley.”

- Slide 2
  - Question posed to class: On this elevation map can you see the flat areas in NE Portland and down into the valley? (Yes)
  - Question posed to class: What are the rough and bumpy areas called? (Uplands)
  - Question posed to class: Did these areas get covered by the floods? (No)
  - “Where do you live on this map? Dexter McCarty is here in the flat areas so it is possible that this land was covered by the Missoula Floods and rocks were deposited here that were carried down from Washington.”

- Slide 3
  - Go down the bullet points
  - Question posed to class: What radioactive elements have you heard of? (Uranium, Potassium, Thorium…)
  - “In the natural decay of Uranium all the elements that are made are solids except for one, which is a gas… RADON.”

- Slide 4
  - Question posed to class: Have you ever heard of Oregon Public Broadcasting, OPB?
  - Question posed to class: Have you ever watched Oregon Field Guide?
  - “They make cool videos about interesting things but put in the science behind it. For example, they want to teach you about hang-gliding and they will explain the physics behind how to obtain flight.”
  - 13 minutes – Video: http://www.opb.org/programs/ofg/segments/view/1808
  - 3 minutes to wrap up

- Slide 5
  - Question posed to class: On the other map in the video where all the zip codes were one color, how many houses did they test in order color it red? (at least 30)
  - Question posed to class: How many houses do you think live in each of those zip codes? (100’s or 1000)
  - Question posed to class: Is 30 out of 1000, or 3%, a good amount of data? (No)
  - Question posed to class: What did Brett Sherry say about the data? (Need more data to make better maps because you can’t just look at the map and say whether you’re house is radon free or not)
  - Question posed to class: So what zip code are we in? (97080)
  - “It says that we have low potential of having high radon levels but… (Every house should be tested)”

- Slide 6
  - Go through each bullet point and go over Radon detector instructions if needed.
**Related Concepts:** Geologic history of Oregon, permeability, rock types, radioactive decay, periodic table of the elements, human health, lung cancer, mapping data, community outreach.

**Materials:** 3-day radon test kits and brochures (English and Spanish) for each student.

**Handouts and worksheets:** 3-day radon test kits and brochures (English and Spanish) for each student.