



**IMPORTANT:**

Read all directions before proceeding

## **SESA TECH CHALLENGE 1**

### **Building the Best Launcher**

**OVERVIEW:** This presentation consists of a challenge in which students must work together to create a table tennis ball launcher using only the materials provided

**OBJECTIVE:** To encourage higher level thinking skills, realize the importance of creativity and technology, and develop the attitude of being a team player

#### **SCIENCE INQUIRY AND APPLICATIONS:**

During the years of PreK to grade 4, all students must develop the ability to:

- \*Plan and conduct simple investigations
- \*Communicate about observations, investigations, and explanations
- \*Review and ask questions about the observations and explanations of others.

During the years of 5-8, all students must develop the ability to:

- \*Design and conduct a scientific investigation
- \*Develop descriptions, models, explanations, and predictions
- \*Think critically and logically to connect evidence and explanations

**GRADE LEVEL:** 3-8

**TIME:** 45-50 minutes

**VOCABULARY:** Technology, challenge, competition, momentum

**MATERIALS:** Per group of 5-6 students

#### **Large Envelope Containing:**

- 2 medium rubber bands
- 6 sheets of copy paper
- 4 drinking straws
- 4 craft sticks
- Roll of scotch tape
- Table tennis ball
- Scissors
- Poster board

#### **Optional:**

- Stopwatch
- Masking Tape

**DEVELOPED BY:** BP New Zealand

## PROCEDURE:

Discuss the term technology. Technology is a scientific method of achieving a practical purpose. Technology provides objects necessary for human sustenance and comfort. Ask students to name examples of technology that we have become dependent on in everyday living. (Microwaves, cordless telephones, cell phones, computers, video games, iPods, dvds, etc.)

Discuss the importance of teamwork. Today, the students are going to become teams of scientists who are working together to build a device which will launch a table tennis ball into the air to stay airborne as long as possible, using only the materials provided.

Make students aware of several conditions before they begin working:

The device must be portable and is not to be taped to the floor.

The ball must be launched solely by the energy stored in the rubber band.

It must not be thrown and must be released from the floor.

The person releasing the ball must have their elbow, forearm, or hand in contact with the floor.

Divide the students into groups of 5 or 6. Students will be given 30 minutes to build their devices. Encourage students to test their devices many times before the deadline as each team will only get one minute to set up for firing and only one firing attempt.

As students work, circulate to each group to see how they are progressing. Give them several time reminders. (You have 10 working minutes, etc.)

When time is called, each group will take turns launching their device from a central location. The launch will be timed from the moment the ball leaves the launcher until the time the ball hits the floor. You may wish to record the times on a sheet of paper, chalkboard, etc. Sheets are provided for each student if you choose to give students experience in recording their own data.

## CLOSURE:

Announce the "winning" team. Point out that we are all winners because we used valuable teamwork skills to accomplish our ball launcher prototypes. Discuss what the students learned about the importance of teamwork.

Talk about how scientist have developed their problem solving skills and higher level thinking skills in order to be on the cutting edge of technology. Impress upon the students that every one of them has the capacity to become a scientist.

# SESA TECH CHALLENGE #1

## Building the Best Ball Launcher

### TASK:

To build a device which will launch a table tennis ball into the air to stay airborne as long as possible, using only the materials provided

### CONDITIONS:

The device must be portable and not taped to the floor.

The ball must be launched solely by the energy stored in the rubber band and released from the floor, desk, or table. **THE BALL CANNOT BE THROWN!**

The person releasing the ball must have their elbow, forearm, or hand in contact with the floor, desk, or table.

Students will be given 25-30 minutes to build their devices.

There will be 1 minute to set up for firing and only **ONE FIRING ATTEMPT WILL BE MADE!**

### JUDGING:

**Launches will be judged based upon the time the ball is in the air**

Group/Team	Time of Flight
Group 1	
Group 2	
Group 3	
Group 4	
Group 5	
Group 6	
Group 7	
Group 8	
Group 9	
Group 10	
Group 11	
Group 12	
Group 13	

# **SESA TECH CHALLENGE #1**

## **Building the Best Ball Launcher**

### **EXTENSION:**

If time allows, have students go back to the designs and come up with a new enhanced version of their ball launchers. Give them two minutes for discussion of revisions. Then, give them five minutes to reconstruct. Redo the launch with the new models, record results, and discuss conclusions. How did the changes affect the flight of their ball? Did it make it better or worse? Explain how technology does not always advance the performance of the prototype the first time and those scientists have to go back and forth from design to test and back to design until the product tested is enhanced and performance is improved to match a desired outcome.

### **RESULTS: (Trial 2)**

#### **Amount of time the ball was in the air per team**

<b>Group/Team</b>	<b>Time of Flight Trial 2</b>
<b>Group 1</b>	
<b>Group 2</b>	
<b>Group 3</b>	
<b>Group 4</b>	
<b>Group 5</b>	
<b>Group 6</b>	
<b>Group 7</b>	
<b>Group 8</b>	
<b>Group 9</b>	
<b>Group 10</b>	
<b>Group 11</b>	
<b>Group 12</b>	
<b>Group 13</b>	