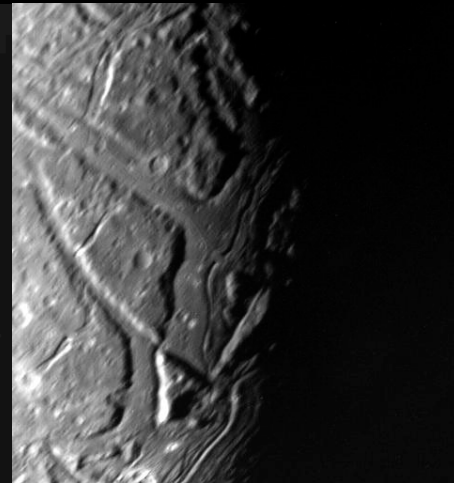
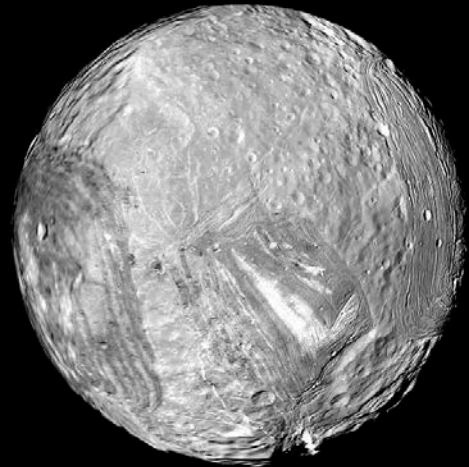
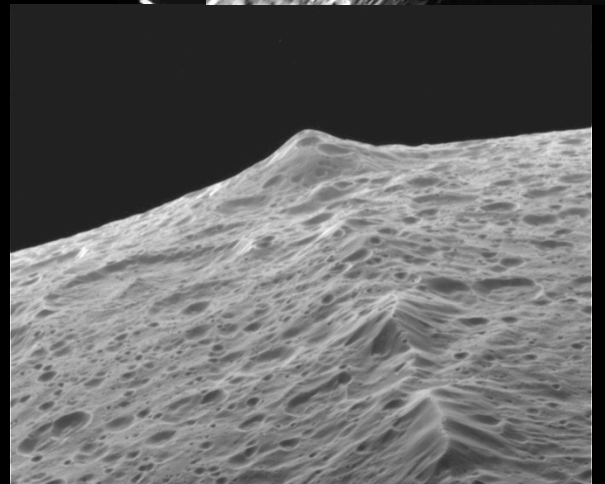
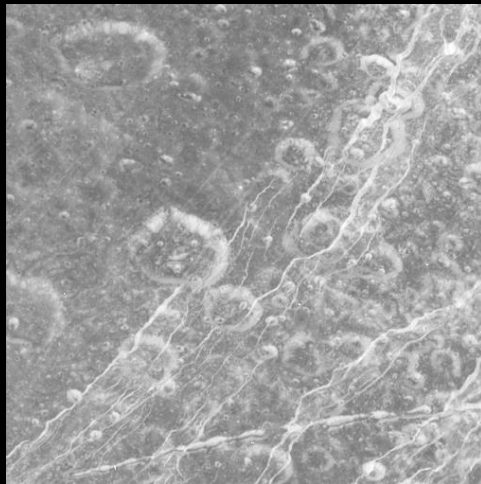


Mid-sized satellites



Zibi Turtle



Question 1:

- **What are the surface and bulk compositions and interior structures of the satellites, and what do they tell us about satellite formation and evolution processes, and formation locations?**
- Compositions, especially of volatile materials, preserve information about formation conditions, subsequent modification (both endogenic and exogenic) and volatile loss, and exchange in the different giant-planet systems.
- Comparisons of diversity of mid-sized satellites within the Saturnian and Uranian systems, and comparisons between the two systems, illustrate different possible evolutionary paths and driving factors behind them. (Are the Uranian satellites the result of system formation processes similar to those at other giant planets or related to other events?)
- Laboratory work can help with interpretation of observations.
- Decadal survey questions: Q1, Q2, Q4, Q6, Q10

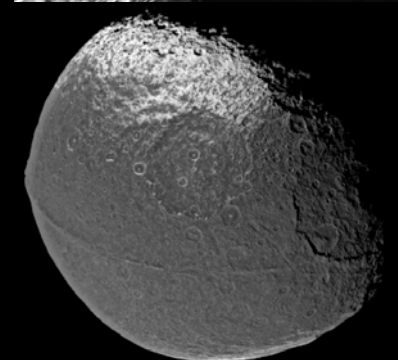
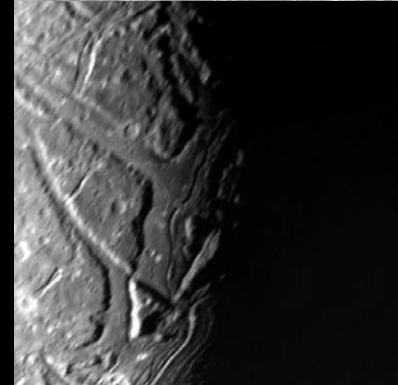
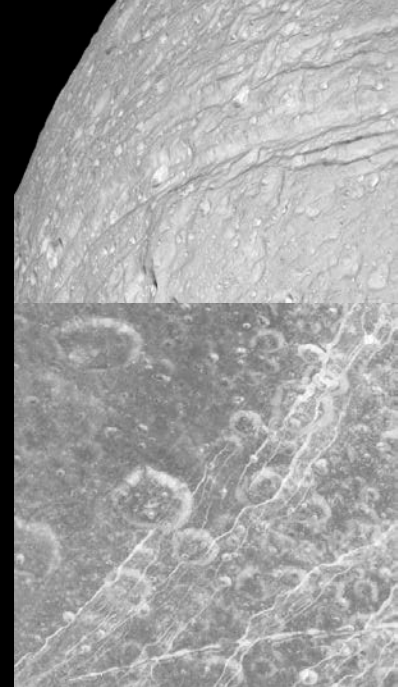
Question 2:

