



# J&J EDUCATIONAL BOOTCAMP

Making Learning Big Fun!

STATES CURRENTLY  
ADOPTING THE  
NEXT  
GENERATION  
SCIENCE  
STANDARDS (NGSS)

Rhode Island

Kentucky

Kansas

Maryland

Vermont

California

Delaware

Washington

District of Colum-  
bia

Nevada

Oregon

Illinois

New Jersey



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## Science Misconceptions: Hampering Your Student's Success

Science misconceptions are often based on student preconceptions. It is therefore, important to begin each lesson by assessing prior knowledge and preconceptions. Conceptual growth can occur when the two are connected. When there is a disconnect, students tend to have a difficult time with association and therefore, learning does not take place. If these pre-established misconceptions are challenged, often times it is difficult for the student to give up what they previously believed. For example, there are many depictions in television and film of a prehistoric man living beside dinosaurs. Because this narrative is so heavily reinforced in the media, students often believe that coexistence



**MAKING LEARNING FUN!**

between humans and dinosaurs actually occurred. When simply told that prehistoric men and dinosaurs roamed the earth in different periods of time, a disconnect is made, and any interest previously held in that subject could wane. In order to combat this disconnect, it is important for teachers to make note of these preconceptions prior to the lesson in order to fully address them. Teachers should engage students and question their

knowledge of the lesson's content. Instructors should never assume that students have no preconcepts or knowledge pertaining to the subject they plan to teach. It is important to encourage students to express their preconcepts and use that as a base to introduce new concepts. From there, inform them of the inconsistencies between their misconceptions and the explanations grounded in fact. Because of this, students are able to challenge their own preconcepts and compare it with factual statements, ultimately assisting them with the learning process. In order for children to fully understand the world around them, they need to be allowed to explore the material and content. They need to be encouraged for discovering new sources of learn-

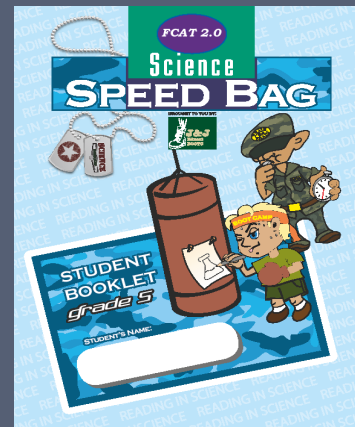
ing, and eventually, understanding. Teachers must be willing to provide an environment that is both appealing to their students and rich in information. In that, instructors will find that their students are more receptive, focused, and able to approach new concepts with enthusiasm.



SCIENCE  
REVIEW  
PRODUCTS  
(NGSSS)



Speed Bag  
Drawing Game  
and Review



LOOK INSIDE

## 25 Misconceptions in Elementary Science

**MISCONCEPTION 1** - Clouds are made of cotton, wool, or smoke.

**TRUTH** - A cloud is a large collection of very tiny droplets of water or **ice crystals**. Near the ground, the water droplets are usually in the form of an invisible gas called water vapor.

**MISCONCEPTION 2** - All light objects float; heavy objects sink.

**TRUTH** - Whether or not an object will float or sink depends on its density, not the size.

**MISCONCEPTION 3** - All metals are magnetic.

**TRUTH** - The only metals that are magnetic are iron, nickel, and cobalt. This includes any object that contains any of these metals such as, knives, spoons, and can openers.

**MISCONCEPTION 4** - The moon is a source of light.

**TRUTH** - The moon does not create its own light. We are able to see the moon because of the light that is reflected from the sun. If the sun were nonexistent, we would not be able to see the moon.

