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| 4th | **Topic**:  STEM Challenge: Defensive Designs | | | **Lesson #**  STEM Day  Date:\_\_\_\_\_\_\_\_\_\_ |
| **Standard**:  **S4L2. Students will identify factors that affect the survival or extinction of organisms such as adaptation, variation of behaviors (hibernation), and external features (camouflage and protection).**  a. Identify external features of organisms that allow them to survive or reproduce better than organisms that do not have these features (for example: camouflage, use of hibernation, protection, etc.).  b. Identify factors that may have led to the extinction of some organisms.  **Essential Question:**  How can I design an animal with defensive features that will help it survive? | | | | |
| **Vocabulary**:  Defense features survival | | | **Materials**:  --Background information within lesson  --AIMS Defense by Design Printables PDF  --Optional: Marshmallows/notecards for each group  --Construction materials- up to individual teacher | |
| **Instruction**: \*\*Adapted from AIMS activity Defense by Design  Day 1:  1. Share the following background information with students:  “Animals have adapted defenses to help them survive. These defenses can be behavioral or structural. Animals often feed in herds. When a predator attacks, the animals scatter and run in different directions. This confuses the predator and allows the animals to escape. Some animals never venture too far from their home in underground dens or thick vegetation and can quickly hide when danger approaches. Many animals have keen senses of sight, smell, and hearing so that they can detect danger and escape. Some animals have horns or antlers to fight off predators. Some animals rely on camouflage to blend in with their surroundings to hide from predators. A few animals are even poisonous or unpleasant tasting. Predators have learned to leave them alone. Some animals use chemicals that they spray from various parts of their bodies. A few animals rely on trickery and copy the defenses of other animals to protect themselves. Animal defenses are varied and each help in an animal’s survival in an environment.”  2. Compile a class list of defensive adaptations on the board.  3. Share the STEM challenge constraints with students. Allow students to begin planning/construction of their animals.  Day 2:  1. Allow students to complete construction of their animals and display them with a prominent number next to them.  2. Have students walk and assess which defensive characteristics each animals is displaying using the Defense By Design Printable PDF pg. 5 of 6. If time permits, allow groups to present their animals and explain what environment they would best thrive in and which predator(s) they would be most likely to avoid. | | | | |
| **Summarizer/Assessment**:  Allow finished groups to observe other groups work. Facilitate conversation about the different ways that groups chose to build and which ideas students like best, why?  Evaluate student construction based on the given criteria/constraints. | | **Lab Safety Precautions:**  Advise students NOT to eat any materials presented for construction in the science lab. Be sure materials are free of sharp edges before distribution and remind students to exercise scissor safety when manipulating materials.  **Classroom Teacher Connections**:  Lesson extension: Encourage students to return to class with their designs and create super predators with adaptations to help them hunt the animals created in the STEM lab.  **Teacher Notes:** | | |

Science Lab Lesson Plan

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4th Grade

Genetic researchers are looking for the best and brightest minds to help them research and create a new super-animal with defensive capabilities! They need you to combine some well known defensive adaptations to create an animal that would be almost immune to the threat of predators. Can you help them?

**Challenge**: Create a new animal with no more than 3 defensive adaptations to fend off predators.

**Criteria:**

1. The main body of your animal will be represented by a large marshmallow.

2. You may choose no more than 3 defensive adaptations to add to your animal.

3. You must construct your animal so that the defensive adaptations are noticeable and clear.

4. You must state on paper what kind of predators your animal could fend off WITHOUT listing it’s defenses.

5. Your animal must have a name.

**Constraints:**

You only have 1-2 days during your STEM time for construction!

You may only use the provided materials

You can’t take the materials home

You must work together as a group to finish the project!

**Materials:**

UP TO THE INDIVIDUAL TEACHER!

**PLAN: Here is or group’s ideas about how to build the new animal.**

**Build your animal and draw a picture of what it looks like:**

**How is your finished animal different from your plan?**

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**How could you make your animal better?**

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