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STUDENT HANDBOOK

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MODULE 1: ASSESSMENT OF PERCEPTION OF INTELLIGENCE

Objective 1: By the end of the course, students will be able to identify whether they have a growth-oriented or fixed-oriented mindset.

Duration: 15 - 30 min.

Materials: Intelligence Perception Assessment (Appendix 1)

METHOD

Do:

1. Distribute the scales to the students and explain how to complete them.
2. Students will assess their own scales (the first three items indicate a fixed mindset, while the last three items indicate a growth mindset). Then, they will compare their scores to identify which mindset they hold.

Explanation:

1. Would you like to meet Mojo? Let's see what Mojo is experiencing. https://www.youtube.com/watch?v=2zrtHt3bBmQ&t=19s will be displayed.

   Question 1: Do you believe Mojo could be smarter? What do you think?

2. Individuals with a growth-oriented mindset believe that intelligence, skills, and abilities can be cultivated through effort, effective use of time, and learning. Conversely, those with a fixed-oriented mindset believe that intelligence, talent, and skills are innate and will not change or develop. Research indicates that individuals with a growth-oriented mindset tend to succeed more in school and life outside.
3. If your score on the scale indicates a fixed mindset, there's no need to panic or feel upset. Throughout this process, we will discuss the growth mindset in detail and engage in practices to cultivate this perspective. In our classes, we will explore how to approach learning and the challenges we encounter, how to tackle the problems we face, and what to do when we feel like giving up. I believe in your ability to learn anything, and I trust you.

Appendix 1: Intelligence Perception Assessment Scale for Children

		Totally Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Completely Disagree
1	You have a certain level of intelligence and there is really not much you can do to change it.						
2	Your intelligence is something about yourself that you cannot change too much.						
3	You can learn new things, but you cannot change your basic level of intelligence.						
4	Whoever you are, you can dramatically change your level of intelligence.						
5	You can always change your intelligence level drastically.						
6	No matter how much intelligence you have, you can always change your intelligence quite a lot.						

What is a Growth-Mindset?

Objective 2: At the end of the course, students will be able to define what a developmental mindset and a fixed-oriented mindset are.

Duration: 30 - 40 min.

Materials:

- Worksheet titled "My Mentality in the Past"
- Pencil
- Internet
- Board

METHOD

Do:

1. Distribute the "My mindset in the past" worksheet to the students.

My Previous Mindset	
Write or draw an event/situation/task that you worked hard on and improved.	Write or draw an event/situation/task that you found very challenging and eventually gave up on.

Explanation:

1. After a sufficient amount of time is given to the students, volunteer students are invited to share their examples. As they share, their attention is directed to clues about growth and fixed mindsets. The board is divided into two sections in a T Graphic format. The examples provided by the students are listed under the appropriate headings. Special emphasis is placed on similarities expressions.

T GRAPHİCS	
Growth Mindset	Fixed Mindset

2. Do you remember Mojo? Today, her friend Katy has a problem. Should we watch and assist her?

Watch: https://www.youtube.com/watch?v=OFKVoCuwl2s (Class Dojo's Growth Mindset Series - Episode 3) https://www.youtube.com/watch?v=v5t-RKm0VFg .

Ask:

a. Let's answer the question: “Do you think Katy learned anything from Mojo?”

b. What do you think Katy will do next?

c. What did you think about your actions while watching the video?

d. Why do you believe you could do what you did? Why do you think you couldn't accomplish what you didn't?

e. After obtaining the answers to the first four questions, connections, parallels, or contrasts between these answers and Table T are discussed.

f. Ultimately, the statements below offer a general overview.

A growth mindset is defined.

According to the growth structure of the mind, intelligence is not a fixed trait individuals possess; rather, it can be developed through learning (Dweck, 2000, pp. 2-4). In this theory, students focus on enhancing their abilities and gaining new knowledge. In other words, students have a learning-oriented mindset. To learn, students are willing to put in the necessary effort, seek out challenging conditions that promote learning, and persist in overcoming obstacles, even in the face of potential failures (Dupeyrat & Mariné, 2005, p.44).

A fixed mindset is defined.

According to the fixed-oriented mindset, people believe that intelligence is a fixed trait. They think everyone has a certain level of intelligence, which is an unchangeable quality (Dweck, 2000, pp. 2-4). In this theory, students primarily focus on obtaining good grades to prove their abilities to themselves and others. Students are performance-oriented. This performance orientation leads students to exert less effort, give up easily when confronted with difficulties, and avoid tasks they anticipate will be hard (Dupeyrat & Mariné, 2005, p.44).

Do: Show the following pictures on the board.

Question: What are the connections between these pictures I showed you?

Collect students' answers. After gathering their responses, share a memory of a time when you fell and got injured. Please go into detail about what happened, how you felt, and how you recovered. After telling your story, encourage the students to share similar experiences. Once their answers are received, say, "let's watch a video!" and turn on the video. As you start the video, tell the students, "please watch the video carefully and take note of what happened; then I will ask questions."

Watch: https://www.youtube.com/watch?v=jIzuy9fcf1k (Stages after watching the video, the following questions are posed.)

1. What happened in the video?
2. What did the baby learn to do?
3. What occurred when the baby struggled to walk (i.e., in the previous two questions, the children must have indicated that they tried to learn to walk)?
4. What were your thoughts while watching this video? What emotions did it evoke in you?

Explanation:

After the students' answers are received, explanations are provided for the table titles below.

For example, When we are born, we learn many things. For example, we learn to walk, eat, Talk, play, go to the bathroom, etc. (Pictures can be used during this explanation if desired.) When we are born, we are curious about ourselves and our surroundings because curiosity is the beginning of learning. However, learning is not always easy. Sometimes we encounter obstacles and difficulties, and sometimes we make mistakes. We may also find what we are trying to learn very challenging. For example, I learned how to ride a bicycle this summer. At first, I was very afraid of falling and had a lot of difficulty. There were moments when I gave up, thinking that I couldn't learn. But then I saw my son riding his bicycle in front of me. He is only seven years old, and I noticed he could ride it with ease. My son became a source of inspiration for me. I didn't give up. I tried every day; even though I struggled, I persisted. In the end, after two weeks, I finally managed to ride a two-wheeled bicycle. I was challenged, but I succeeded. At that moment, I felt so happy that I can't explain it.

Carol Dweck defines mindset in five key areas.

Key Area	Fixed Mindset	Growth Mindset
Challenge	An intelligent person avoids difficulties to maintain their image. ***If I select an easier course, I can achieve a higher grade with less effort.***	With a desire to learn, challenges are accepted. ***Being in a degree program requires more effort, but I will gain more knowledge.***
Barriers	Giving up when facing obstacles and setbacks is a common reaction. ***I made mistakes during my football match, so I have to quit football.***	Perseverance in the face of obstacles and setbacks is a typical response. ***I made a mistake during my football match, but by working with the coach, I can improve.***
Effort	Putting in effort or trying something is often seen negatively. If you have to make an attempt, it implies that you may not be particularly clever or skilled. ***If you're intelligent, you shouldn't have to struggle. You're either intelligent or you're not.***	Hard work and effort create the path to success. ***The key to becoming smarter is to work more intelligently.***
Criticism	Negative feedback, regardless of its constructiveness, is frequently overlooked. ***When I seek assistance from my teacher, they believe I am not capable.***	Criticism provides valuable feedback that can enhance learning. ***When I get stuck, I seek help, as asking for assistance is the most effective approach. By receiving feedback, I can improve my skills.***
The Success of Others	The success of others is perceived as a threat, triggering feelings of insecurity or vulnerability in individuals. ***I avoid taking challenging classes or jobs and shying away from difficult problems because I feel the need to appear smart all the time.***	The success of others can be a source of inspiration and growth. ***I aim to surround myself with successful individuals to learn from them.***

Ask: Have you ever had an experience, event, or situation where you faced challenges in learning and made mistakes?

Important Note: When the answers are received, highlight the words "challenge," "effort," "perseverance," "patience," and so forth, and write them on the board.

Watch: Let's watch Shakira, shall we? (Everyone is invited to dance and dance during the song)

https://www.youtube.com/watch?v=c6rP-YP4c5I (Try everything - Shakira song)

Play-Reinforce

Participants are divided into groups of 4 to 6 people. Each group receives statements about fixed and growth-oriented mindsets.

First, they are asked to categorize these statements under the headings of fixed and growth-oriented mindsets. While doing this, they discuss why each statement belongs under the relevant heading.

Statements reflecting a fixed mindset are to be rephrased to align with a growth mindset. (For example, "I am not good at this job" can be rephrased as "I need more practice in this job.") The suggestions from each group are then discussed as a whole class.

