Group: 3 (Force, Motion and Energy)

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Topic: Understanding How Forces Can Change the Shape of Objects.

Learning Competency/ies:

Determine how forces can change the shape of objects such as when they are pushed, pulled, stretched, bent, twisted, or squeezed;

Application of Science Pedagogies

A. Inquiry-based learning approach

Steps:

1. Question & Plan

Essential Question: how do different types of forces affect the shape of objects?

Specific Questions:

- What are the different types of forces that can act on an object?
- What can happen to the shape of an object when force is used?
- Are the changes in shape temporary or permanent? Why?
- Why is it important to understand how forces affect materials in daily life?
- What happens if we use more force?

2. Research & Discover
   Answers:

Essential Question: Different forces can change the shape of an object by bending, compressing, stretching, or deforming it. Applied forces, whether contact or non-contact, can cause these shapes to change depending on the direction of the force and the magnitude, as well as the material's properties.

Specific Questions:

- The different types of forces are push, pull, twist, bending, and compressing.
- When force is applied to an object, it can change its shape by bending, stretching, or compressing. It also depends on the object; some objects may be flattened.
- Changes in the shape can be either temporary or permanent, depending on the material and the force applied. Some materials like rubber return to their original shape (elastic), while others like clay or metal may keep the new shape (plastic deformation).
- It helps us comprehend how objects move, can change, and interact with each other, enabling us to build better machines, design safer structures, and solve various problems.
- The shape changes more, or the objects might even break.

References;

https://www.scribd.com/presentation/502684157/3rd-quarter-force#:~:text=of%20An%20Objects-,Force%20can%20change%20the%20shape%2C%20size%2C%20and%20movement%20of%20objects,and%20breaks%20into%20smaller%20pieces
https://www.goodscience.com.au/courses/year-7-physics-course/lessons/introduction-to-forces-lesson/topic/changes-in-shape-7ph-1-1-4/
https://www.quora.com/What-happens-after-applying-a-force-to-an-object

Note: Please include the references where you obtain the answers.

3. Organise & Present

Briefly describe how you will present what you have discovered based on the questions you created.

I will present what I have discovered by making a simple chart that shows how each type of force (like push, pull, twist, or squeeze) changes the shapes of different objects. And to make it more engaging, I will bring real materials like rubber bands, sponge, and clay to show how they change shape when force is used. I will also let them try it themselves. For example, they will squeeze the sponge, stretch the rubber bands, or press the clay. And after that, I will explain the difference between objects that go back to their shape and those that don't. I will also use pictures and speak in simple words so my students can understand easily.

4. Reflect

Go back to your inquiry and contemplate on what you have learned and how did you learn them. Try to reflect on the questions below.

What did I know at the start? What didn't I know?

- At the start, I knew that force means push or pull. But I didn't know that force can change the shape of objects in many ways, like stretching or squeezing.

What do I know now?

- Now I know that there are different types of forces, and they can make objects bend, stretch, or even break. And also I already know that some objects go back to their shape and some stay changed.

What do I need to know?

- I still need to learn more about how different materials react to force. I want to learn more about why some things are soft and easy to change, and why some are hard. I also want to know how people use force in real life.

How well did I do?

- I think I did well because I tried all the activities, answered the questions, and shared what I saw. I also enjoyed learning by touching and testing real objects.

B. Science-Technology-Society (STS) Approach
Steps:

1. Invitation

In this phase, to gain the attention of the students, the teacher will start by asking questions.

1. Are you familiar with force?
2. Have you ever stretched a rubber band? Did it go back to its shape?
3. What do you think will happen if you step on an empty plastic bottle ?
4. Can you name an object at home that changes shape when you press or twist it?
5. Do all things go back to their shape after being pressed or twisted?

The teacher will then show a short video or a demonstration using real objects like ball, clay and spring. After that, the teacher will now ask the big question.
Video link: https://youtu.be/L9KY43hDSzI?si=wJtmpZGMGQBRlPFc
Big Question: How can force change the shape of different objects around us?

