SUITE SCIENCE

BOUNCING BALLS!

CLASS: 2nd – 4th	30 mins	SESE (SCIENCE) & PE

Learning Objectives - WALT (We are learning to…)

1. Investigate falling objects
2. Investigate energy and momentum

Curriculum links Science & PE

- **Energy and Forces** – falling objects
- **Games** – Develop and practice a range of ball handling skills.

Teaching Methodologies

- **Talk and Discussion** - listening, questioning
- **Collaborative/Cooperative Learning** - group work
- **Active Learning** – Hands on learning experience with real life examples.
- **Skills through Content:** observing, predicting, describing, recording, classifying.

Equipment and important notes for Tutors:

- Soccer balls
- Basketball (optional)
- Tennis balls
- Safety goggles
- Mini whiteboards and marker

Safety:

- Make sure the children wear safety goggles in case the tennis ball hits them
- Make sure they are in a safe area and delicate equipment is put away
- Children may get excited during this activity so make sure they listen and obey rules (e.g. – no running in small spaces)

Make sure to incorporate the scientific process steps throughout the lesson. Establishing a sense of familiarity with the students on these will improve their scientific thinking as well as instilling the framework of future lessons. Remember to ask trigger questions and be inclusive, reminding them that science is all about asking what we don't know!

Introduction:

In this experiment the children can learn about energy and the conservation of momentum. Energy is constantly changing forms and transferring between objects. The amount of momentum an object has depends both on its **mass** and **how fast it is going.** It can be thought of as "mass in motion". In a collision between two objects, momentum can be transferred from one object to the other, yet the total momentum of the system must stay the same (conservation of momentum).

In this experiment the conservation of momentum is demonstrated in a fun interactive way for the children.

Experiment:

Set up: 5 mins
Have the children split up into groups of three and hand out the safety goggles. Make sure they are in a safe area. Hand out the whiteboards and markers if available. Use a pencil and paper if not.

Activity 1: 10 mins
Hold up a soccer ball for the class and ask them "***What will happen if the ball is dropped from shoulder height, will it bounce higher, or lower, or back to the same height? ".*** Have the children to write down their predictions and then test the result in groups.
Explain that the ball bounced lower as some of the energy was transferred into the floor as it bounced and it lost *momentum,* meaning it was unable to return to its original height.
Get the class to repeat the exercise with the tennis ball again ensuring that they make a prediction first.

Activity 2: 10 mins
Now ask the class what will happen if we drop the two at the same time. Which will bounce higher? Have them write down their predictions and test the results again**, remember to work scientifically**.
Next, ask the class what they think will happen if the tennis ball and soccer ball are dropped at the same, with the tennis ball *on top* of the soccer ball. Have them write down their predictions and test the results.
Explain that the energy from the soccer ball transferred to the tennis ball & caused it to bounce really high!
Let the children explore different combinations of balls and have them try to explain the results.

Demonstration 1: 5 mins
If you have time and if weather permitting, demonstrating this with a tennis ball and basketball outside may be more fun. If you decide to do this make sure you are in a wide, open space and that the children stand far back.

Explanation:
If the tennis ball bounces off the top of the basketball, then it bounces high into the air – approximately nine times as high as previously.

This is a demonstration of conservation of momentum. Some of the momentum from the basketball is transferred to the tennis ball, thereby causing the tennis ball to bounce higher.

There are also other reasons why the ball bounces higher, such as the different sizes, elasticity and air resistance of the two balls.

Athletes and sports players can kick and throw a ball really high and fast because their **muscles** have been trained and built to hit the ball with more energy. If you keep practicing, you can be the same!

Reflect over your WALT goals and have the children reflect over what they learned before they leave the class!

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