Fixed Mindset	Growth Mindset
Science class is not my thing.	I can develop my brain.
I'm not good at this.	I need to change my strategy.
She's the smartest girl in the class.	My hard work and effort paid off.
Grades are more important than improvement.	I'm not there yet.
It's better to look smart than to take risks.	People can change.
I'll never be clever.	It is important to have a good attitude in the learning process.
To tell you the truth, I feel like an idiot.	I'm a problem solver.

Fixed Mindset

Growth Mindset

Objective 3: At the end of the course, students will be able to define the brain and its parts.

Duration: 15 - 30 min.

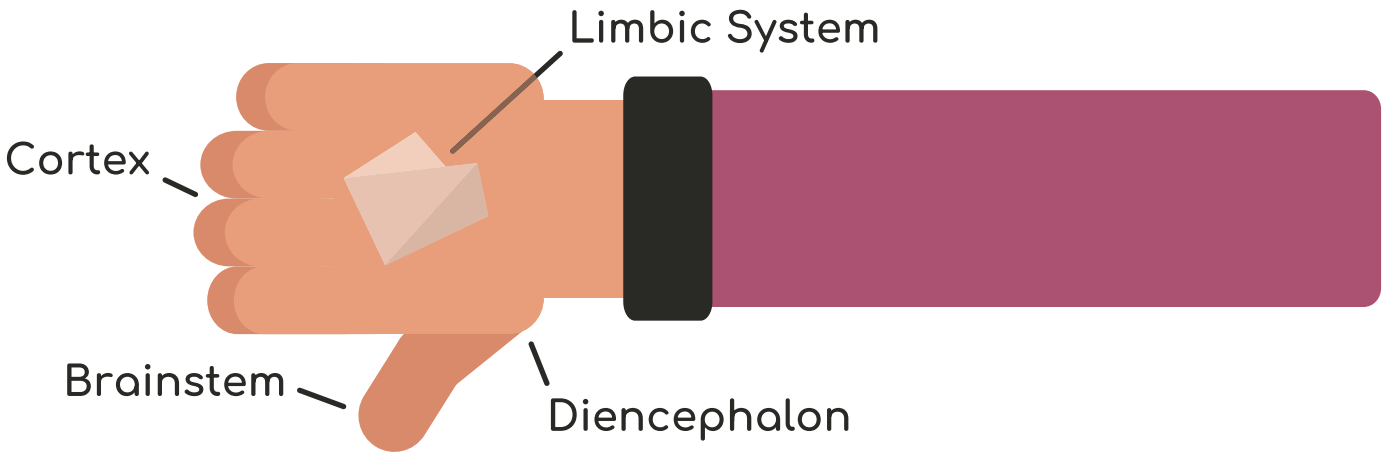
Materials:

- Hand paint
- Paper
- Pencil

METHOD

Build-Show: An "Our Brain in Our Hands" event will be organized.

Hold a piece of paper in your hand and fold it into your palm. Raise your thumb like a hitch-hiker. Now rotate your fist into a "thumb down" position. Your thumb represents the brain stem, and its tip is where the spinal cord joins the brain stem; the fleshy part of your thumb represents the diencephalon; the folded paper in your palm, covered by your fingers and hand, symbolizes the limbic system; your fingers covering the paper represent the cortex.



The following explanations will be added to the picture above. These explanations will appear sequentially when you click, similar to a slide. Thus, the explanations will be presented in order.

The brain is roughly divided into four parts: the brainstem, the diencephalon, the limbic system, and the cortex. The brain is organized from the inside out, with increasingly complex parts added to an old foundation. The lower and most central areas, the brainstem and diencephalon, are the simplest. They are the first to evolve and develop as a child grows. The cortex is the pinnacle of brain architecture and its most complex region.

The lower parts of the brain share an arrangement similar to that of primitive creatures like lizards, while the middle areas resemble those of mammals, such as cats and dogs. The outer regions are only shared with other primates, like monkeys and great apes. The part of the brain most unique to humans is the frontal cortex, though even this shares 96% of its organization with chimpanzees.

In summary, all four areas of our brain are organized hierarchically: from bottom to top and from the inside out.

Let's remember our hand again!

The limbic system is completely internal to the human brain; you cannot see it from the outside, like those papers. The frontal cortex is like your little finger pointing towards the upper and frontal areas. Although these are interconnected, each of the four main areas controls a different set of functions.

The Brain Stem: Mediates our main regulatory functions, such as body temperature, heart rate, respiration, and blood pressure.

Diencephalon and Limbic System: Responsible for emotional responses that guide our behavior, such as fear, hate, love, and happiness.

Cortex: Regulates the most complex and highly human functions such as speech and language, abstract thinking, planning, and deliberative decision-making.

Watch: Should we examine the brain more closely?

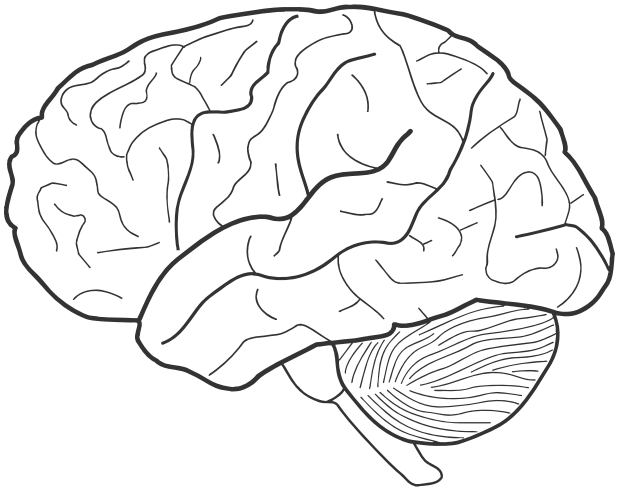
https://www.youtube.com/watch?v=ZyniF0vbzQg video (Main parts of the brain, Dr. Ali Mattu9). If this video does not open, https://www.youtube.com/watch?v=XV0nBuEFXCM (2nd link)

Play-Learn (Worksheet): After the video, reinforce what we have learned.

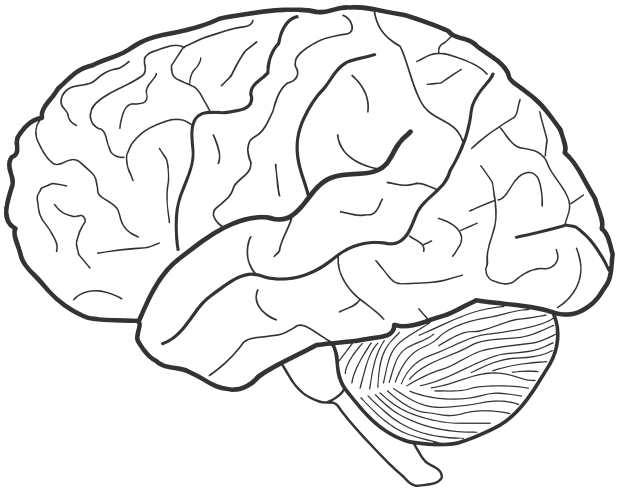
Then, they will be asked to match and draw pictures of their brain on one side and descriptions on the other. (https://www.pngwing.com/tr/free-png-ngfyu source of brain pictures)

REGIONS OF OUR BRAIN - LET'S MATCH AND FIND

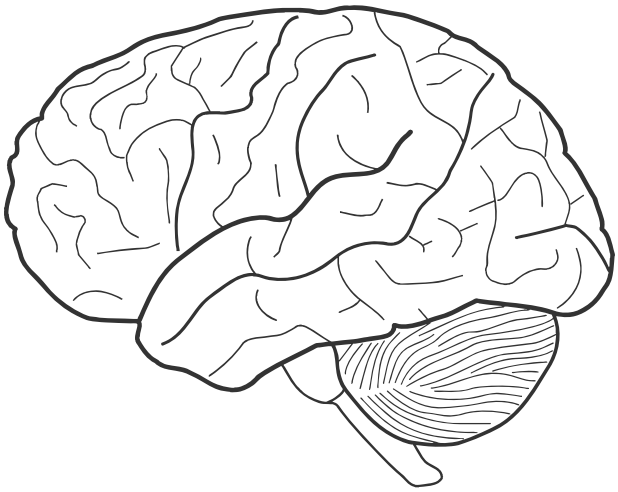
In the brain pictures below, draw the region in the description.



The Brain Stem: Mediates our primary regulatory functions, including body temperature, heart rate, respiration, and blood pressure.



Diencephalon and Limbic System: Responsible for emotional responses that guide our behavior, such as fear, hate, love, and happiness.



