PREFACE

"Study the science of art. Study the art of science."

Leonardo Da Vinci

STEAM is an educational discipline that aims to spark an interest and lifelong love of the arts and sciences in children from an early age. Science, Technology, Engineering, the Arts and Math are similar fields of study in that they all involve creative processes and none uses just one method for inquiry and investigation. Teaching relevant, in-demand skills that will prepare students to become innovators in an ever-evolving world is paramount, not only for the future of the students themselves but for the future of the world.

STEAM empowers teachers to employ project-based learning that crosses each of the five disciplines and fosters an inclusive learning environment in which all students are able to engage and contribute. As opposed to traditional models of teaching, educators using the STEAM framework bring the disciplines together, leveraging the synergy between the modeling process and math and science content, for example, in order to blur the boundaries between modeling techniques and scientific/mathematical thinking. Through this holistic approach, students are able to exercise both sides of their brain at once.

An important part of this educational approach is that students who are taught under a STEAM framework are not just taught the subject matter but they are taught how to learn, how to ask questions, how to experiment and how to create.

The goal of this guide is to provide instructional tools in line with the National Curriculum of Pakistan, and it will be useful for teachers of students in all grades. It presents a teaching approach that encourages the active participation and involvement of students in the learning process, with an appropriate balance between thinking and hands-on activities. Sometimes students will be engaged in discussion, and if teachers use questioning effectively, it can improve their students' thinking and communication skills.

To make the guide user-friendly, simple step by step instructions are provided.

A total number of periods is also suggested for each unit, but the amount of time needed to complete each unit or activity may vary according to its degree of difficulty and the abilities and skills of the students. Teachers can adjust the times to suit their particular needs and context. Advanced preparation and clear instructions by teachers will help to minimize classroom management problems.

All materials suggested for the activities should be easily available at low/no cost: alternative materials can be substituted if necessary.

HOW TO USE THIS GUIDE

Following the simple guidelines can help you get most out of these lesson plans. However, as all teachers know, in order to deliver the best lessons, you should be thoroughly familiar with the subject matter before you plan your lessons.

1. Always read the lesson plans thoroughly before the class to maximize confidence and command over your teaching. It will also enable you to modify in advance the plans to suit the needs of your particular students.

2. Collect and test all the materials listed in the plan before the lesson in order to obtain the required results. This will also minimize classroom management problems.

3. Instead of giving your input directly, introduce the key vocabulary using the glossary or dictionary. Involve the students in exploring the meanings of the key vocabulary using the glossary and if any meaning is not there, ask them to look up the meanings in a dictionary. You can also prepare flash cards for the new terms and display them on the walls. Before starting your lesson, ask the students to read these words aloud and share their meanings. This will help your students improve the pronunciation of the new scientific terms and their fluency in using these terms in discussion of the topics.

4. Before any activity, give clear instructions about what, how, and why they are going to do it.

5. Each additional worksheet has been coded according to the following criteria.

STE. 2. 1. 4

| Subject | Grade | Term | Number |

6. The concept of STEAM education is new for everyone. If a child takes longer time than you had anticipated, adjust accordingly. Always be appreciative of the work done in class.

We hope that this guide will prove useful in making the learning and teaching something to be looked forward to and enjoyed by teachers and students alike.

IQRA ZAHID

DEPARTMENT OF ACADEMICS

THE NEXT SCHOOL

THE NEXT SCHOOL

DAILY LESSON PLAN

Class: 2   **Term 2**   **Lessons 1 and 2**

Project: Learn to program by writing code for your friends: **My Robotic Friends**	**Duration**
	70 min

Learning Objectives: At the end of the lesson, students will be able to
- Work collaboratively in small groups to create something together
- develop joint focus, sense of sharing, and reinforce positive behavior and social contact.

Teaching Objectives: Teacher will
- Help children develop their mathematical skills, spatial awareness and encourage them to solve problems and come up with new ideas.
- Help children to achieve a sense of accomplishment, pride and build on their self-confidence and self-belief

Skills involved:

Thinking skills · Problem Solving · Communication · Self-management

Resources required:

· Computer or Laptop

https://youtu.be/uBZpd6zGVFI

Instructions:

Warm up: Gather all the students and show them video: **Intro to Code Studio**

Discuss the basic rules of the lab and ask them to start the puzzles

https://studio.code.org/s/coursec-2021/lessons/3/levels/2

Challenge: Programing with angry Bird (6 puzzles in each class)

Step 1: For this puzzle, drag all of the blocks together and click "Run" to watch it go.

Step2: Drag an extra "Move forward" block out of the toolbox to finish your code.

Step3: There is one extra block that is going to cause the bird to crash.

Throw it away by unhooking it from the grey blocks and dragging it back to the toolbox.

Step 4: "Trace the path and lead me to the silly pig."

Step 5: Avoid TNT or feathers will fly!

Step 6: Continue doing all the puzzles and print the certificate of the student and give them at the end of the activity.

Evaluation/Reflection:

_____   _____

Signature of the teacher   Signature of the Head/Coordinator

THE NEXT SCHOOL

DAILY LESSON PLAN

Class: 2   Term 1   Lessons 3 and 4

Project: Real-life Algorithms: **Plant a Seed**	Duration
	70 min

Learning Objectives: At the end of the lesson, students will be able to
- Decompose large activities into a series of smaller events
- Arrange sequential events into their logical order

Teaching Objectives: Teacher will
- Gave them the idea that it is possible to create algorithms for the things that we do everyday
- Make sense of problems and persevere in solving them.

