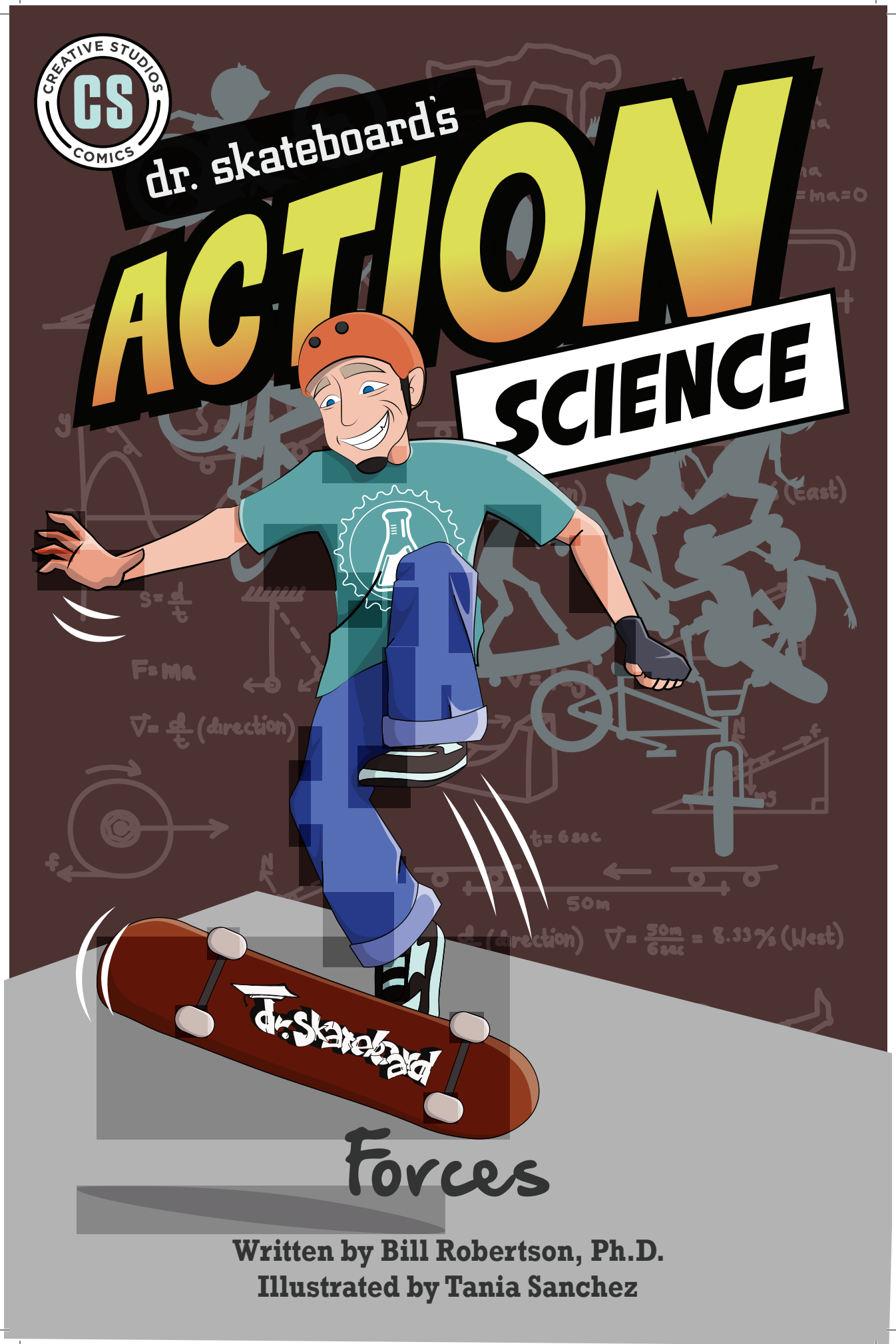
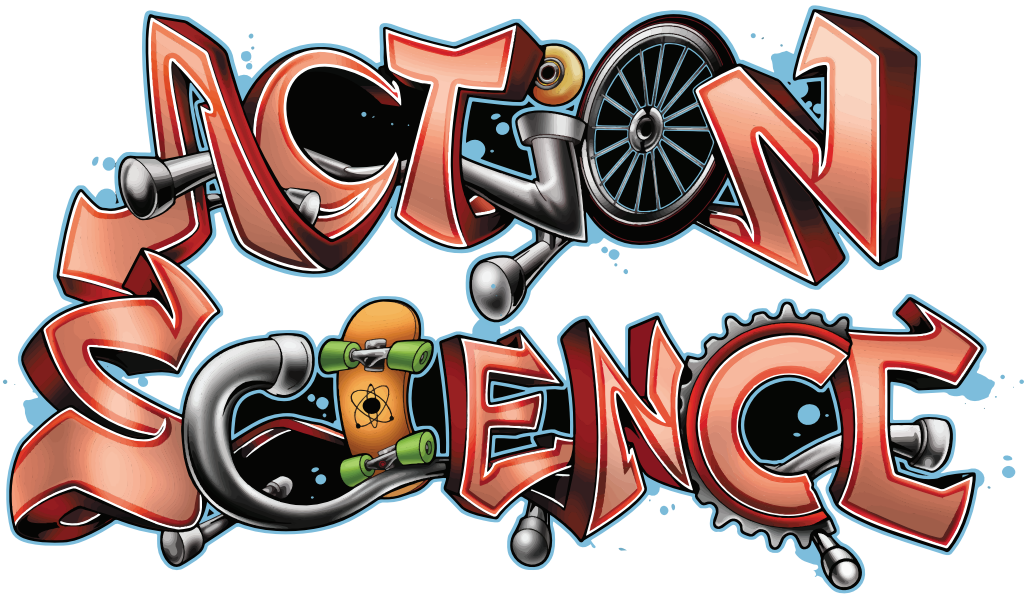

