

## Mars for Earthlings

**LESSON 2: Birth of Planets*****In-Class Activity 1******Differentiation and JELL-O 1-2-3***

**Purpose:** Observe and understand the reasons for internal planetary differentiation.

**JELL-O 1-2-3**

Observe the JELL-O provided by your instructor and answer the following:

1. What has happened to the JELL-O?
2. Explain why the layers formed.
3. What is the difference between the layers?

**The Earth's Interior**

1. Describe the Earth's interior. What are the different layers?
2. How does the composition of the Earth change between the layers?

**Planets and JELL-O**

1. How similar/dissimilar is the internal differentiation of the planets from JELL-O 1-2-3 differentiation?



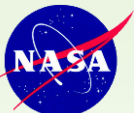
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### Changing Conditions

What physical and/or chemical conditions might change the behavior of the JELL-O and the differentiation of a planet?

### Mars's Interior

1. Explore the information page on the future InSight mission (<http://insight.jpl.nasa.gov/home.cfm>). What is the primary goal of the mission? Why can understanding the planet's interior tell us about the history of Mars?



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### Homework 1

Birth of Planets\_MFE

*The Pluto Debate*

#### Directions:

1. You will be asked to argue in the affirmative or negative for the retention of Pluto's classification as a planet. Utilize facts of Pluto and the IAU Planet Classification system (<http://www.iau.org/public/pluto/>).
2. Write a 1 page, 12pt font, double-spaced summary of your position regarding Pluto's classification as a planet.

#### Pluto Facts:

1. Pluto is the smallest planet in the Solar System, smaller than Earth's Moon, and half the width of Jupiter's moon, Ganymede.
2. Pluto's journey around the Sun takes 248 Earth years. This means that, since its discovery in 1930, it still has 177 years to go until it has made a complete orbit around the Sun.
3. Pluto's atmosphere is composed of a thin layer of gas containing carbon monoxide, methane, and nitrogen. Its atmospheric pressure has been estimated to be 1/700,000 compared with that of earth.
4. Pluto orbits the Sun on a different plane than the other 8 planets.
5. Pluto has three identified moons. Charon, the largest, is not much bigger than Pluto itself (Pluto is 2,280 kilometers wide, Charon is 1,212 kilometers wide).
6. A day on Pluto is equivalent to Earth's 6 days and 9 hours, meaning that it has the second slowest rotation in the Solar System (after Venus, which takes 243 days to turn on its axis).
7. Pluto's orbit is the more eccentric (more elliptical) than any planets' orbit. It can come closer to the Sun than Neptune, but then go almost two billion kilometers further away from Neptune's orbit.
8. Pluto maximum distance from the Sun – 7.38 billion km (4.6 billion miles).
9. Pluto's minimum distance from Earth – 4.28 billion km (2.7 billion miles).

#### Kuiper Belt and the Oort Cloud:

1. Familiarize yourself with the Kuiper Belt and the Oort Cloud:  
[http://www.nasa.gov/sites/default/files/files/Kuiper\\_Belt\\_Lithograph.pdf](http://www.nasa.gov/sites/default/files/files/Kuiper_Belt_Lithograph.pdf)

#### IAU Classification System:

1. A planet is a celestial body that
  - a. is in orbit around the Sun,
  - b. has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and
  - c. has cleared the neighborhood around its orbit.
2. A "dwarf planet" is a celestial body that
  - a. is in orbit around the Sun,
  - b. has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape,



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- c. has not cleared the neighborhood around its orbit, and
- d. is not a satellite.

### The New Horizons Probe:

1. Explore the mission page for the New Horizons Probe.  
([http://www.nasa.gov/mission\\_pages/newhorizons/main/](http://www.nasa.gov/mission_pages/newhorizons/main/))
2. What new information did you learn about Pluto from this mission? Does this information change your opinion about Pluto's classification? Why or why not?