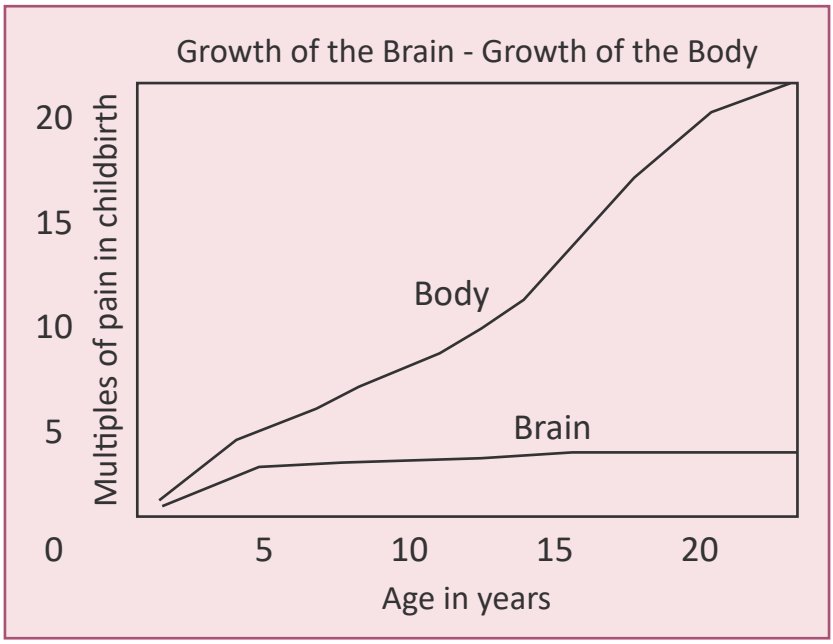
Cortex: Regulates the most complex and crucial human functions, including speech and language, abstract thinking, planning, and deliberation decision-making.

Question and Answer: After stating that "We have seen the parts of our brain, even if roughly", the following questions are asked, and answers are taken respectively.

1. How do you think our brain develops?

2. At what age does our brain stop developing?

Answer 1: The graph below is projected on the board.



After the graph is projected, explanations are expressed:

The physical growth of the human body increases in a roughly linear fashion from birth to puberty. In contrast, the physical growth of the brain follows a different path. The fastest growth rate occurs in utero, and the brain grows rapidly from birth to 4 years of age. The brain of a 4-year-old child is equal to 90 percent of its adult size! Most of the physical growth of the brain's neural networks occurs at this time. It is a time of great opportunity for the developing child: Reliable, predictable, formative, and repetitive experiences can help to express a wide range of genetic potential. Unfortunately, this is also the time when the organizing brain is most vulnerable to the most devastating effects of threats, neglect, and trauma.

However, this early pattern of brain growth does not mean that the development or organization of the brain has ended. Important neurodevelopmental processes continue throughout childhood and adolescence as the brain's systems become more complex. Important cortical remodeling and myelination, i.e., brain cell development, continue until the 25s.

Cortical

Limbic

Midbrain

Brainstem

The human brain develops sequentially, following the order in which its areas mature. Beginning with the brain stem, the most primitive and central regions develop first. As a child grows, each successive part of the brain (from the center to the cortex) undergoes significant changes and develops in turn. However, for each area to function properly, appropriate timing, patterning, and repetitive experiences are necessary.

Answer 2: The traditional belief that the human brain becomes static at the age of 20 has been challenged by recent studies. What does this mean? It means that we can acquire new skills as we age, but the way we acquire these skills changes over time. The human brain has the most grey matter (the tissue containing neurons, nerve fibers connecting neurons, and support cells) in early adolescence, and after this period, the amount of grey matter begins to decrease. Synapses (the connections between nerves) reach their peak early in life; a 2-year-old child has 50% more synapses than an adult. While the specifics are less crucial, the brain is continually developing and changing during the first 20 to 30 years of life, which influences the context in which learning occurs. Although the adult brain may not be as adaptable as that of a child or adolescent in certain ways, it remains open to learning and change. Additionally, because the adult brain's adaptability differs from that of younger brains, learning as an adult occurs through somewhat different mechanisms. **So what does this mean?** If we young people and adults put in enough effort, our brains will find a way.

Objective 4: Students will be able to define neuron and plasticity at the end of the course.

Duration: 15 - 30 min.

Materials:

- Basketball
- Tire package
- Glove
- Image or model of the human brain

METHOD

Demonstration: Enter the classroom with the following materials.

- Basketball
- Package tyre
- Glove
- Picture or model of the human brain

Before asking questions, teachers will be told, "Remember! There is no right or wrong answer to the questions asked".

Ask: Regarding the materials brought in,

- Which of these ingredients do you think is strange in combination with the others?
- Any other weird stuff?
- Can you tell me why you think it's weird?

After receiving the answers, he/she shows the students how the glove and the rubber band stretch and says, "I want you to think about why I showed you the glove and the rubber band while I was reading the book."

Read Joann Deak's book "Your Amazing Flexible Brain" (The book's pages will be turned into a presentation and will be progressed as they are read). After reading the book, the following questions will be asked:

- What did you think at the beginning of the lesson when I showed you the tire and the glove?
- What can you do to develop your brain? What did you learn from the book?

- Let's see, shall we play a game now? and the following activity is started.

Say-Do: T Table is distributed to the students. They are asked to write the sentence "I can achieve everything." on the table first with the hand they write and then with the hand they do not write.

How I Felt While Writing	
The hand I use for writing	The hand I do not use when writing

Ask:

- What did you feel when you were writing by hand? How did you feel when writing with the other hand?
- Why is it easier to write with one hand than the other?

Answers are taken. Let's answer whether the answers are correct or not with the video.

Watch: https://www.youtube.com/watch?v=ELpfYCZa87g (neuroplasticity video belongs to sentis channel)

The video and the answers connect. Again, it emphasizes why we write easily with the hand we use, but it also emphasizes that we can improve our writing with the other hand if necessary.

Neuroplasticity is the ability of the brain to change and develop throughout life, so it guarantees continuity of learning.

LET'S SEE IF THESE THINGS WE SAY MEAN WHAT WE SAY IN REAL LIFE (Stories are read)

Read-Share:

Neuroplasticity and Stories

1. Taxi Drivers Have Bigger Brains

The brains of the drivers of London's famous black cabs were found to be larger than usual. According to the research, as taxi drivers memorize the roads, their brains develop. Becoming a taxi driver in London requires at least 2 years of study.

It has been revealed that a part of the brain of taxi drivers in London, the capital of England, grows over time to remember the city's roads. According to the research, the more time they serve as taxi drivers, the larger the relevant part of the brain becomes.

In front of the brain's frontal lobe is a section called the 'hippocampus.' This region has been found to play an important role in orientation in birds and other animals. Now, researchers from University College London analyzed the tomographs of London taxi drivers, with 16 drivers participating in the study.

As a result, the 'hippocampus' region, also known as the orientation center, which plays a vital role in the learning process, was larger in taxi drivers than in the general population.

The research was published in the Bulletin of the National Academy of Sciences. 'A specific part of the hippocampus, the posterior part, was larger in taxi drivers, while the anterior part was relatively smaller,' researcher Dr. Eleanor Maguire told the BBC. The growth was also more pronounced as the length of service as a taxi driver increased.

According to Maguire, gray cells in the hippocampus are remodeled as the brain evaluates navigational information. 'This is very interesting,' says the British neurologist, 'because a healthy human brain undergoes structural changes.

Being A Taxi Driver Is Not Easy

'It seems there is a decisive relationship between the navigational behavior of taxi drivers and brain changes,' says the British researcher. Scientists hope to use the information gathered from this study to develop new rehabilitation programs for patients suffering from memory loss due to Parkinson's disease or brain injuries.

Of course, these research findings only apply to black London taxi drivers because becoming a driver in London is no easy feat. It's not enough to obtain a taxi license and a car; about 23,000 black taxis are in London. A taxi driver must know every street, alley, and side street within a 1500 km² area, and it takes roughly two years to memorize all this. However, that's still not sufficient. The taxi driver must demonstrate that they have memorized every inch of London. About 3,500 people take the taxi driver's exam each year, but only one in five candidates earns the right to sit behind the wheel.

2. Cameron Mott And The Right Brain

Shelly Mott said, "It was very scary because you can't imagine what your child will be like after that kind of brain surgery. It feels like he can't remain the same child," says mom Shelly Mott. "It was absolutely the right choice. We knew what was wrong with her, and we understood it was our only option to help her." Doctors believed that removing the right side of her brain, which controls the left side of her body, would paralyze her. However, after the operation, everyone was surprised when she unexpectedly began to move. The only conclusion that could be drawn was that the right side of the brain was forming new connections that the left side needed to perform its functions. Furthermore, this growth happened much faster than the doctors had anticipated. He managed to leave the hospital only four weeks after the operation. Cameron, whose physiotherapy process has recently concluded, now dreams of becoming a ballerina. She is now a university student...

