

Lesson Plan: Researching the History of Astronomy

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(Day 1) – Assign partners randomly. By way of introduction, partners are assigned an astronomer and a separate unrelated historical topic to research (examples: Kepler and Geocentric model of the Universe). Another group can cover the three laws of Kepler and Ptolemy. When these groups present, the class gets two different perspectives on the same time frame. Partners are assigned a brief first reading (from textbook or articles or library books) on their topic and astronomer. Students begin researching their topic and astronomer in other resources, online or in the library.

(Days 2-3) – The assignment is explained: each student will develop a brief presentation (5 to 10 minutes) with the use of a poster and/or a PowerPoint and a written article. Students design a rubric on what will be required in the assignment as well as the quality of work each team will need to complete.

The rubric changes every year because the students are the ones who help decide the rubric content. Areas of the rubric are usually presentation, article, group work and research. However, I have found that the rubric sometimes has to be influenced by the teacher because students often make very challenging criteria or sometimes very weak criteria. They may also make criteria that is not possible to use in real grades by the teacher! This is a point of formative assessment of student understanding of the project.

An example rubric is on the next page. If students don't include proper citation and avoiding plagiarism, then the teacher should.

Before proceeding to Days 4-5 of the plan, give students some time to research and prepare articles and presentations outside of class time. This could be a good time to put in labs and lessons on scientific method. I have students bring in their projects for quick spot checks (every day or two) for progress and cooperation. Partners may need to be separated here if problems develop and rubric must sometimes be adjusted for one student.

(Days 4-5) – (Partners present their information to the class for students for taking notes such as who, what, when, where, and unusual or important details and ask questions in 5 to 10 minutes. All groups must present before going on to the next part. One article is turned in per group for teacher assessment according to the rubric.

(Days 6-7) – Students are regrouped into teams of 5-6 students; previous partners are not allowed in same teams. Groups then jigsaw all their notes on all the presentations to construct a timeline with important information, particularly based on those items the students decided (or were told) were important. By jigsawing, gaps can be filled in, and the assessment of evidence of cooperation and division of labor, as mentioned in the example rubric, continues. The groups are encouraged to get as much information on the timeline as possible to better prepare for a test that will follow where the timeline can be used. Thus, each person in the group will need to copy the timeline for their further research. Groups turn in multiple choice questions for use on final test.

(Day 8) – (May not necessarily be the day after the jigsaw exercise.) Each student uses the timeline they prepared to answer test questions over the presentations. Test includes some teacher developed questions that follow what was presented in the class. Usually some form of essay question over how the Science of Astronomy has developed over time is included. Another essay question will cover the topic or figure the student researched about what they learned in their research about science.



<i>Grade</i>	<i>Group Work (25%)</i>	<i>Research (25%)</i>	<i>Article (25%)</i>	<i>Presentation (25%)</i>
A (90-100)	All homework spot checks show progress of work together. Clear evidence of cooperation and equal division of labor.	5+ cited acceptable sources. Evidence of deep understanding of assigned parts. Article includes life details or information with how it fits into timeframe.	On topic; each partner clearly identified for section written. Paper's length exceeds minimum three pages. Covers assigned topic and astronomer. No significant typos, grammar or spelling errors.	Presentation covers all assigned parts, is engaging, student speaks clearly and without note cards or reading. Organized. Correctly answers questions.
B (80-89)	80% of homework spot checks show progress of work together. Evidence cooperation and division of labor. Most products equally divided between partners.	4 cited acceptable sources. Evidence of understanding of assigned parts. Includes some life details or information with how it fits the timeframe; explains the importance of this topic.	On topic, each partner clearly identified for section written. Meets minimum of three pages. Covers topic and astronomer assigned. Few (1-2) significant typos, grammar and spelling errors.	Presentation covers all assigned parts, is engaging, student speaks occasionally without reading or use of note cards. Organized. Correctly answers most questions.
C (75-79)	60% of homework spot checks show progress of work together. Evidence of some cooperation and division of labor; products are unequally divided between partners.	3 cited acceptable sources. Evidence of some understanding of assigned parts. Article includes few life details of or information with how it fits into the timeframe; Student does not explain well the importance of this topic.	On topic but each partner not clearly identified for what they wrote. Meets minimum length of three pages. Covers topic and astronomer assigned. Some (3-4) significant typos, grammar and spelling errors.	Presentation covers all assigned parts; speaking is dependent on note cards or reading PowerPoint. Organization is not balanced for different parts. Correctly answers only some questions.
D (70-74)	40% of homework spot checks show progress of work together. Little evidence of cooperation and division of labor; products not equally divided between partners.	2 cited acceptable sources. Article includes little life detail or information on how it fits the timeframe.	On topic but each partner not clearly identified for what they wrote. Does not meet minimum length. Several (5+) significant typos, grammar and spelling errors.	Presentation that covers all assigned parts but student reads from note cards or reading sheets. Organization not evident. Unable to answers questions.
F (0-69)	No evidence from spot checks of students working together or cooperation and division of labor.	None or one cited source and/or plagiarism present.	Does not meet minimum length. Does not cover assigned topic and/or astronomer. Numerous grammar and spelling errors.	No presentation or not on assigned topic.