CREATIVE STUDIOS
CS
COMICS
dr. skateboard's
ACTION
SCIENCE
Forces
Written by Bill Robertson, Ph.D.
Illustrated by Tania Sanchez

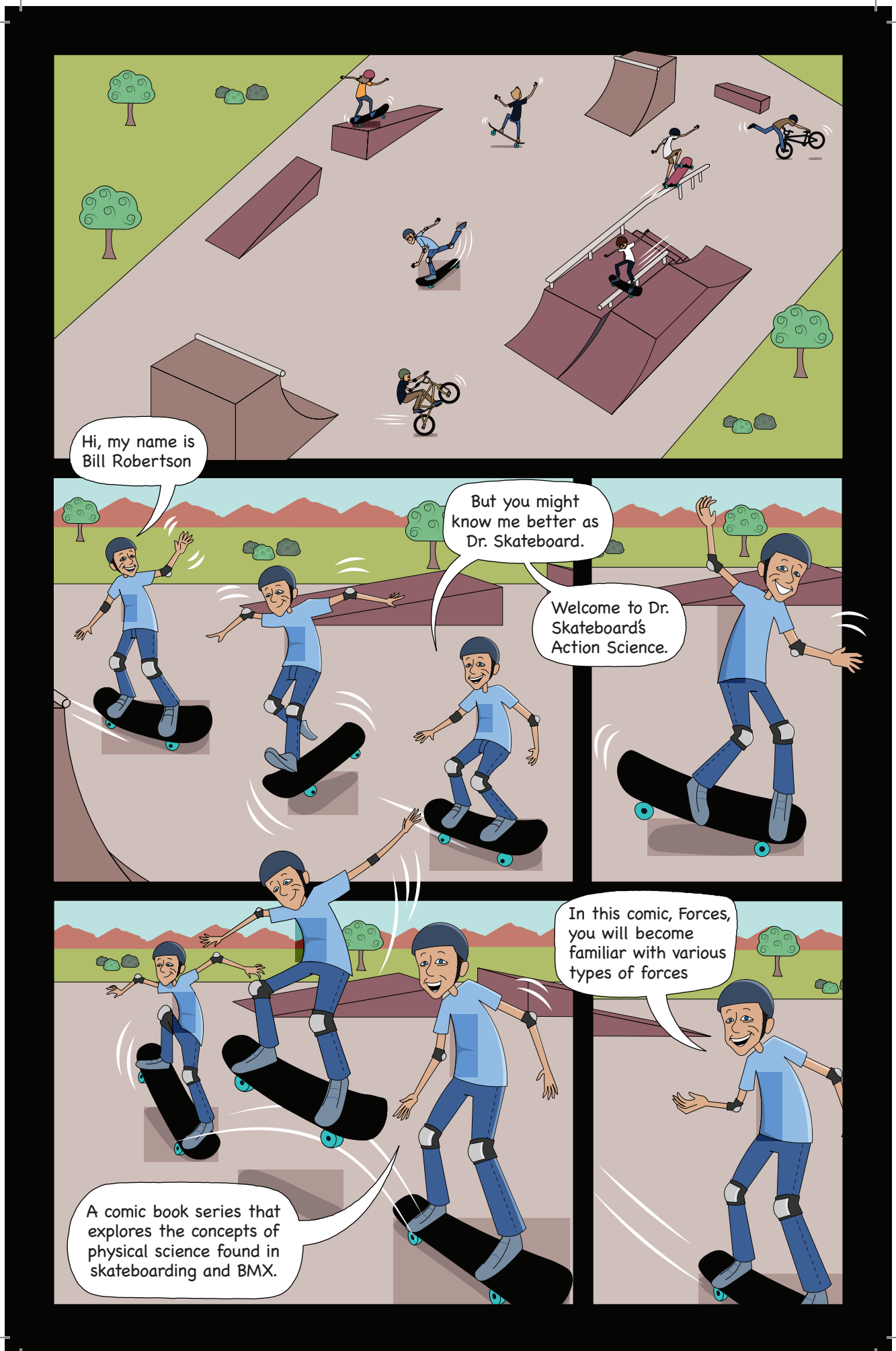


About Action Science

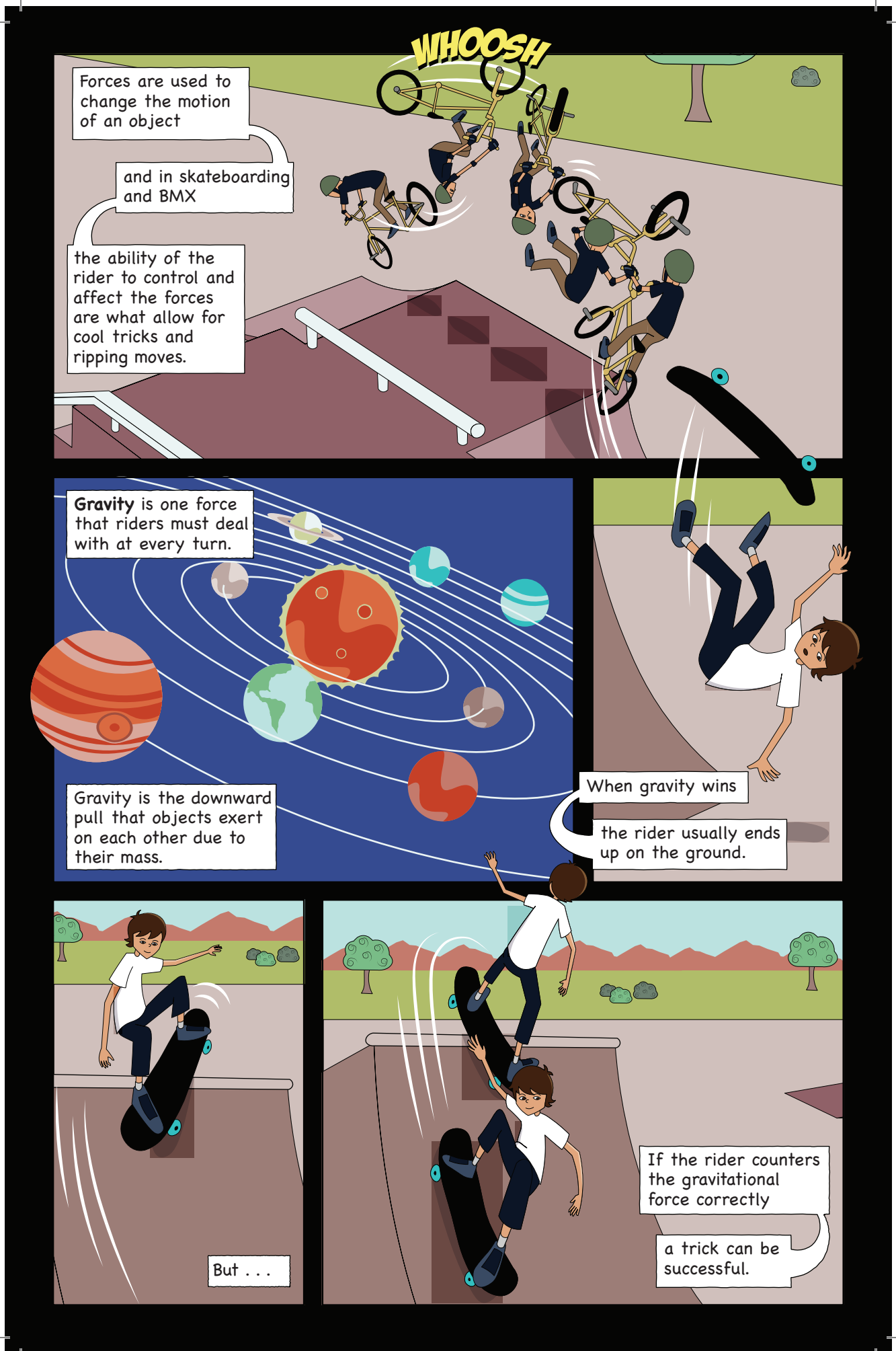
How can you get young people interested in science and mathematics? What efforts are there to integrate the experiences of middle school students into the things they need to do and learn in school? How can action sports, like skateboarding and bicycle motocross (BMX), be used to teach physics, algebra, data collection, and help students to grow in their engagement and motivation in science and mathematics? The answer lies in part to an approach I have termed as Action Science.

