



The Willamette Meteorite:

Lessons from Oregon's Ancient Extraterrestrial Visitor

Grades: 6-HS

Subjects: American History, Oregon History, Native American History, Social Studies, Earth Science, Astronomy

Suggested Time Allotment: 3-4 class periods

Overview:

This interdisciplinary lesson is designed to teach concepts of social history, natural history, physical science, and legal issues of personal and community property rights. Learning is centered around one of Oregon's most unique natural treasures: the Willamette Meteorite that was found near the town of West Linn in 1902. Utilizing the [Historic Oregon Newspapers](#) website, students will access first-hand news accounts of the meteorite's discovery and the subsequent battle in court to determine its rightful ownership. Further inquiry will reveal information about the science of meteors and a key formative event in the region's distant geological past. A role-playing mock courtroom activity helps to personalize and elucidate the competing claims of rightful ownership that have continued to surround the meteorite up to the present day.

A) **Discovery of the Meteorite... and the Litigation That Followed**

Begin by asking students if they are aware that the largest meteorite ever discovered in the United States--and the sixth largest in the entire world--was found right here in our home state of Oregon. Then ask how many of them have ever seen this remarkable object in person. If any students answer in the affirmative, solicit from them the story and circumstances of how and where they came to view the meteor.

Students should then be instructed to perform keyword-based research about the Willamette Meteorite in [Historic Oregon Newspapers](#). Challenge them to locate the very first news story about the meteorite's discovery. Ask them to find an historic newspaper photograph of this remarkable object from space. (You can either have students perform their own keyword searches, or see below for links to key stories on the website.)

Also inform the class that there was immediate controversy about the rightful legal ownership of the meteorite. Students should be tasked with using [Historic Oregon Newspapers](#) to learn more of the facts in this case: *Oregon Iron Co. v. Hughes*, which was decided by the Oregon Supreme Court in 1905.

After the students have completed their research, initiate a class discussion and share-back about what they have learned. Key questions for this conversation are: Who first discovered the meteorite? Where did they find it? Why did they undertake the extremely difficult task of moving the 15-ton object 3/4 of a mile? How did this lead to a case in the Oregon Supreme Court? What was the Court's decision? Was the decision fair? What did the winners of the court case then do with the meteorite?

Answering this last question should reveal that the Willamette Meteorite was sold in 1905 to Mrs. William E. Dodge, who then donated it to the American Museum of Natural History in New York City, where it remains on display to the present day. Students should be asked how they feel about this. Was it right to send the Willamette Meteorite all the way to the other side of the country, or should this important relic have remained here in Oregon, where it was found?

B) The Science of the Willamette Meteorite

In the science classroom, discussion of the Willamette Meteorite can be used as a point of entry for teaching important lessons in astronomy and geology.

First, ensure that students gain a thorough, basic knowledge of the nature of meteorites in general: what they are, where they come from, and how they have impacted the earth throughout time. This can be gleaned through classroom discussion, from relevant chapters in standard science textbooks, or via online resources such as solarviews.com and Wikipedia.

Students may be tasked individually or in small groups to answer questions and solve problems such as:

- What systems do scientists use to classify different types of meteorites?
- Which of these types is the Willamette Meteorite classified as?
- What is the convention by which meteorites are named?
- What is the evidence that meteorite impact may have played a key role in the extinction of the dinosaurs 65.5 million years ago?
- What is the approximate number of meteorites that strike the earth's surface every year?
- What are the four periodic elements of which the Willamette Meteorite is composed?
- Over the years, two smaller pieces of the Willamette Meteorite have been offered for sale: one weighing 14 kg (30 pounds), the other weighing 130 grams (4.5 ounces). If these pieces had never been broken off the meteor, how much would it weigh today?
- What are the physical and chemical processes that have led to the highly pitted appearance of the Willamette Meteorite?

Students should next be made aware of a most perplexing fact about the Willamette Meteorite: it would be expected that an object of this mass falling from space should leave a huge crater where it struck the earth. However, where the Willamette Meteorite was discovered in Oregon, it simply lay half-buried in the ground, with no crater.

How can this be explained? Ask your students to brainstorm some hypothesis of their own before the class investigates further.

This is an excellent segue to the subject of Ice Age glaciation and the Missoula Floods (also known as the Bretz Floods or Spokane Floods) that played a key role in shaping the present-day geography of Oregon.

Geologists have hypothesized that, during the last Ice Age, the Willamette Meteorite made its original impact on the great ice dam that lay far to the northeast, in present-day Canada. Sometime around 11,000 years ago, this massive ice barrier was breached, releasing a torrent of water greater in volume than all the earth's rivers combined. Giant icebergs broke free in the floodwaters, and one of these chunks of prehistoric ice rafted the meteorite hundreds of miles before depositing it at the location where it would eventually be found in the Willamette Valley.

Through guided research assignments and/or classroom lecture, students should be made aware of the history and dynamics of the Cordilleran Ice Sheet and resulting Missoula Floods. Resources on the Web include [The Ice Age Floods Institute](#) and [The US Geological Survey](#). Maps are a valuable aid for helping students to visualize these ancient phenomena: a good one can be found [here](#). [PBS NOVA](#) has produced an episode, "Mystery Of The Megaflood," that you may wish to screen in class (a teacher's guide is also available on their Webpage.)