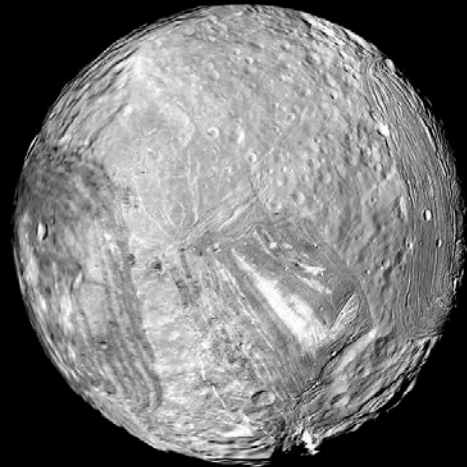
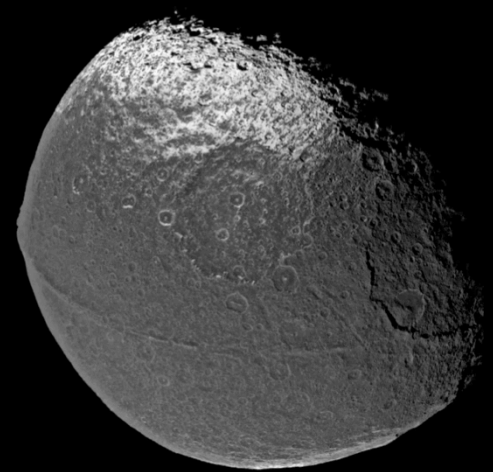
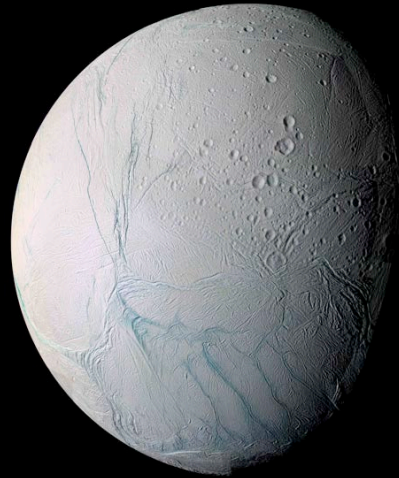
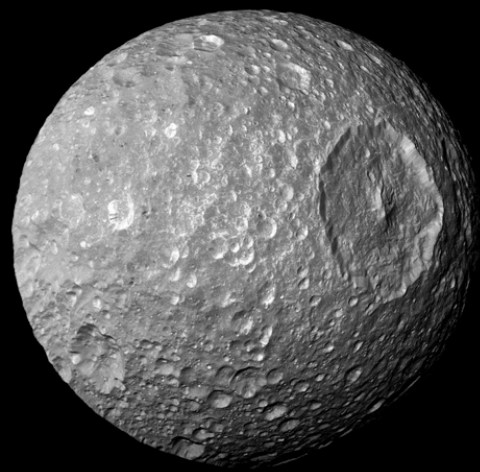


- **What processes drove satellite formation and evolution and allow interior oceans and long-lived endogenic activity on even small satellites?**
- Satellite formation processes have produced diverse systems. Understanding the natures of these systems, and of the individual satellites, provides key constraints on the processes involved in their formation. Q1, Q2, Q3, Q4, Q6, Q7, Q10
- Available energy sources are critical to satellite histories. Coupled evolution of satellite systems, and tidal interactions in particular, are important long-term sources of energy that need to be better understood through exploration and modeling. Q4, Q6, Q7, Q10
- Among mid-sized satellites, Enceladus exhibits strong evidence for a sub-surface ocean; Rhea, Titania, and Oberon also potentially host interior oceans. Determining presence and natures of sub-surface oceans, esp. if liquid water is in contact with rock, is crucial to understanding satellite evolution and how materials are processed within them. Q4, Q6, Q7, Q10

Question 3:

- **What processes have shaped and continue to shape the satellites, and what controls which of the wide variety of observed processes occur?**
- Very diverse expressions of geologic processes, and in many cases, similar conditions and processes have led to extremely different expressions in landforms. Q6, Q7, Q10
- Cryovolcanism particularly difficult to identify -- perhaps simply rare, may also be challenging to interpret in the context of icy materials. Only definitive case is Enceladus. Intriguingly, Ariel has features strongly suggestive of extrusive viscous flows. Q4, Q6, Q7, Q10
- Impact crater distributions have implications for understanding solar-system evolution, projectile populations, temporal changes therein, and bombardment history throughout the solar system. Crater morphologies provide valuable probes of target subsurface structures and properties. Q3, Q4, Q6, Q7, Q8, Q10





Suggestions, additions, etc.
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