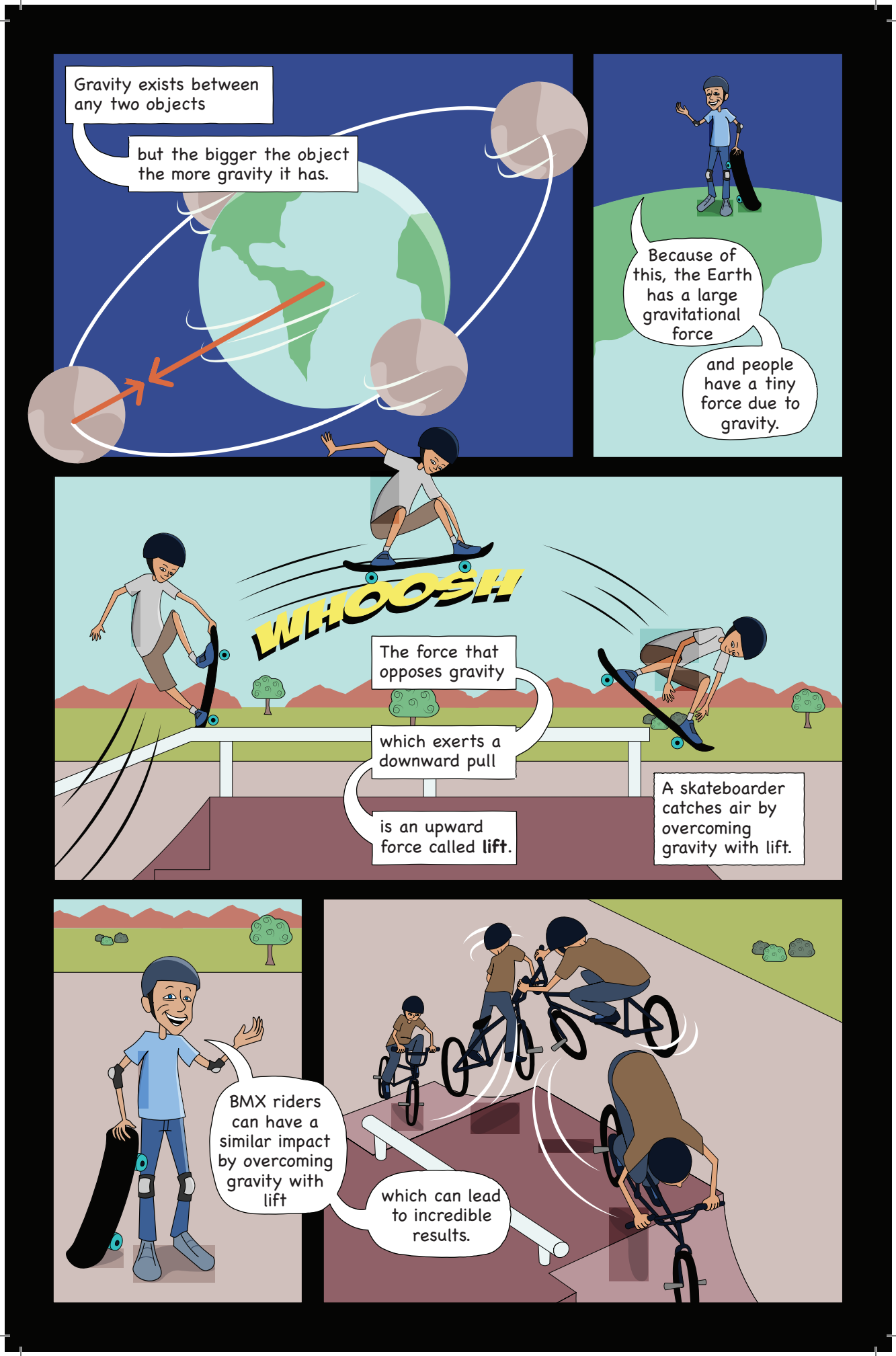
Action science is an example of the use of transformative educational strategies to enhance the study of science for K-16 students. The term "action science" can be defined as the use of familiar objects, circumstances and situations within the lives of students in order to explain specific concepts in science built around student interests, including action sports like skateboarding and BMX.