2. Exploration

During the exploration process, the students will be introduced to different types of objects and observe how forces like push, pull, twist, bend, and squeeze affect their shape. Students will bring or be provided with simple everyday items such as:

- sponge
- rubber band
- clay
- paper
- plastic bottle

Force and Shape Test is a simple hands-on activity where students apply different forces on each object and observe the changes.

Examples of activities students will do:

- **Squeeze a sponge** – What happens to its shape?
- **Stretch a spring** – Does it return to its original form?
- **Press and mold clay** – Does the shape stay the same?
- **Twist foil or paper** – Is the shape permanent?

Students will record their observations and answer guide questions like:

- Did the shape change?

- Did the object go back to its shape?
- Was it easy or hard to change?

3. Proposing explanations and solutions

In this phase, students will share their findings through a **Think-Pair-Share** activity. They will explain:

- Why some materials change shape easily
- Why some materials return to their original shape while others don't
- How people choose materials based on their properties

The teacher will then help them summarize key points and connect them to real-life examples (e.g., making toys, building materials, packaging).

4. Taking action

After discovering how forces affect the shape of objects, students can apply their learning through the following creative and practical tasks:

"Force Detectives" Role-Playing

Students act as detectives trying to find out what force changed an object's shape.
Example skit:

"Someone sat on the plastic bottle. What force was used? What happened?"
"Can it go back to its shape?"

C. Problem-based Learning (PBL) approach

Steps:

1. **Identify the problem**.
   In this part, the teacher will present a problem for the students to explore and solve:
   "In our daily lives, we used different objects—toys and school supplies are examples. Some of them get damaged easily, like squeezed pencil cases, bent rulers, etc. This makes it hard to use them again and makes them unsafe to use. Now, why do some objects change shape when we push, pull, twist, or squeeze them? How can we choose the right materials for things we use everyday?"
2. **Gather the needed information to solve the problem.**

To better understand the problem, the students will explore by:

- Listen to the teacher's discussion covering the differences of hard, soft, and elastic materials used in objects we use everyday, and what is their connection in our topic.
- Observe and try to change the shape of the different objects provided by the teacher.
- Apply different forces: Push, Pull, Bend, Squeeze, Twist
- Record which object changes shape and which returns to its normal shape.

3. Study the information and apply to solve the problem.

Students found that some materials easily change their shape when force is applied while others do not, after testing different objects using forces like pushing, pulling, squeezing, bending, twisting. Soft and flexible objects were easier to squeeze or bend and often they returned to their original shape. Meanwhile, harder materials were more difficult to change and sometimes broke and unsafe to use. Now, Using these observations, the students will now design a simple product using either flexible or rigid materials, depending on the purpose of the item. They will sketch their ideas and carefully choose which materials to use. For example, soft materials can be used to make a squishy toy or a stress ball, while harder materials can be used to create useful items like a pen holder or small container. Through this activity, students will apply what they have learned about how forces affect different objects and materials, helping them make better choices in designing safe and functional items.

D. Interdisciplinary Approach

Application to different subject

SCIENCE

Students will explore how different forces like push, pull, bend, twist, and squeeze can change the shape of various materials (e.g rubber band, ruler, sponge, clay, bottle, paper, etc). They will do hands-on activities and observe which materials go back to their shape and which ones don't.

MATH

Students will count and compare objects that changed shape and did not based on its reaction to force. They can sort objects into two groups: Changed Shape and No Change. Students will use simple data handling skills like tally charts, bar graphs, or comparison using more/less.

EPP/TLE

Students will use recycled or available materials to create a simple item (e.g., toy, container, holder), applying what they've learned about material strength and force.

ART

	Students will design or decorate the items they created. They can also draw an object before and after a force is applied (e.g., a sponge before and after squeezing). This helps them express observation creatively. **ENGLISH** Students will write short sentences or a paragraph about their observations using correct describing words. They will also answer comprehension questions related to a short story or paragraph about force.
E.	Multidisciplinary Approach
F.	Transdisciplinary Approach