Discuss: You have listened to both stories;

1. What do you think about these stories?
2. Do you think we can all change our daily lives based on what is expressed in these stories? (If yes, how? If no, why?)
3. Link to new video.

Watch-Discuss: https://www.youtube.com/watch?v=MFzDaBzBlL0 (The backward Brain Bicycle - Smarter every day)

After the video, we will move on to the topic of neurons. As in the video, the work of neurons is the basis of neuroplasticity. Now, let's examine what a neuron is and how it works.

Objective 5: Students will be able to define neurons at the end of the course.

Duration: 15 - 30 min.

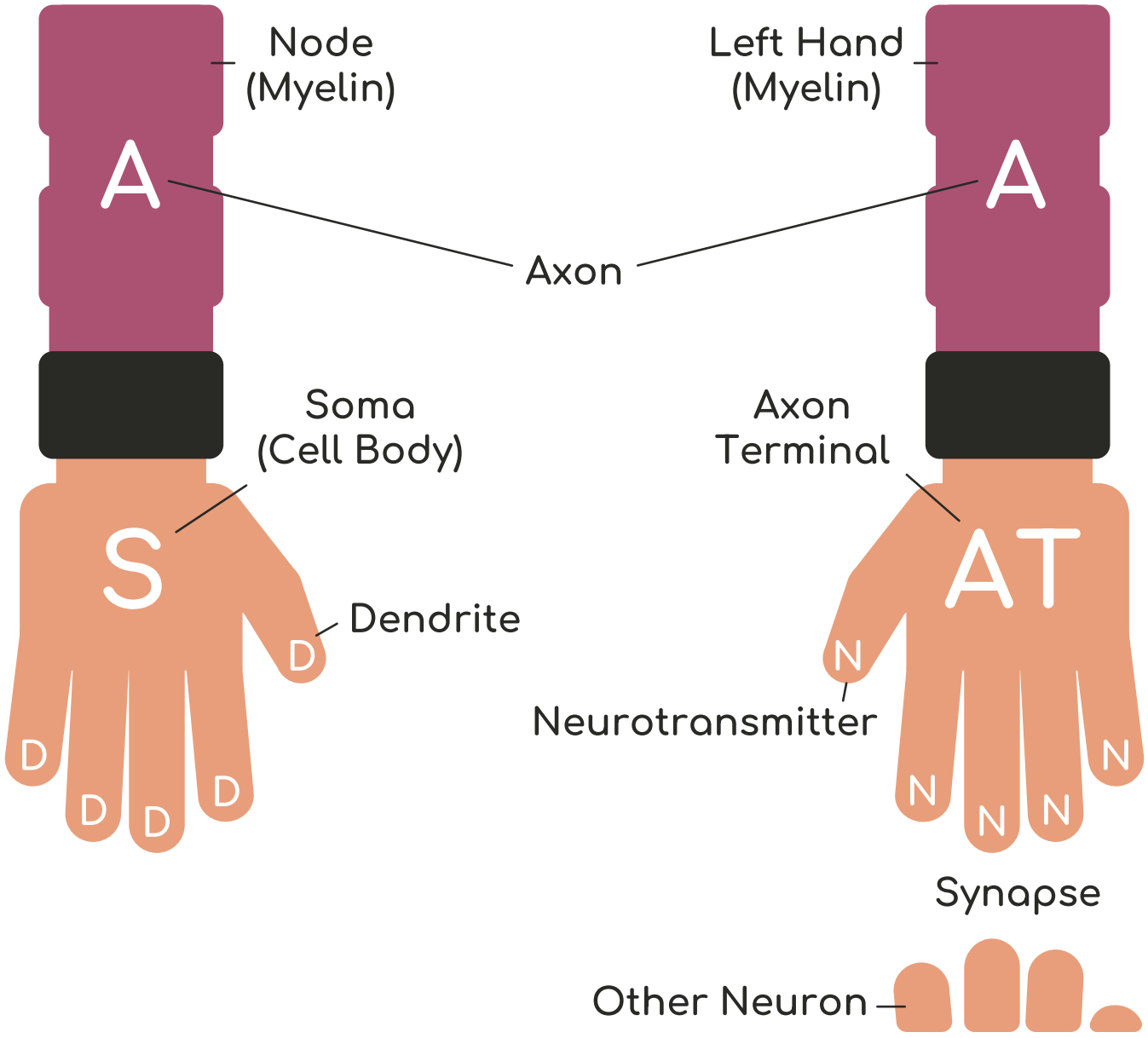
Materials:

- Pencil (the kind of pencil that can scratch and erase the body)

METHOD

Watch: https://www.youtube.com/watch?v=6Ct6NDRlDuw video opens. (Anatomy of the neuron Khan Academy video.)

Activity: Let's reinforce what we have watched. "Neurons in our arms" activity is done.



Pencils are distributed to the students. They are asked to write "D" on all fingers of the right hand, and they are told that these are dendrites. They are asked to write "S" on the right hand. This is soma (cell body). The arms are asked to write "A," and this is the axon. They are told that each knuckle of the arm is Myelin. "A" is written on the left arm and states that the axon continues. The left hand is asked to write "AT," and this is the Axon Terminal. "N" is written on all fingers of the left hand, and this is a Neurotransmitter.

(Neurons consist of three parts. Dendrites are tree-like branches that receive inputs from other neurons. These dendrites extend to the cell body, containing DNA that ensures the cell's survival. Finally, axons are living appendages of varying lengths (ranging from microscopic lengths in the brain to 1.80 meters down the legs). Axons are often compared to cables because they carry electrical impulses very quickly (between three and 300 kilometers per hour) compared to the dendrites of surrounding neurons. Axons do not touch neighboring dendrites; they are separated by a microscopic gap called a synapse. When an electrical signal reaches the end of an axon, it triggers the release of a chemical carrier known as a neurotransmitter into the synapse. The chemical carrier travels to the dendrite of a nearby neuron and excites or inhibits that neuron. **When we say that neurons form new connections, we mean that this change occurs at the synapse and either strengthens or weakens the interactions between neurons. So, learning either happens, or it doesn't.**

Watch: Did you know that neurons can communicate with one another? Video on.

https://www.youtube.com/watch?v=hGDvvUNU-cw (How neurons communicate by brainFacts.org)

Watch: After the video, a brief clip begins by inviting viewers to look at real neurons. https://www.instagram.com/reel/Ces_oIqBrV7/?igshid=MDJmNzVkMjY%3D.

MODULE 2: PERSEVERANCE

Objective 1: Students will be able to describe their perseverance level at the course's end.

Duration: 15 - 30 min.

Materials: Short Perseverance Scale (Appendix 2)

METHOD

Do:

1. Distribute the scales to the students and explain how to fill them in.
2. Students are asked to evaluate their scales (items 1, 3, 5, and 6 are reverse coded. High scores indicate a high level of perseverance. It can also be scored according to sub-dimensions. *1. Consistency/intensity of interest sub-dimension (PASSION):* 1st, 3rd, 5th, 6th items. *2. Persistence in endeavor sub-dimension (DETERMINATION):* 2nd, 4th, 7th, 8th items). "Perseverance" levels are determined by making score comparisons.

Description:

Perseverance is the average of how passionately you do something and how determinedly you pursue that passion.

TALENT + PERSEVERANCE = SKILL

SKILL + PERSEVERANCE = SUCCESS

Talent, an innate characteristic, is how fast **your skills** develop when you make **an effort**. Success is what happens when you use the skills you have acquired with effort. If we need to formulate it,

Talent + Perseverance = Skill

Skill + Perseverance = Success

The formula shows that talent and skill are necessary for success, **but perseverance is much more important**.

Watch: https://www.youtube.com/watch?v=vzle_Puyg5o&t=161s (GRIT: Traits that Matter for School, Work, and Life)

Ask:

1. What did you think about perseverance?
2. Is there something you like to do very much? What do you think and feel when you are doing this job?
3. Do you have problems with this work you are doing? What motivates you to start again?
4. Can we apply what makes you start again to other things? (If yes, how? If not, why?

Read: *J. K. Rowling's Success Story That Can Inspire You Not to Give Up (Presentation to be prepared and read, additions to be made from other sources, and pictures to be added)*

Many people have heard that he became famous with the Harry Potter series and was not well known before that. However, his life was not easy before that, and he lived on the edge of the abyss many times.