In schools, the approach to these topics is also done in very traditional manners that employ content delivery mechanisms that are often not put in relevant terms for the K-16 learner.


Hi, my name is Bill Robertson
But you might know me better as Dr. Skateboard.
Welcome to Dr. Skateboard's Action Science.
In this comic, Forces, you will become familiar with various types of forces
A comic book series that explores the concepts of physical science found in skateboarding and BMX.

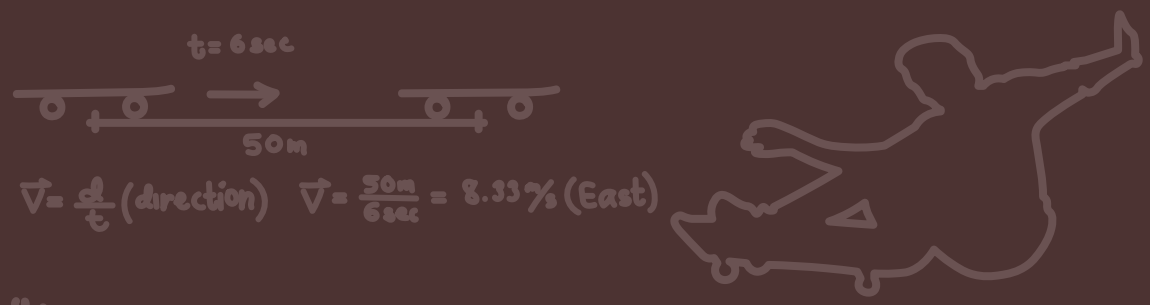

what they do and how
they help riders perform tricks and maneuvers on boards and bikes.
So let's get moving and learn about forces!
A **force** is any push or pull, and can be a helpful force
as in the way the wind will push a sailboat forward on the water.
WHOOSH
It can also be a hindering force
such as when a salmon is trying to swim against the current in a river.


WHOOSH
Forces are used to change the motion of an object
and in skateboarding and BMX
the ability of the rider to control and affect the forces are what allow for cool tricks and ripping moves.
Gravity is one force that riders must deal with at every turn.
Gravity is the downward pull that objects exert on each other due to their mass.
When gravity wins
the rider usually ends up on the ground.
But . . .
If the rider counters the gravitational force correctly
a trick can be successful.