**MISCONCEPTION 5** - There is a full moon when the moon is between the sun and Earth.

**TRUTH** - A full moon exists when it is on the opposite side of the earth away from the sun.

**MISCONCEPTION 6** - Sound travels faster through gas.

**TRUTH** - Sound waves travel faster through solids because the molecules are tightly packed together, which help the sound waves jump from one molecule to another at a

**MISCONCEPTION 7** - The earth is flat.

**TRUTH** - Earth is considered an oblate spheroid, which is a revolving surface attained by rotating an ellipse

**MISCONCEPTION 8** - The earth, Sun, and moon are of a similar size.

**TRUTH** - The sun is actually larger than earth, and the earth is larger than the moon. We can get an idea of how far apart they are in size by comparing them to a basketball, ping pong ball, and a corn kernel, as the sun, Earth, and moon, respectively.



DEBUG  
NOW!



HAPPY  
TESTING  
LATER!



Benchmark  
Power Drill

Speed Bag  
Booklets

Relay Race  
Board  
Game

Vocabulary  
Fitness  
Game



**MISCONCEPTION 9** - The moon orbits the sun.

**TRUTH** - *The moon orbits Earth, the earth orbits the sun, and they both rotate on their own axes.*

**MISCONCEPTION 10** - The moon is only visible at night.

**TRUTH** - *The moon can be seen during the day. The only phases of the moon that cannot be seen during the day are the full moon (which is usually only visible at night) and the new moon (which is not visible from Earth at all).*

**MISCONCEPTION 11** - It is hotter in the summer because the earth is closer to the sun.

**TRUTH** - *Temperature changes have nothing to do with the distance of the sun from the earth, but rather the rotation of the earth's axis. The earth is tilted at a 23.5 degree angle. When Earth's north hemisphere is tilted towards the sun, it is summer in that region. As a result, it is hotter in summer months for northern*

**MISCONCEPTION 12** - Pluto is a planet.

**TRUTH** - *Pluto is considered a dwarf planet because it does not have a clear orbit around*

**MISCONCEPTION 13** - Humans are not animals.

**TRUTH** - *All living things are classified as an animal or plant. Humans are not plants therefore, they are animals. Specifically, they are mammals (which is a type of animal).*

**MISCONCEPTION 14** - Snakes do not have backbones.

**TRUTH** - *A characteristic of reptiles is that they have backbones, which is why they are called vertebrates, and they also have scales on their bodies. A snake is a vertebrate therefore, they must have a backbone.*

**MISCONCEPTION 15** - All animals are furry and have four legs.

**TRUTH** - *Not all animals are furry with four legs; Animals can be categorized as mammals, fish, and insects. Most children think of mammals (dogs and cats) when they say all animals are furry. However, a dolphin is an animal from the fish category and is not furry with four legs.*

**MISCONCEPTION 16** - Insects are not animals.

**TRUTH** - *Insects are indeed animals.*



**PRODUCTS  
GREAT FOR  
MATH REVIEW  
(CCSS)**

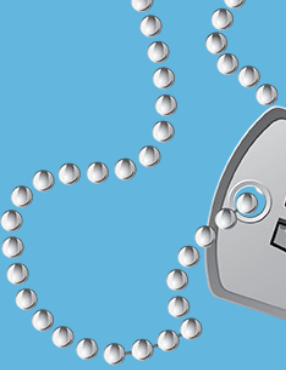


**Sergeant B Smart reminds you to...  
USE YOUR TIME WISELY**

**Math Rock Climbing Daily Review (CCSS) – 10 minutes each day  
OR  
Science Daily Poster Review (NGSSS) 10 minutes each day**







## SCIENCE REVIEW PRODUCTS (NGSSS)



Benchmark  
Power Drill



Relay Race  
Board Game



## VOCABULARY FITNESS (BINGO-LIKE GAME)

Regular play can significantly improve the vocabulary needed to comprehend questions on the Next Generation Sunshine State Standard



## 25 Misconceptions in Elementary Science continued...

**MISCONCEPTION 17** - Lizards and snakes are amphibians.

**TRUTH** - Lizards and snakes have scales on their bodies and have lungs at birth therefore, they are classified as reptiles. Amphibians do not have

**MISCONCEPTION 18** - The heart is on the left side of the chest.

**TRUTH** - The heart is located 2 inches from the left of the center of the chest, directly behind the breast-

**MISCONCEPTION 19** - Plants get food from the soil.

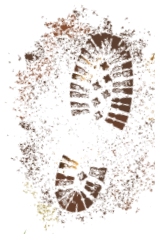
**TRUTH** - Plants get their food from water and carbon dioxide, which is converted into glucose (plant food).