The year 1990, Rowling was only 25 years old. Ideas such as Harry Potter, Wizard School, etc., formed in her mind in those years. One day, while traveling from Manchester to London by train, she starts to write as soon as she gets on the train. He got so into it that he continued to write without taking a breath when he got home. In December of the same year, his mother passes away, and this causes him to enter a period of pause. he begins to experience changes in his life. This loss also affects the structure of the fictional characters he creates.

Shortly afterward, she moved to Portugal and started working as an English teacher. She met a journalist, and they got married in 1992. One year later, she had a child. However, a few months after the birth of her daughter, she divorced due to domestic violence. He decided to return to England again, and on his way back, he finished three chapters of Harry Potter. But returning to England was not going to make her life rosy.

And that's exactly when he hits rock bottom. He has had a troubled marriage, had to change countries, has a child to support, and is unemployed to death. During this time she struggled with depression and even attempted suicide. She even received assistance from social services for poverty. However, none of these experiences prevented her from writing. She accepted her difficult conditions and did the only meaningful thing for her, namely writing.

She devoted all her energy to finishing the book she had started, even going to cafes with her daughter occasionally and continuing her book. In contrast, her daughter slept on her lap. Finally, she sent her completed book to 12 publishing houses but did not receive a positive response from any of them except one. That publishing house was "Bloomsbury" one of the smallest ones.

The chairman of the publishing house's board of directors was interested in the book because his 8-year-old child, whom he had read the book to, liked the first part very much. He immediately requested one more, and there was no end to the requests after that date. The past is the past, and his books have sold over 400 million copies worldwide. The films that followed broke box office records. All this made Rowling the first female author to become a billionaire.

He experienced all this success because he made a choice: He chose not to give up after failures, no matter the cost. In his speech at a Harvard diploma ceremony, he discussed this issue as follows.

"You may never have as great failures as I have, but some are inevitable in life. Only people who live extremely carefully do not fail and have hardly lived at all. In such a case, you are defeated by forfeit."

Question:

1. What kind of perseverance did Rowling show in writing books?
2. What would have happened if Rowling had abandoned her goal?
3. Do you think about the time we spend working towards a goal?
4. Can you think of a time when you were successful? What steps do you think led to your success?

Watch: https://www.youtube.com/watch?v=H14bBuluwB8 (Angela Lee Duckworth: The key to success? Fortitude)

Appendix 2: Short Perseverance Scale

The results obtained from these questionnaires will be used in a scientific study. You are invited to evaluate yourself after reading these statements and mark an **(X)** next to the option that best represents your feelings. Opposite each question, you will find: **(1) Not at all for me**, **(2) Very little for me**, **(3) A little for me**, **(4) Quite a bit for me**, and **(5) Completely for me**. Please provide ONE answer for each statement and do not leave any blank. I appreciate your thoughtful responses and thank you for your contributions.

1	Sometimes, new ideas and projects confuse me about my old ones.	**1**	**2**	**3**	**4**	**5**
2	Challenges do not discourage me.	**1**	**2**	**3**	**4**	**5**
3	I get caught up on a specific idea or project for a bit, but then I lose interest.	**1**	**2**	**3**	**4**	**5**
4	I'm a dedicated individual.	**1**	**2**	**3**	**4**	**5**
5	I often set goals for myself, but I tend to pursue different ones instead.	**1**	**2**	**3**	**4**	**5**
6	I struggle to stay focused on projects that take longer than a few months to finish.	**1**	**2**	**3**	**4**	**5**
7	I complete whatever I begin, regardless of the circumstances.	**1**	**2**	**3**	**4**	**5**
8	I work hard.	**1**	**2**	**3**	**4**	**5**

Objective 2: Students will be able to explain the importance of perseverance and determination.

Duration: 40 min.

Materials:

- A4 paper and pens
- Role cards (to be prepared)
- Science Perseverance reflection cards
- Video: "A Story of Perseverance and Success" - https://www.youtube.com/watch?v=-Ko_Dym09Hws

METHOD

Role-Play-Discuss:

1. The teacher greets the class and starts the lesson. He/she asks the following question:

"Was there a subject or experiment in science class that you had difficulty with but did not give up?"

2. Each student is given 3 minutes. They are asked to write by following this structure:

- What did I have difficulty with?
- Have I thought about giving up?
- What did it get me to keep going?

3. Volunteer students share.

The teacher should emphasize the following when receiving the answers: "Difficulty is not failure. Continuing is learning itself."

4. The role cards activity starts after the students' answers are received.

5. Students are divided into groups of 2-3 students.

6. One card is distributed to each group.

You followed the class subject but could not answer enough in the exam.

The teacher explained the subject twice, but you still didn't fully understand, so the teacher asked you to comment.

You're afraid your friends will laugh if you give the wrong answer. But in science class, you're expected to answer.

You need to make a model of a cell for a science exhibition, but you don't trust your manual dexterity. You don't know where to start and feel demoralized at first.

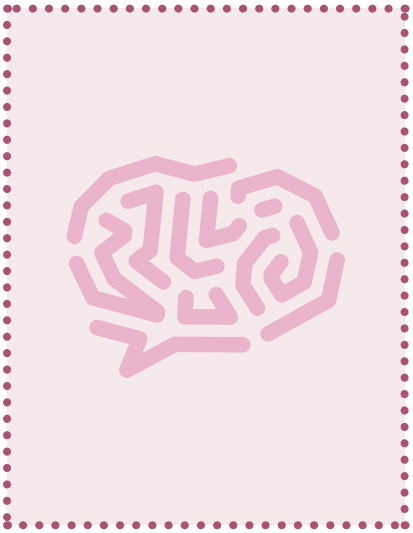
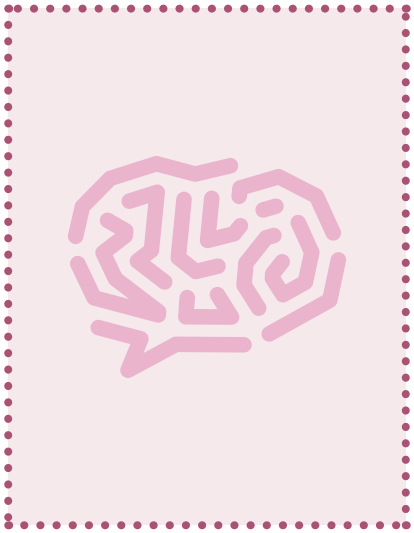
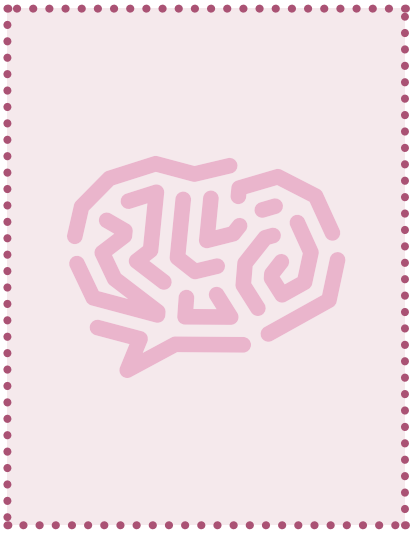
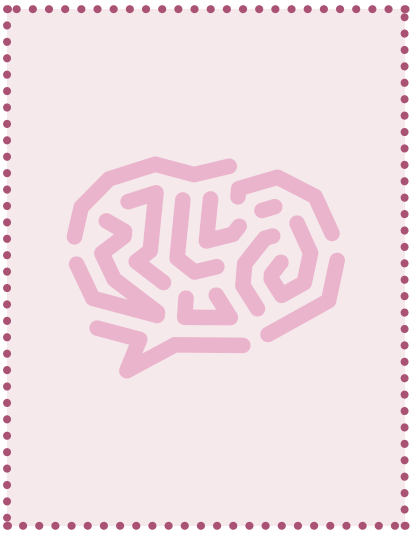
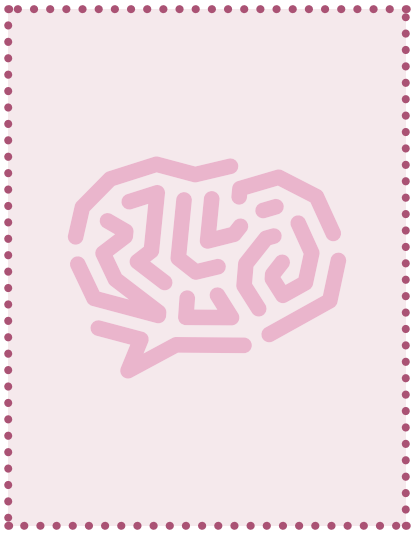
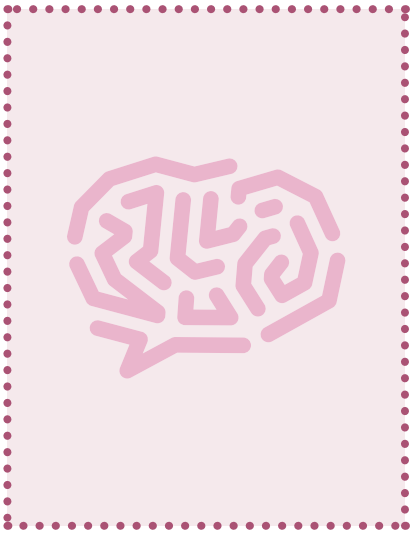
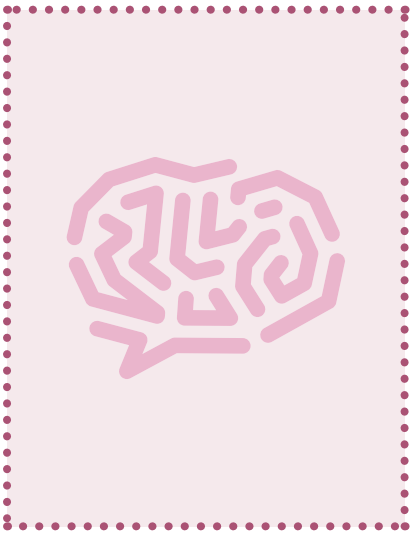
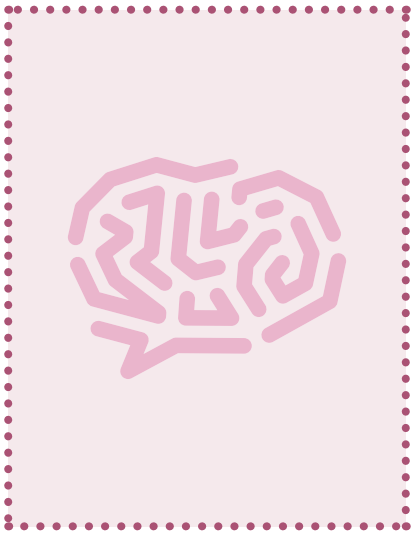
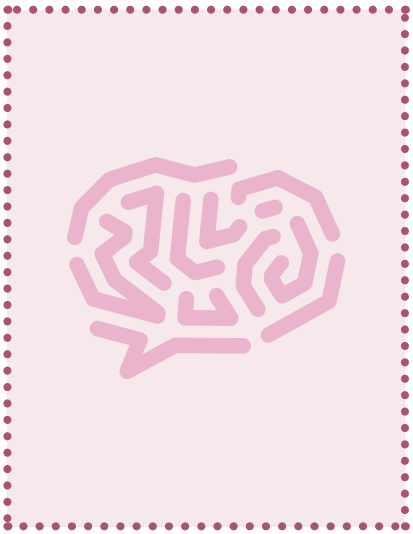
In group work, your friends do not listen to your suggestions.

