

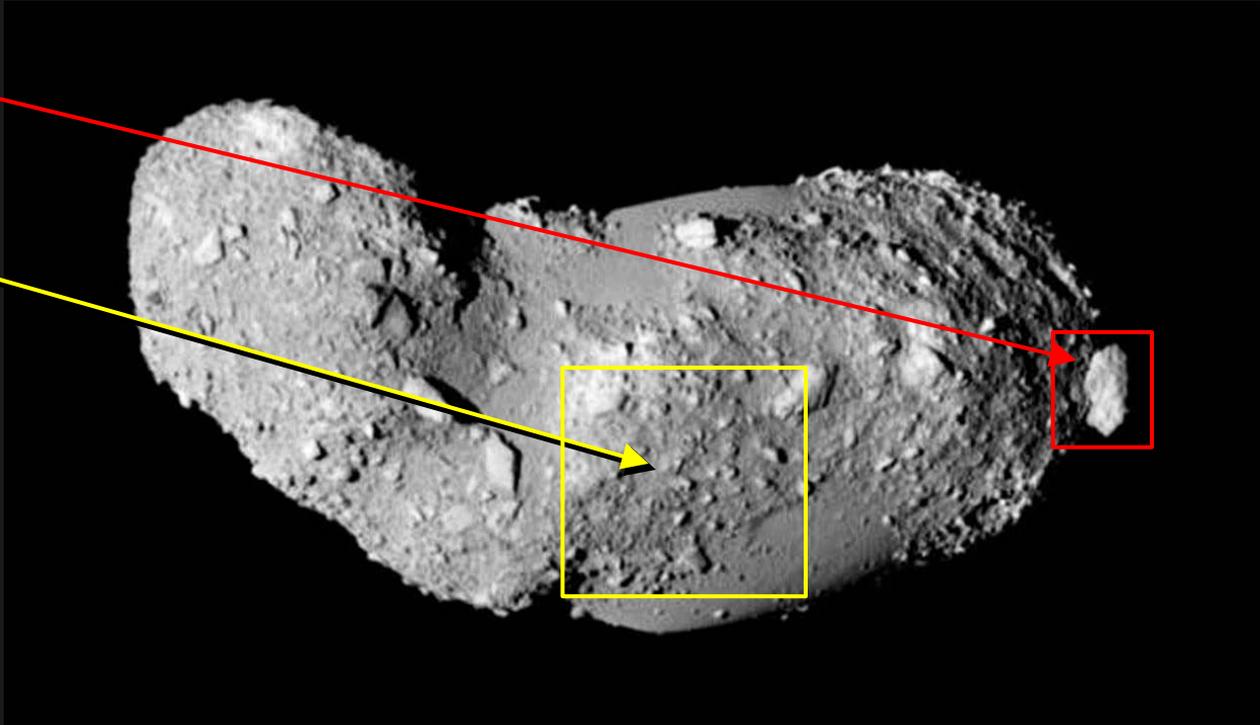
Asteroid 101 Presentation

Mike Delmonaco
Trevor Rosenlicht
Nicole LaReddola

Image 1 (Asteroid Itokawa)

Feature 1:
Boulder

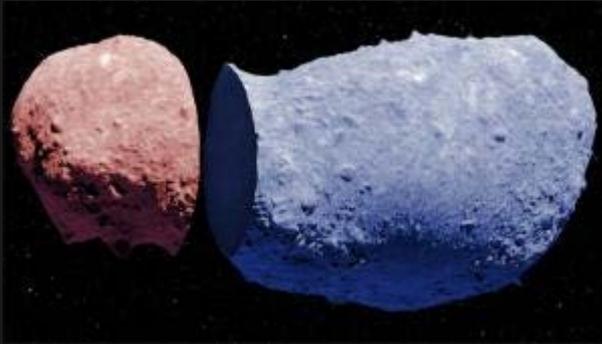
Feature 2:
Regolith
Fragments



Color key
Rubble:
Boulder
Regolith
Particles
Regolith
Fragments
**Domes and
Craters:**
Impact Crater

Background information on Asteroid Itokawa

Since Asteroid Itokawa is not dense in most areas, it does not have enough gravitational force to compact into one solid rock so it is classified as a rubble pile. It is peanut shaped from the combination of two smaller asteroids and it is a Mars-crosser asteroid because it crosses the orbit of Mars.



This image shows the two parts of Asteroid Itokawa. They were separated based on differences in density and composition. These two bodies collided, forming the new asteroid.

What geologic features are present?

Feature 1: Boulder

Feature 2: Regolith Fragments



How did they form?