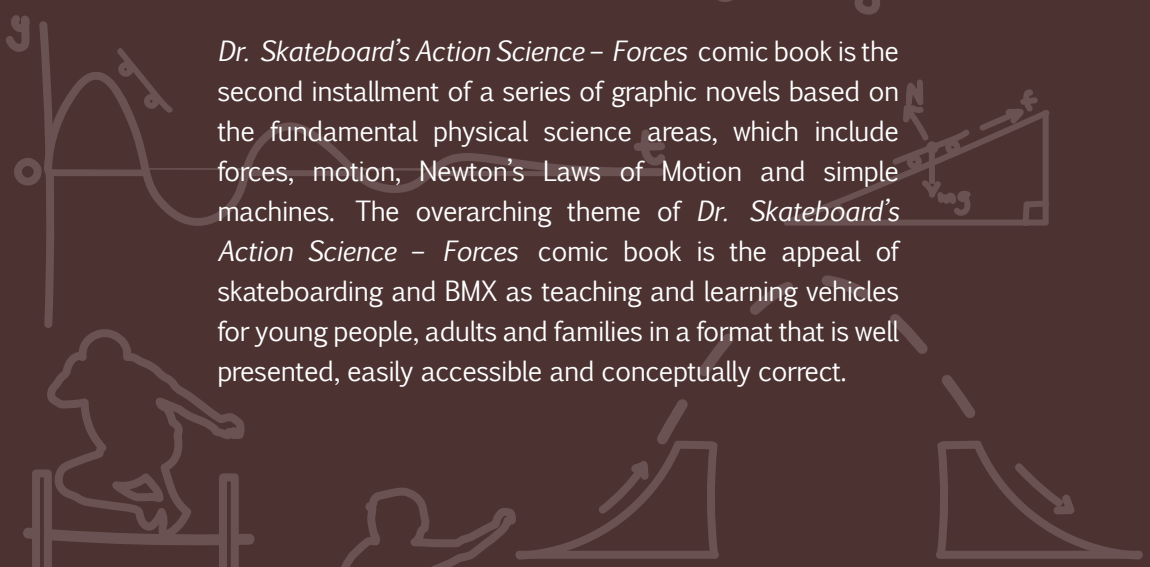

Gravity exists between any two objects
but the bigger the object the more gravity it has.
Because of this, the Earth has a large gravitational force
and people have a tiny force due to gravity.
WHOOSH
The force that opposes gravity
which exerts a downward pull
is an upward force called **lift**.
A skateboarder catches air by overcoming gravity with lift.
BMX riders can have a similar impact by overcoming gravity with lift
which can lead to incredible results.

