# Lesson plan: Evidence Vs. Reasoning

Standard H.B.1: The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.

Essential Q: How is evidence different from reasoning?

Tools: Computer access, projector, paper/ pencils

Day 1

Opening: Project the diagram from the Argumentation toolkit website about CER.

Clarify with examples to explain what claim, evidence and reasoning are using examples.

Guided practice: Using the pdf from Argumentation toolkit [here](https://drive.google.com/open?id=1AxAXE7xG2wrFviK1Ka7oyOIrNVlMEg-2) project the vegetable example. Model the example to show the difference between evidence and reasoning

Independent practice: Students work in pairs on the Luna Moth example. They all use a particular color from Claim, Evidence and Reasoning.

After they complete it, students will self evaluate using the the checklist [here](https://drive.google.com/open?id=1n_KHd51--3mDTRTcpJk_B0VmzrUbLPVb) (from modelteaching)

Day 2

Opening: (opening borrowed from Edutopia) (15 mins)

Students will watch a NASA Curiosity Rover video [here](https://youtu.be/oHLbXTOaw7w) and then they will answer the following questions

1. What are these scientists curious about—what do they want to know? (Claim)
2. What data will the rover collect? (Evidence)
3. How will this data help scientists answer—make claims about—their questions (Reasoning)

Remind students about the reasoning tool from day 1. They will have partner discussion to see if their answers were similar/ did someone phrase it better/ would anyone change their response (if so, to use a different colored pen and write that down). We will save this and come back to it later in the week for analysis.

Guided lesson: Explain to the students that the goal of the lesson is to be able to differentiate between evidence and reasoning and use that to write accurate scientific explanations for phenomenon.

We will use the [following](http://datanuggets.org/wp-content/uploads/2019/01/Fast-weeds_studentA.pdf) data nugget for the lesson using the [rubric](http://datanuggets.org/wp-content/uploads/2016/09/Grading-Rubric-2016.pdf) that comes with the activity.

The remaining class time on day 2 will be spent on annotating, answering questions and discussing the article. Students will work in groups of 3-4 for this part.

Closing: Remind students what CER is and have them work in the same groups as before to provide feedback so that they can improve upon their evidence and reasoning.

Day 3

We will start the class by rewatching the rover video and revisiting our answers to the questions. Individually, each student will reflect and revise their CER for the video using the color coding scheme (Claim, Evidence and Reasoning).

They will then do a double blind peer review of their analysis by mixing up their responses and randomly distributing them for peer review.

We will then as a class discuss elements that make up evidence Vs. reasoning and clarify any further questions

The class will then be divided into different groups for a card sort activity and be given examples of student evidence and reasonings for a particular claim. Their goal will be to sort the evidence from the reasoning and then rank the evidence based on quality.