

## How to Teach Why the Dynamical Definition of Planets is the Best Method

---

Alex Michael Leonard Klein<sup>1</sup> and Dr. Harold Alden Williams<sup>2</sup>

The first lessons cannot include why the dynamical definition of planets is the best method, simply because people have to know something about all methods before making an intelligent choice by themselves as to which is the best method. As such, some of these lessons will be purely informational, while others will have elements of persuasion tied into them. These instructional elements will influence, as the goal of science is not to get absolute answers, but to foster ideas and to use those ideas to further explore. The first lesson will be on the historical definition of planets, as that is what most people know and want to stand by, and the second lesson on the geophysical definition. Next, the third lesson will be on the size definition. Finally, we will then get to the dynamical definition method. These four lessons will be the purely informational lessons. Then will come the last lesson: a synthesis type of lesson. It will provide all of the information on pros and cons of each method of definition, and on the timescale within the Lyapunov characteristic exponent which gives minor planets a timescale less than the main sequence life time of the sun. The second component, which will be still mostly informational, will still introduce some subtle elements of persuasion. This part will be on how applicable each method of definition is, lending itself automatically to the dynamical definition.

References to be used in lessons to include:

Jack J. Lissauer, "Chaotic motion in the Solar System," Review of Modern Physics 71, 835-845 (1999)

[http://en.wikipedia.org/wiki/Chaos\\_theory](http://en.wikipedia.org/wiki/Chaos_theory)

[http://en.wikipedia.org/wiki/Lyapunov\\_exponent](http://en.wikipedia.org/wiki/Lyapunov_exponent)

<sup>1</sup> Montgomery College at Takoma Park/Silver Spring, Takoma Avenue and Fenton Street, Takoma Park, MD 20910 [alex.klein@earthlink.net](mailto:alex.klein@earthlink.net)

<sup>2</sup> Montgomery College at Takoma Park/Silver Spring, Takoma Avenue and Fenton Street, Takoma Park, MD 20910 [harold.williams@montgomerycollege.edu](mailto:harold.williams@montgomerycollege.edu)