You have tried to solve the problem given to you in science class many times, but the result is not correct. You check the solution steps, but you get stuck somewhere.

In the graphing question the teacher gave you, you have difficulty understanding which data represents what. Your friends are solving the question, but you are still stuck at the first step.

In science, there's a new generation of long experiment questions. Even when you read the title, you're intimidated. You read the paragraph but couldn't develop a solution strategy.

In the activity about atomic models during the lesson, you placed the sample in the wrong group because you could not solve it. As a result, the model turned out to be incorrect.

7. The group develops two different reactions:
    a. What does a determined student do?
    b. What does a student who gives up do?
8. Pair reenactments are made, and the class makes comments.

When receiving these answers, the teacher should emphasize: "The same situation leads to different results from different perspectives. It is up to us to develop a determined perspective."

Watch:

9. After the groups have completed their animations, the video on the link "https://www.youtube.com/watch?v=Ko_Dym09Hws" is watched, and the students are asked to notice the messages about perseverance in this video.
10. Students are given reflection cards and asked to complete the sentence on the card.
11. The cards are hung on the board or displayed in the classroom.

When I am committed and resolute; I can achieve the following in science class:	When I am committed and resolute; I can achieve the following in science class:	When I am committed and resolute; I can achieve the following in science class:

When I am committed and resolute; I can achieve the following in science class:	When I am committed and resolute; I can achieve the following in science class:	When I am committed and resolute; I can achieve the following in science class:

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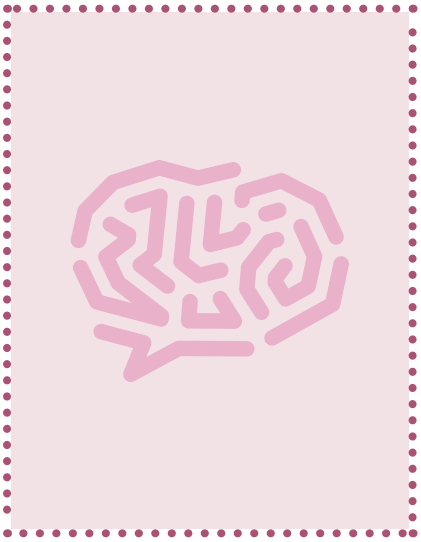
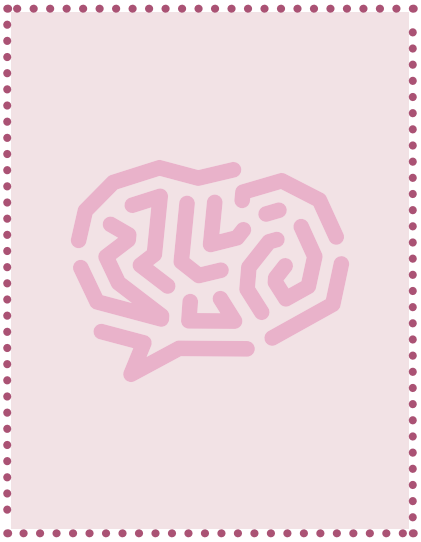
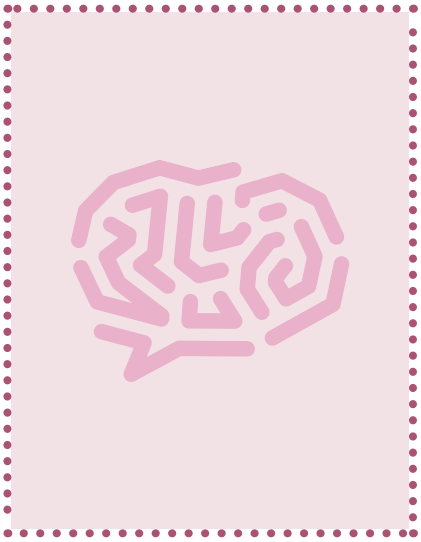
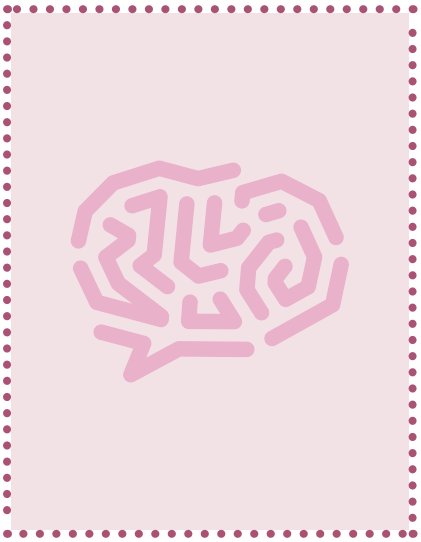
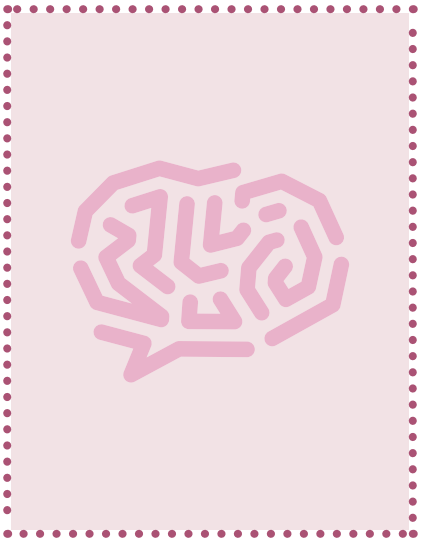
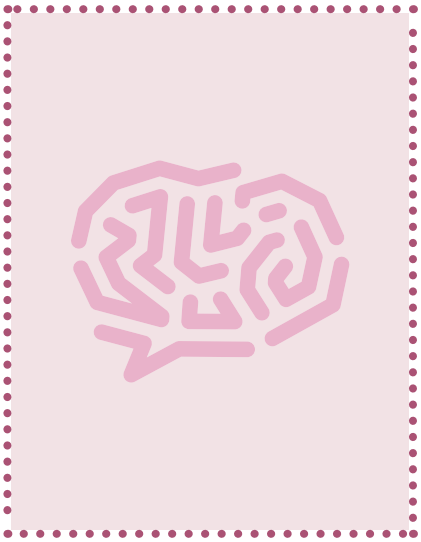
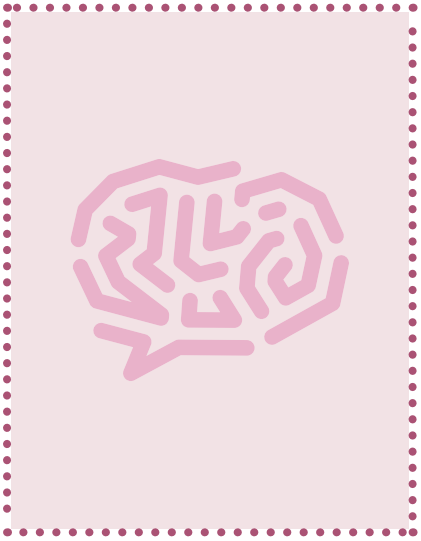
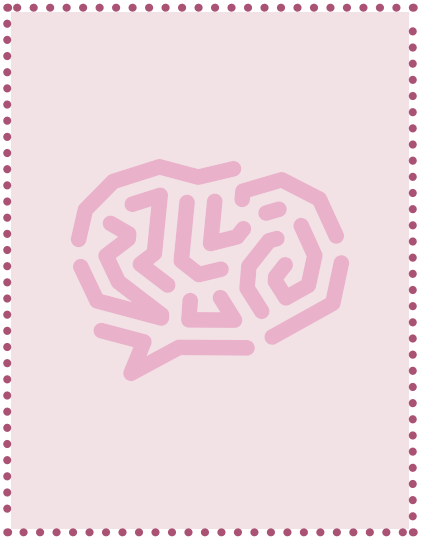
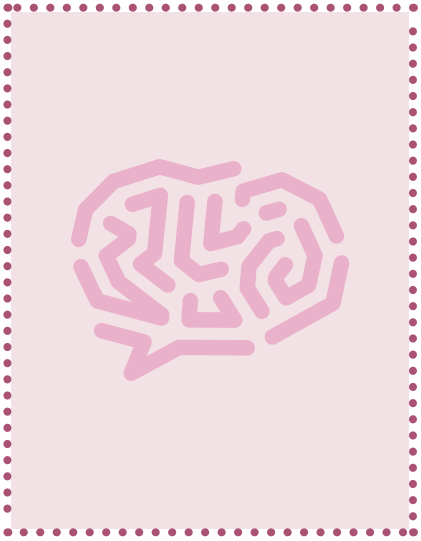










