**3rd Grade Interdisciplinary Lesson - Science and Literacy Connections in Elementary**

*What makes moving toy cars stop?*

*By Emily Miller*

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**Interdisciplinary Standards**

* Science Standard -

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| **3-PS2-1.** | **Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.** |

* CCSS ELA Standards

CCSS.ELA-LITERACY.W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CCSS.ELA-LITERACY.W.3.2.A Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.

* CCSS.ELA-LITERACY.W.3.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

CCSS.ELA-LITERACY.W.3.3.C Use temporal words and phrases to signal event order.

Materials:

1. Writing materials (e.g. science notebook)
2. Match box cars at least one per every 2 students.
3. Various materials around the room (e.g., tape, string, rulers, books, etc.)

**Background Knowledge**

Unbalanced forces

**https://study.com/academy/lesson/unbalanced-force-definition-example-quiz.html**

**Description of What the Class Does**

**Introduction**:

Introduce the Driving Question: *What makes moving toy cars stop?*

Solicit background knowledge. Ask the class the Driving Question, holding up one of the cars: “*What makes moving toys stop?*”

Ask for a suggestion, for what might make the car stop when you make it go. Take suggestions based on experience. And then have a student stop the car with their hand or a book.

Tell them that things that are moving change their motion when there is an unbalanced force applied to them.

Write down the Definition of Unbalanced Force: “An unbalanced force is something that changes the **motion** or **direction** of something moving.”

Ask the students what this might mean. And see if you can apply it to the event of the car stopping.

Draw the motion of the car and the unbalanced force of the hand stopping the car. Ask them how you would show the hand “pushing” against the car and applying a force and making it stop. Tell them that when you show events in science with a picture that show *how* the event happened, that it is then a model.

**Lesson**: Give the assignment: The student have to figure out in partnerships four (or more) ways to stop their car. Talk about what very different means. Are using two different books in the same way, very different. They can use anything around the room to make the matchbox cars stop.

**The rules are**: The partners need to 1. Have the same stopping ideas on their paper; 2. Put all materials back where they belong and, 3. both people in the partnership needs to come up with at least one idea.

Investigation: Let the students mess around with the cars, and support them thinking of *very different* ways to make them stop. (Ideas are, blowing on the car to make it stop, dropping a book on the car, making it roll over, using a ruler and balancing the car on the ruler to make it stop, etc.) If no student thinks of a way to make the car stop using a pull, encourage this thinking. Give the students about 30 minutes to investigate.

For each way they think of they need to **draw and write** how they made the car stop.

1. The picture and the writing need to be clear enough for the audience to understand it. (labeling can help)
2. The writing and the picture explain the event.

Explanation: Have students gather in the carpet to describe some of the ways they made the car stop. For some of the different ways, work with the students to draw the unbalanced forces that make the car stop.

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| Teacher Prompt: *How can we show this unbalanced force, and its effect in the model?* |

If a student shared their car stopping without “anything” stopping it, help the students understand that there are sometimes friction in the system and that it is also an unbalanced force.

**Wrap up**:

Free write: Have the students free write and draw in their notebook about the Driving Question: *What makes moving toy cars stop?*

If you want to extend this, possible ideas are: 1. Ask the students if they can think of how they would write and draw the force that made the car go, and then the one that made it stop, 2. Give the students a story: “Two partners were trying to make their car stop in a park by a lake. One student, by accident, had the car go fast in the water. Does it stop, if yes or no, can you draw your prediction?”

Possible extensions: Make a class book with well-written explanations of the different ways to stop a car. Decide on a common way to draw the forces and also the motion of the cars, so that they all use the same “language” in the models.

**Resources**

1. Obtaining and Evaluating and Communicating information: *Who will plant a Tree* by Jerry Pallotta
2. More Literacy extension: Read *the Carrot Seed*, *The Tiny Seed*, and *Seed, pop, stick, glide*, and discuss the features of the seeds. The Garden video by Frog and Toad.

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