Feature 1 formed from a small rock floating through space that was attracted by the gravity of the asteroid or stuck to it after arbitrarily colliding softly. Since it is still jagged and whole, you can tell it wasn't attached violently. The boulder itself was probably formed by dust in the solar system collecting. Feature 2 is Regolith Fragments. It is just a collection of small pieces of rock that collided with or landed on the asteroid forming a rough surface. These rocks could be from a collision not involving the asteroid that was captured by it or any number of dispersions of fragmented rocks. One other way could be the combination of the two bodies forming the current asteroid

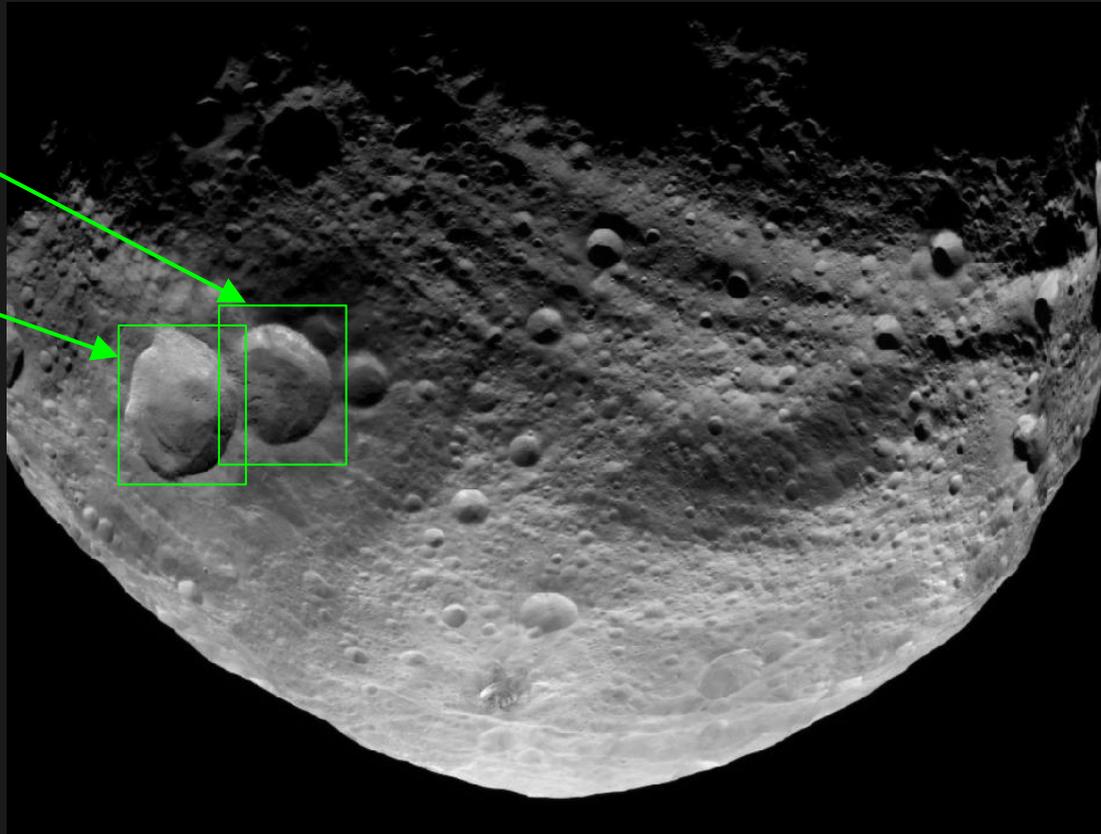
How old are they relative to each other and how do you know that?

We know how old things are relative to each other because of superposition. Superposition is basically using the positions of objects relative to each other to determine age. Superposition uses the idea that if something is placed on top of something else, that placed object is newer or younger to the whole object than what it was placed on because the first object had to be there to have something placed on it. Since Features 1 and 2 are both “placed” on the actual asteroid, it can be inferred that the asteroid is older than the two features. If the Regolith Fragments labeled are from the collision of the two main asteroid parts, it is likely older than the Boulder because the Boulder would not likely have existed in its current state through a collision like that so it would must have been placed after.

Image 2

Feature 1:
Crater 1

Feature 2:
Crater 2

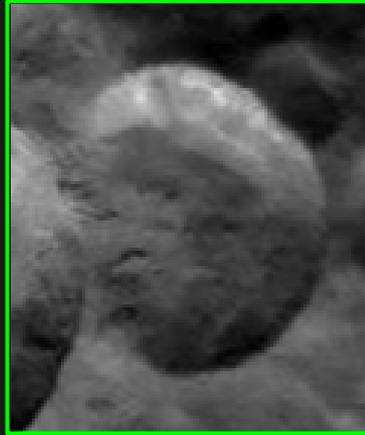


Color key
Rubble:
Boulder
Regolith
Particles
Regolith
Fragments
**Domes and
Craters:**
Impact Crater

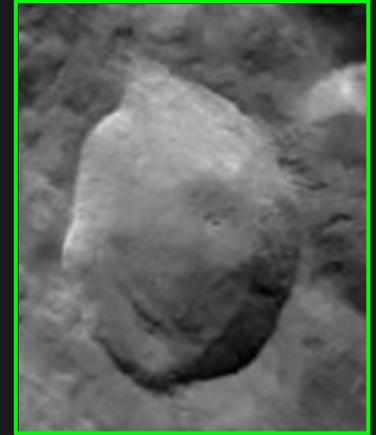
What geologic features are present?