Relevant questions to guide class discussion: In what ways would Oregon circa 9,000 B.C.E. have looked very different than we find it in the present day? What are some factors that were responsible for these changes? Which of the state's geographic features were directly shaped by the Missoula Floods? Besides the Willamette Meteorite, what other pieces of evidence for these Ice Age floods have been discovered in Oregon?

C) Debating the Issue of Contemporary Ownership

In the year 2000, the Confederated Tribes of the Grand Ronde Community of Oregon alleged that the meteorite was their rightful property. For centuries before it was "discovered" by Ellis Hughes, the meteorite was known to Native Americans living in the Willamette Valley. In fact, they had a special name for it, *Tomanowos*, and used it in an annual religious ceremony. Thus, the Confederated Tribes argued, the meteorite should be returned to them.

Against this claim, the American Museum of Natural History continued to assert that the meteorite was legally purchased and donated to them in 1905. Some individuals who agreed with the museum also argued that the meteorite is a national treasure, and should always remain on prominent display in a place where the greatest number of American citizens would have the opportunity to see and enjoy it.

This lesson will consist of a mock courtroom trial in which students actively debate the merits of these opposing claims.

Classroom Activity

Divide the class into two groups of equal size. Each group will act as the "legal team" representing one of the two parties who claim ownership of the meteorite. The first group will present the case for the *Confederated Tribes of the Grand Ronde Community*, the second group will represent the *American Museum of Natural History*. (It is a good idea to remind your students that, even if they do not personally agree with the claims of their "clients," the rules of American legal practice dictate that they must nonetheless present the strongest case possible for the parties they have been "hired" to represent in court.)

Half the students in each group should assume the role of ‘Expert Witnesses’ who will take the stand; the other half will act as ‘Lawyers’ who will ask questions to lead the testimony of their own witnesses, and cross-examine witnesses from the other side. Various roles for Expert Witnesses might include Native American Spiritual Leader, Native American Mother, Anthropologist, Historian, Astronomer, Public School Teacher, Museum Curator, Museum Patron, etc. Groups should be given classroom time to collaboratively develop their roles, to brainstorm the merits of their case, and to form their strategies for arguing it. They should also be assigned homework to research their case and to prepare “documents” for court.

When their “day in court” arrives, the teacher should role-play the part of the Judge. The activity can begin by “swearing in” the whole class as a group. Lawyers from each side should then be given the opportunity to call their Expert Witnesses to the stand and present their testimony in the case. Next, each team of Lawyers has the opportunity to call Expert Witnesses from the *other* side and cross-examine them. Throughout the simulation, the teacher in the role of Judge can guide the activity by ‘overruling’ Lawyers and by ‘striking from the record’ Expert testimony. To the greatest extent possible, however, students should be allowed to self-direct the presentations of their cases.

At the conclusion of the activity, rather than issuing a Judge’s ‘ruling’ in favor of one side, you can tell the class how the actual dispute was settled: with a mutual compromise. The Confederated Tribes reached an agreement with the Museum, stating that tribal members are allowed private time to conduct their traditional ceremony around the meteorite once per year, and that ownership will be transferred to the Tribes in the event that the Museum ever removes the object from display. Hold a class discussion on the subject of whether or not your students believe this was a fair settlement.

In closing, you might suggest that students may visit the original site where the meteorite was found near the present-day Willamette Methodist Church in West Linn; or a replica of the meteorite that occupies a place of honor outside the Museum of Natural and Cultural History on the University of Oregon campus in Eugene; or the Evergreen Aviation & Space Museum in McMinnville, which exhibits a small, 7.5 inch piece of the actual meteorite. And, of course, if they ever find themselves on a visit to New York City, they shouldn’t miss the opportunity to see the Willamette Meteorite in person at the American Museum of Natural History!

Key highlights of Historic Newspaper coverage of the Willamette Meteorite:

Portland Morning Oregonian, November 3, 1903, p.4:

<http://oregonnews.uoregon.edu/lccn/sn83025138/1903-11-03/ed-1/seq-4/>

*photos of the meteorite

Portland Morning Oregonian, April 29, 1904, p.4:

<http://oregonnews.uoregon.edu/lccn/sn83025138/1904-04-29/ed-1/seq-4/>

*a few details of Native American beliefs about the meteorite

Portland Morning Oregonian, January 20, 1905, p. 4:

<http://oregonnews.uoregon.edu/lccn/sn83025138/1905-01-20/ed-1/seq-4/>

*account of the State Supreme Court case

Portland Morning Oregonian, August 24, 1905, p.10:

<http://oregonnews.uoregon.edu/lccn/sn83025138/1905-08-24/ed-1/seq-10/>

*unveiled at the Lewis & Clark Exhibition

Portland Morning Oregonian, September 1, 1905, p.8:

<http://oregonnews.uoregon.edu/lccn/sn83025138/1905-09-01/ed-1/seq-8/>

*published poem about the meteorite

Salem Daily Capital Journal, October 10, 1905, p.6:

<http://oregonnews.uoregon.edu/lccn/sn99063957/1905-10-10/ed-1/seq-6/>

*more photos

Salem Daily Capital Journal, February 22, 1906, p.4:

<http://oregonnews.uoregon.edu/lccn/sn99063957/1906-02-22/ed-1/seq-4/>

*sold to museum in New York