MODULE 3: CREATING A GOAL

Objective 1: Identify the differences between goals and dreams.

Duration: 30 - 40 min.

Materials:

- "Goal? A Dream?" Board Game
- Pet bottle cap
- Straw
- Label
- Cardboard (used if possible)
- Box
- Tape
- Scissors

METHOD

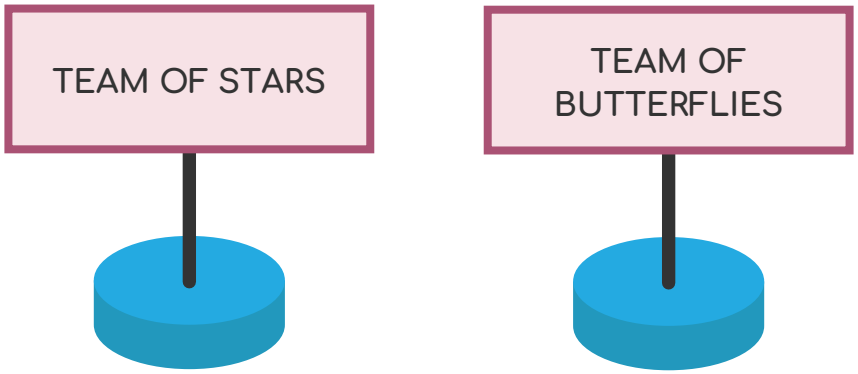
Discuss-Play:

1. The teacher enters the classroom, tells his/her students about goal setting and dreaming, and starts the discussion by asking the following questions.
    - "What do you think it means to dream?"
    - "What does it mean to set a goal?"
    - "What does it take to turn a dream into a goal?"
    - "Do you think there are limits to dreaming? And setting goals?
2. After students share their answers, the teacher writes down important key concepts (e.g., reality, planning, time, and effort).
3. The teacher asked the students, "Goal or Dream?" after hearing their opinions in class. Dream? Board Game.

    It is Remember to emphasise to the students the distinction between a dream and a goal. type of game aims to help students learn the situation permanently while encouraging them to work in groups.

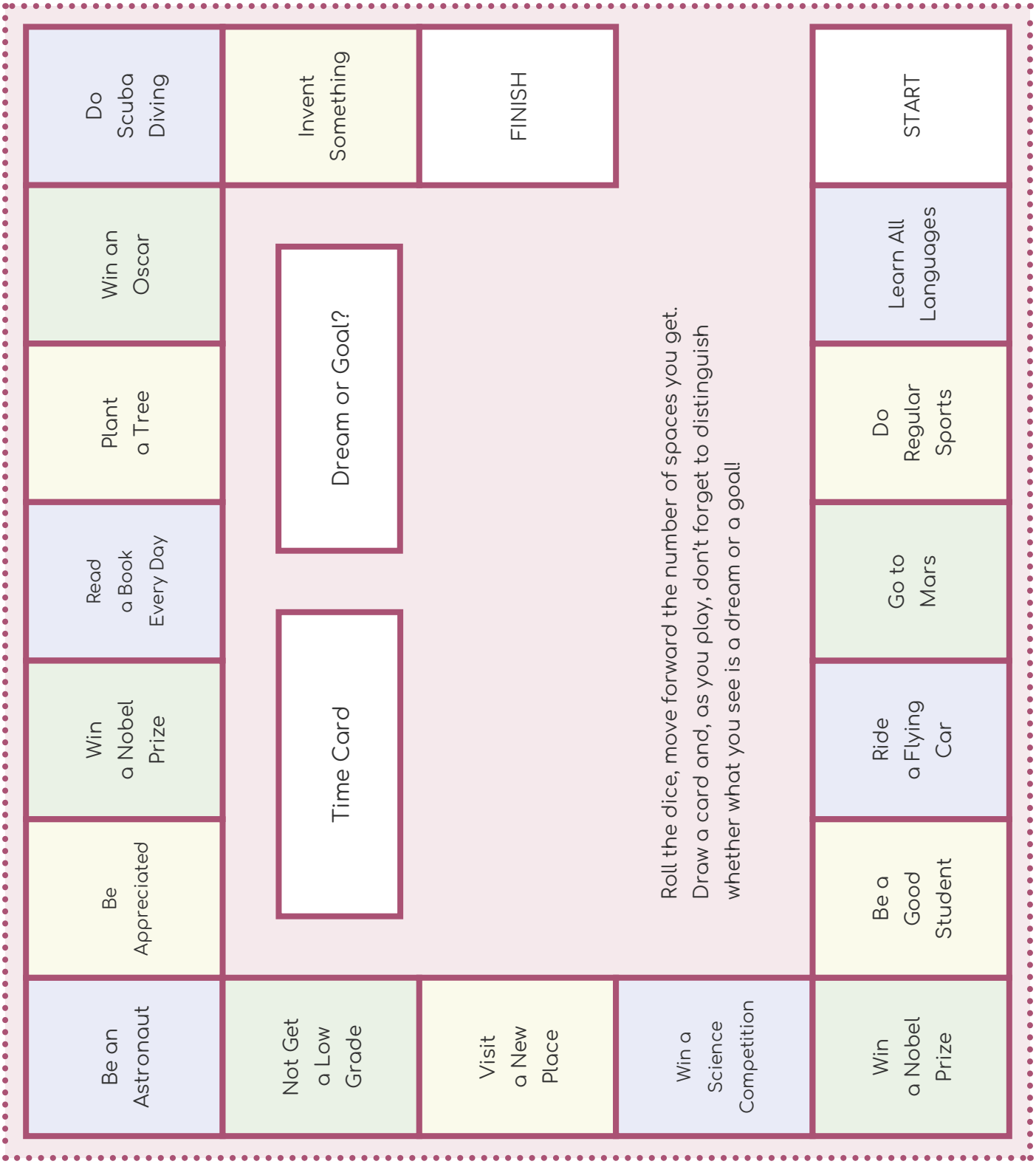
Description:

1. Students are divided into groups (it is important for the game's playability that there are no groups with more than four students; the number of students in the groups should be equal).
2. Each group is given the materials (straws, bottle caps, cardboard, labels, and tape) to make their pawns. The students are asked to utilize these waste materials and create a game pawn with their group names written on it.