**MISCONCEPTION 20** - The arrow in the food chain pointed towards an animal means "eats".

**TRUTH** - The arrow in the food chain pointed toward an animal means "is eaten by".

**MISCONCEPTION 21** - Polar bears grow thick warm coats because they live in a very cold environment.

**TRUTH** - There was a certain population of polar bears that had a variety of fur thicknesses. Once the climate turned colder, the bears with thicker fur had an advantage over the bears with thinner fur. Because of this, the bears with thinner fur either migrated to warmer regions or died from the cold. Consequently, polar bears have thick fur because their ancestors were the only ones that survived.



**MISCONCEPTION 22** - When an object burns, parts of it disappear and no longer exist.

**TRUTH** - When an object burns, it turns into carbon dioxide, water, and particulate matter (i.e. ash).

**MISCONCEPTION 23** - Heavy objects fall at a greater speed than objects with less mass.

**TRUTH** - If objects of various masses are dropped from the same height, they will hit the ground at the same time, unless air resistance interferes with one or more of the objects.



**MISCONCEPTION 24** - Rocks are always large.

**TRUTH** - A rock is defined as naturally formed aggregate of mineral matter constituting a significant part of the earth's crust. Therefore, a rock can be small or large. It is not classified as a rock based on its size.

**MISCONCEPTION 25** - Clouds are made of gas.

**TRUTH** - Clouds are made up of water droplets or ice crystals.



**PRODUCTS  
GREAT FOR  
MATH REVIEW**

**Rock  
Climbing  
Review**

**Smart to  
the Core  
Booklets**

**Benchmark  
Power Drill**

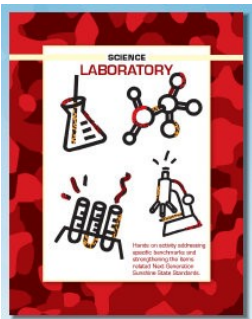
**Triathlon  
Board  
Game**

**Company  
Drill Game**

## Hands on Science is Imperative to Science Education

Hands on activities are so important to science education because many students are kinesthetic learners. Observation and experimentation is critical in a child's learning process. They learn and understand best from things they can see, feel, and manipulate. In order for a student to fully grasp a concept, teachers must be able to tie the hands-on activity with the states' benchmark and weekly objective. However, the problem that presents itself is when too much time is spent on the hands-on activity and not enough on actually making the connection to the standard and/or objective being addressed.

The Science Laboratory Booklet provides the perfect hands-on learning activities that maximizes students engagement time so that the time remaining can be spent to make the critical connections necessary for mastering the Nature of Science.





## Upcoming Events

### Math Boot Camp Free Trainings 2015

- September 7-11

Dade County, FL

Broward County, FL

Osceola County, FL

Lake County, FL

Orange County, FL

- September 17-22

Fulton County, GA

Wake County, GA

- September 24

Duval County, FL

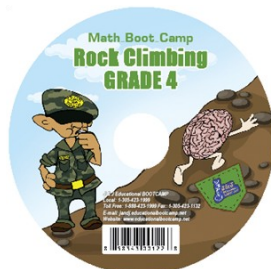


## Educational Boot Camp Issue 01 March 2015

### Math Products



**Smart to the Core  
Student Booklets**



**Rock Climbing - Daily  
Review (CD - Rom)**



**Benchmark Power  
Drill (CD - Rom)**



**Mathables (Foldable  
with Journaling Tasks)**



**Company Drill Board Game**



**Triathlon Board Game**

