Your group has a plastic surface that represents the gravitational potential energy of a space station-Earth system as a function of the position of the space station relative to Earth. The height of the surface corresponds to the value of gravitational potential energy.

Interpret the Surface:

- Mark a point on the surface where the gravitational potential energy of the system is zero.
- If a one inch difference of height corresponds to an energy difference of 1 TJ, what is the gravitational potential energy of the system when the space station is at the blue circle?
- What is the difference in gravitational potential energy of the system if the space station moves from the blue circle to the red star?

Find Patterns: For each of the locations listed below, identify all other points on the plastic surface model with the same gravitational potential energy:

1. the blue circle
2. the red star
3. the green square
4. the point you marked in question 1.

What patterns are you noticing?
Describe an Orbit: Draw a dot on your whiteboard to represent the center of Earth. Draw a closed, elliptical orbit of the space station. Using the information in the plastic surface model, what happens to the gravitational potential energy as it moves around the orbit?

If the space station does not use its engines during the orbit so that the total energy is constant, what happens to the speed of the space station?
Generate a Graph: Using your whole whiteboard, sketch a large graph that shows how the gravitational potential energy of the system depends on the space station's distance from the center of Earth. Clearly label the axes of your graph. Be ready to show where you chose $U = 0$ and to explain your reasoning to your classmates.