Skills involved:

Thinking skills · Problem Solving · Communication · Self-management

Resources required:

Computer or Laptop

https://www.youtube.com/watch?v=icVRxFr39AU&list=PL2DhNKNdmOtqBgWyF5kmy2oPh0U-Zfv2G

Instructions:

Warm up: Ask your students what they did to get ready for school this morning.

Write their answers on the board

If possible, put numbers next to their responses to indicate the order that they happen

If students give responses out of order, have them help you put them in some kind of logical order

Point out places where order matters and places where it doesn't.

Challenge: In this activity, we will create an algorithm to help each other plant a seed!

Step 1: Cut out the steps for planting a seed from the **provided worksheet.**

Step 2: Work together to choose the six correct steps from the nine total options.

Step 3: Glue the six correct steps, in order, onto a separate piece of paper.

Step 4: Trade the finished algorithm with another person or group and let them use it to plant their seed!

Step 5: Open the given link and start the algorithm

https://studio.code.org/s/course1/lessons/6/levels/2

FILL POT WITH SOIL   POKE HOLE IN SOIL   PUT SEED IN HOLE   ?   WATER POT   PUT POT IN SUNLIGHT

Evaluation/Reflection:

_____   _____

Signature of the teacher   Signature of the Head/Coordinator

THE NEXT SCHOOL

DAILY LESSON PLAN

Class: 2   Term 2   Lesson 5 and 6

Project: **B**lowing up balloons with CO_2**: Balloon baking soda science activity**	Duration
	70 min

Learning Objectives: At the end of the lesson, students will be able to
- Learn about gas and chemical reactions by discovering how to inflate a balloon using baking soda and vinegar.

Teaching Objectives: Teacher will
- Explain the basics of reaction between bases and acids
- Help the children participate in collaborative conversations about the topic

Skills involved: Thinking skills · Problem Solving · Observation skills · Self-management

Resources required: Baking Soda(2 teaspoons), Vinegar(half bottle)

Instructions:

Warm up: Ask the student to guess what you think are chemical reactions? Why do they take place?

Now tell them the science behind this balloon baking soda experiment, is the chemical reaction between the base {baking soda} and the acid {vinegar}. When the two ingredients mix together the balloon baking soda experiment gets its lift!

That lift is the gas produced from the two ingredients is carbon dioxide or CO_2. As the gas tries to leave the plastic container, it goes up into the balloon because of the tight seal you have created. Because the gas has nowhere to go and is pushing against the balloon it inflates it! Similarly, we exhale carbon dioxide when we blow up balloons.

Challenge:
- Blow up the balloon a bit to stretch it out some.
- Use the funnel and teaspoon to add baking soda to the balloon. Started with 2 teaspoons and added a teaspoon for each balloon.
- Fill the container with Vinegar halfway
- When balloons are all made, attach to containers making sure you have a good seal!
- Lift up the balloon to dump the baking soda into the container of vinegar
- Watch the balloon fill up
- To get the most gas out of it, swirled around the container to get it all going!
- Go ahead and use a sharpie to draw emojis, shapes, or fun pictures on your balloons before filling them with baking soda.

BALLOON CHEMISTRY

Evaluation/Reflection:

_____   _____

Signature of the teacher   Signature of the Head/Coordinator
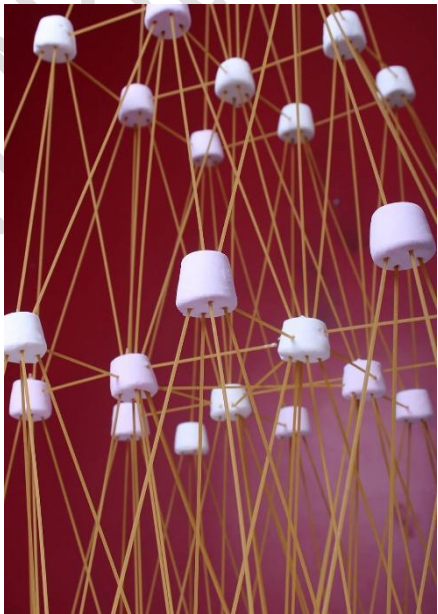
THE NEXT SCHOOL

DAILY LESSON PLAN

Class: 2   Term 2   Lesson 7 and 8

Project: Build the tallest spaghetti tower that can hold the weight of a jumbo marshmallow: **Spaghetti Tower Challenge**	Duration
	70 min

Learning Objectives: At the end of the lesson, students will be able to
- Work collaboratively in a small group to create something together.

Teaching Objectives: Teacher will
- Help children to achieve a sense of accomplishment, pride and build on their self-confidence and self-belief

Skills involved:
Thinking skills · Problem Solving · Communication · Self-management

Resources required:
20 sticks of dry spaghetti,1 yard or 3 feet of string,1 yard or 3 feet of tape,1 jumbo marshmallow

Instructions:
Warm up: Ask the student to guess how they breath? How do plants take oxygen and release carbon dioxide?

Challenge: Build a tower of spaghetti noodles that will hold a jumbo marshmallow. Make the tallest tower possible from the materials supplied. The marshmallow must be able to sit on top without falling off.

STEP 1: Share design ideas, discuss structures and strength, and even sketch ideas before you begin.
STEP 2: Build your design.
STEP 3: Make the tallest tower possible from the materials supplied.
STEP 4: When students are done, ask them to build different structures according to your choice.

Evaluation/Reflection:

_____   _____

Signature of the teacher   Signature of the Head/Coordinator