**Unit Essential Question:** *What are the effects of an asteroid collision and how can we prevent a future one?*

You will be designing a solution to prevent the impending collision of the asteroid *Etiam* with Earth. After each task, you will return to the table below to organize what you learn as you go through the unit. By the end of the four tasks, you will have all this information to use for your culminating project. For each activity, be sure to include answers to **ALL** the questions provided.

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| Lift-Off Task: Asteroid Collisions | In order to develop a solution to an impending collision with the asteroid *Etiam*, we need to learn everything we can about the impacts of an asteroid collision.   * Summarize what you already know about collisions, including:   + Possible negative consequences.   + The types of methods humans use to prevent every-day collisions. |
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| Task 1:  An Ancient Collision | Today we learned that there has already been an asteroid collision in the past that had huge consequences. Use this ancient collision to justify your design solution:   * What evidence is there that this has happened before? * What were the effects last time? * How will you use the evidence to convince the public that it is important to protect Earth from another asteroid collision? |
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| Task 2: Contact Forces | In this task, you explored and studied how different contact forces and factors like mass help predict the motion of objects. Now, let’s use these ideas to start deciding how to deflect *Etiam* from its path towards Earth.   * How will *Etiam’s* large mass affect Earth? Use experimental evidence from the task as well as scientific ideas of mass, kinetic energy, and speed to back up your response. * How can Newton’s three laws help us predict and explain what will happen when *Etiam* hits Earth? * Record ideas you have on deflecting *Etiam*, using the following questions to help you:   + In the experiments, which solutions worked best?   + Based on the data, can you combine characteristics from the best solutions to create an even better one?   + How does each solution use contact forces and your understanding of mass and motion? |
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| Task 3: Gravity – A Non-Contact Force | In this task, you learned about another, less tangible force that also affects the motion of *Etiam*. Look back at the trajectory of *Etiam* from your Culminating Project handout and brainstorm where this force may help you prevent *Etiam’s* collision with Earth.   * Draw a diagram showing how gravity is currently influencing *Etiam.* * What other objects in our solar system might influence *Etiam’s* movements as it travels through space? Why? * Illustrate moments in *Etiam’s* trajectory where the asteroid might be impacted by other gravitational forces in a way that changes its trajectory.   + Explain how this works. |
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