Feature 1: Impact Crater

Feature 2: Impact Crater



Crater 1



Crater 2

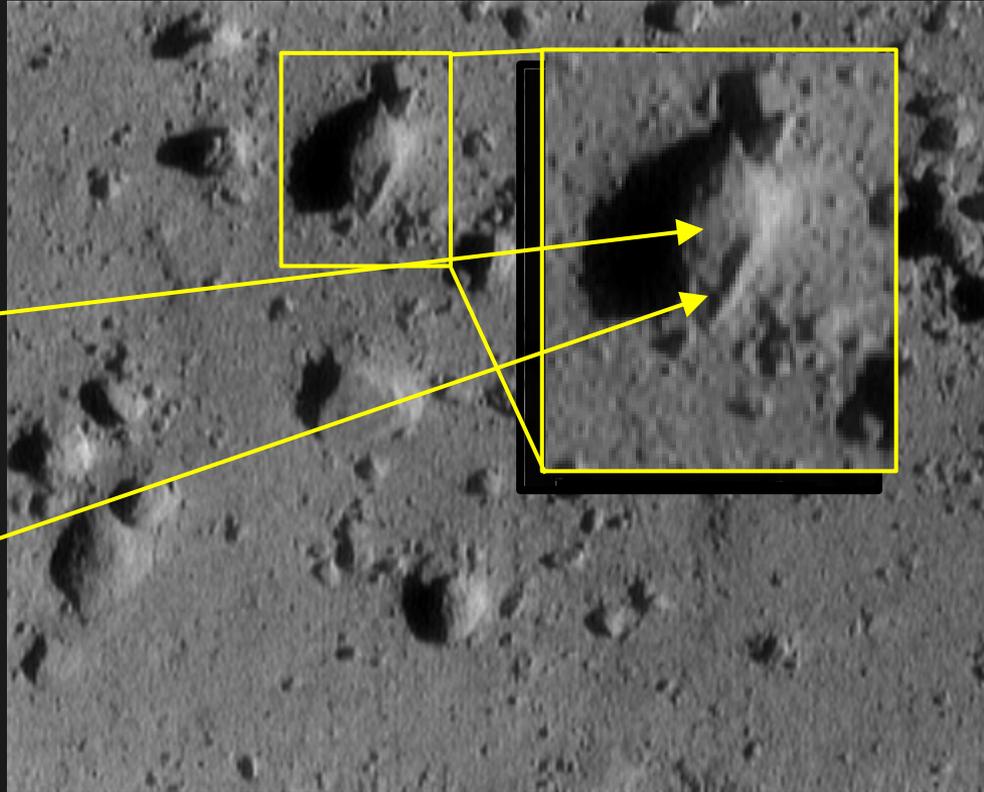
How did they form?

Both of these craters likely formed from the collision of a smaller body and this asteroid. This asteroid is much larger than whatever collided with it so it survived. The collision object could have been anything from a smaller asteroid to a large rock not given asteroid status.

How old are they relative to each other and how do you know that?

Using superposition, it can be inferred that the surface is the oldest feature because everything formed altering it. Then, crater 1 formed followed by crater 2. This can be deduced by looking at the area between the two craters. Crater 1's outer wall covers the outer wall of crater 2 showing that it formed on it.

Image 3



Feature 1:
Regolith Fragment 1

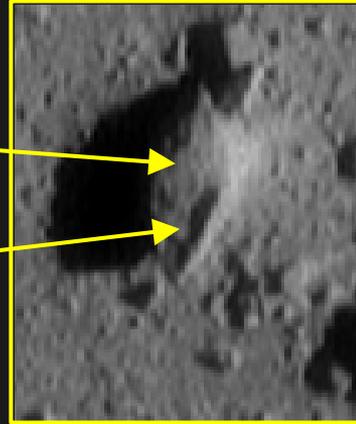
Feature 2:
Regolith Fragment 2

Color key
Rubble:
Boulder
Regolith
Particles
Regolith
Fragments
**Domes and
Craters:**
Impact Crater

What geologic features are present?

Feature 1:
Regolith
Fragment 1

Feature 2:
Regolith
Fragment 2



How did they form?

These Regolith Fragments could have formed in a number of ways. They probably were captured by the asteroid's gravity or they could have simply landed on the surface softly already having been on a collision course with it. Since it is jagged and not very weathered, it probably was not formed violently, but rather a soft landing on the surface.

How old are they relative to each other and how do you know that?

Since the Regolith Fragments landed on the surface, the surface is oldest.

Regolith Fragment 2 is on Regolith Fragment 1 so it is likely younger because it required the first one to be there to land on it. Overturning could have occurred moving the rubble around rendering superposition inaccurate. This is unlikely on a surface that is not active like that of an asteroid.