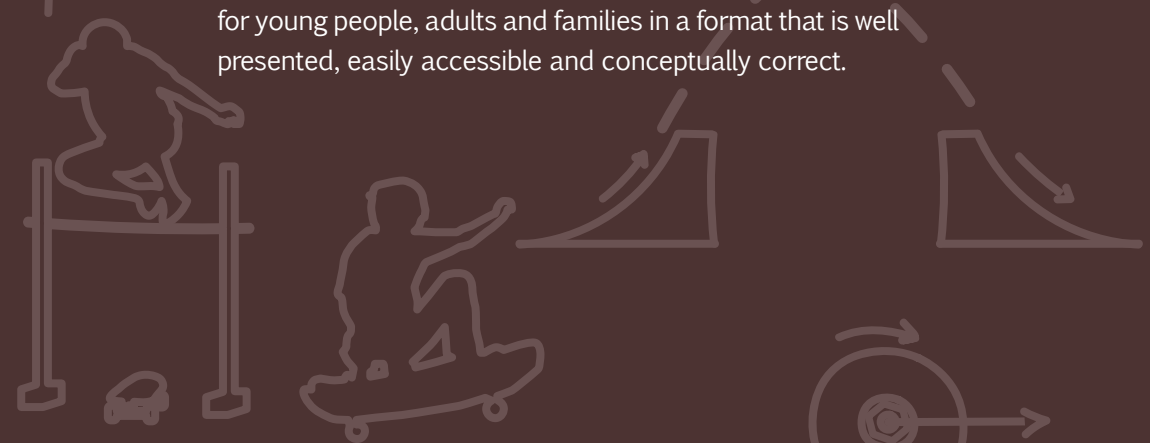
About Dr. Skateboard

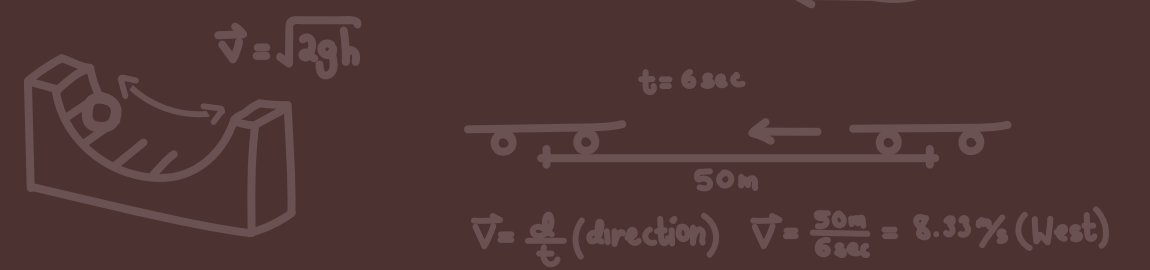
Dr. Skateboard is Bill Robertson, a Ph.D. in Education and a skateboarder for over forty years. Bill has done hundreds of demonstrations nationally and internationally in festivals, events and in academic settings. He has performed for thousands of students in elementary, middle, and high school levels throughout the United States, in Canada, Mexico and into South America. Bill has been an educator for over twenty–five years. His academic areas of expertise are science education, curriculum development and technology integration. He also teaches and does research in the areas of problem-based learning and action science.

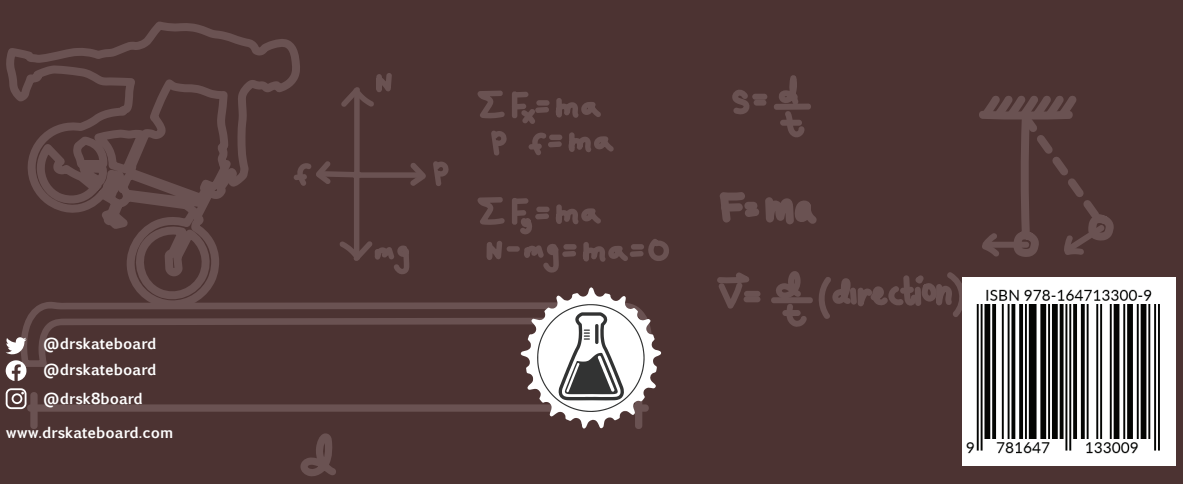


Dr. Skateboard's Action Science – Forces comic book is the second installment of a series of graphic novels based on the fundamental physical science areas, which include forces, motion, Newton's Laws of Motion and simple machines. The overarching theme of *Dr. Skateboard's Action Science – Forces* comic book is the appeal of skateboarding and BMX as teaching and learning vehicles for young people, adults and families in a format that is well presented, easily accessible and conceptually correct.









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