3. Game materials are introduced to the students and related instructions are given:

Game Board:



Game Board:

Time Cards:

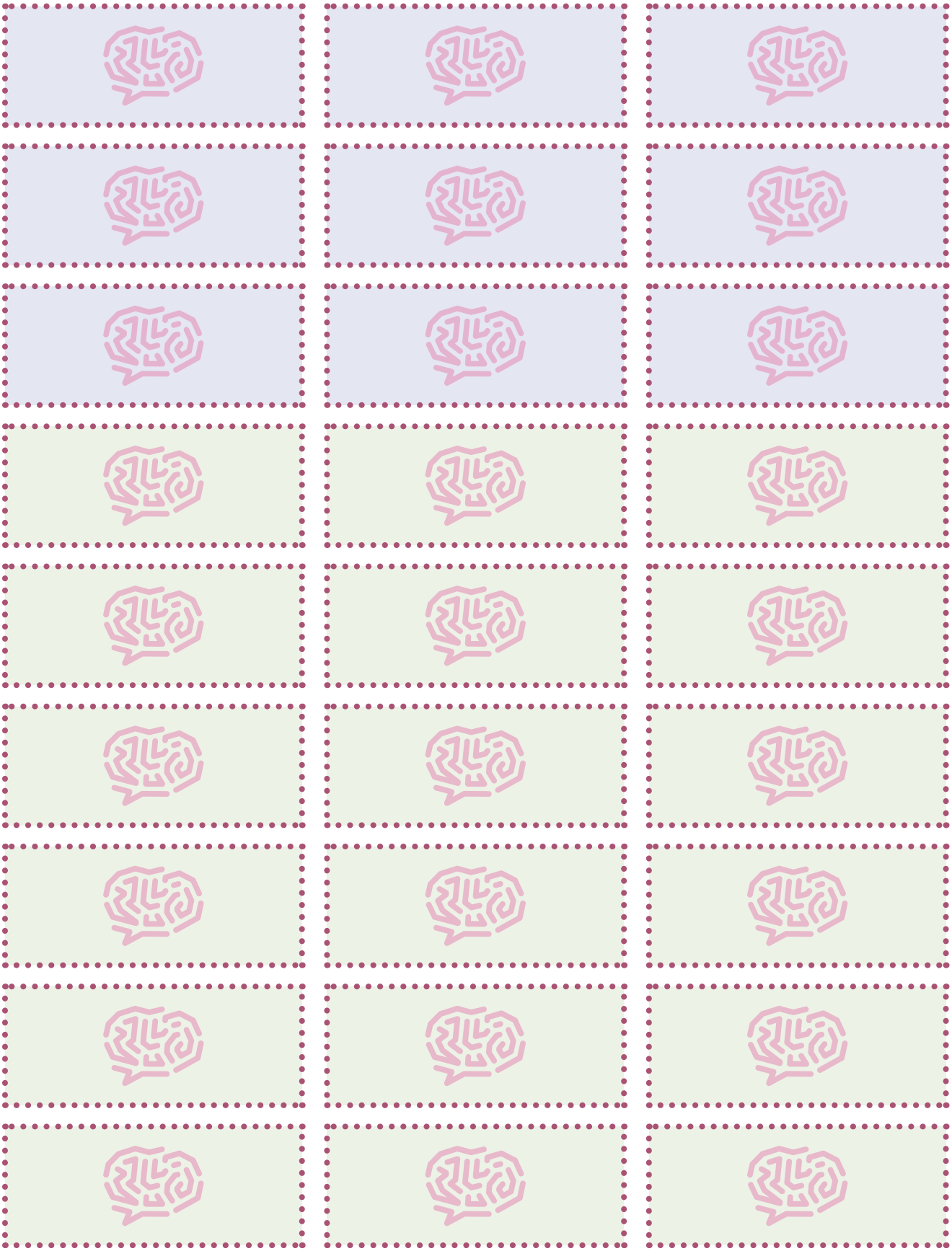
TIME CARD	I Can Do This in 1 Year	I Can Do This in 3 Years
I Can Do This in 5 Years	I Can Do This in 3 Months	I Can Do This in 6 Months
I Can Do This in 1 Months	I Can Do This in 1 Week	I Can Do This in 2 Week

Goal? Dream? Cards:

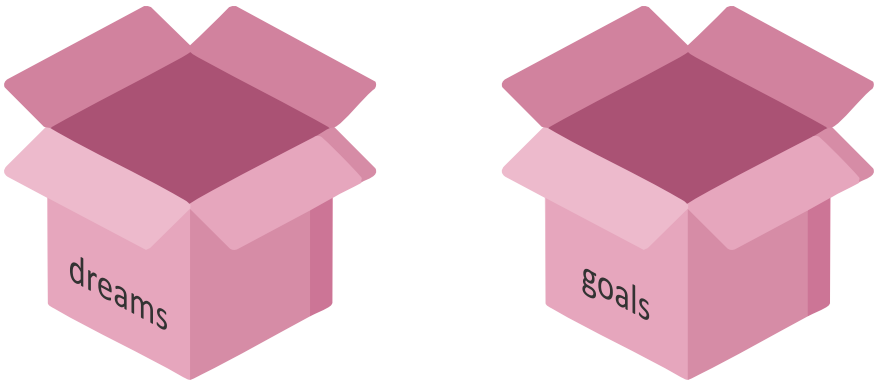
Hedef Mi Hayal Mi?	Be an Astronaut	Receive Praise
Win a Nobel Prize	Read a Book Every Day	Ride in a Flying Car
Learn All Languages	Plant a Tree	Win an Oscar
Go Scuba Diving	Invent Something	Get High Grades
Exercise Regularly	Travel Somewhere New	Win a Science Competition
Win a Nobel Prize	Be a Good Student	Go to Mars

Time Cards:

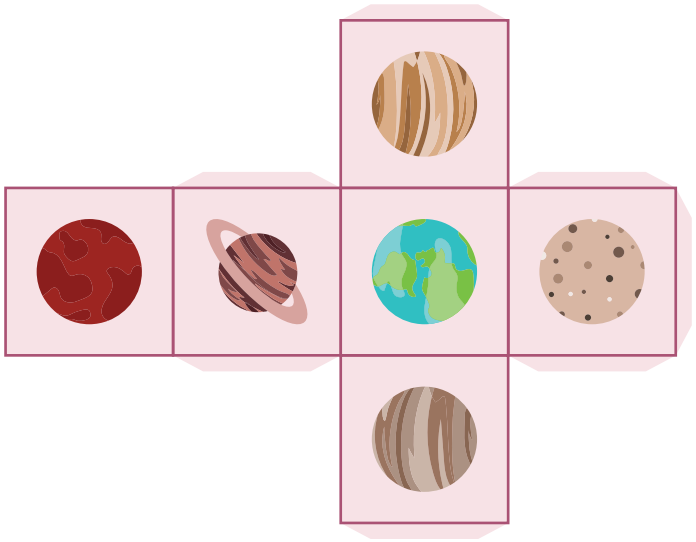
Goal? Dream? Cards:



Goal and Dream Boxes:



- Each group rolls the dice. Whoever rolls the biggest die starts the game
- The planets on the dice should be explained to the students. Each planet represents a number. Here, students will identify the number on the dice based on the order of the planets using their sixth-grade knowledge, and they will play the game this way.



- The group whose turn it is to play:
  - It proceeds according to the dice result.
  - The time draws the card.
  - Discuss whether the frame's "goal or dream" example can be realized in the given time.
  - Depending on their decision, he/she puts the card in the "Goals" or "Dreams" box.

4. After the rules and materials of the game are introduced to the students, the teacher explains the following.

   "This game is called "**Goal? Dream?**". We will play this game with you today. I want you to form equal groups. After forming your groups, you will make your pawns using the bottle caps, straws, cardboard, and labels you see. We aim here to reuse the cardboard we use without throwing it away. Next, I want you to write your group name on the label. Then, each group will roll the dice once, and the group with the highest roll will start the game. When you reach a point, you will draw a time card. I want you to discuss whether the goal-dream you see on the game board can be achieved in the time written on the time card. According to the result of the discussion, you will throw the game card with the text written on the board into the box labeled "Goals" or "Dreams." For example, I would love to be a world-famous teacher, but it would be my dream to do it in 1 week. This is something that will be in my dream box. In this way, the game will continue until the cards are finished."

5. After the game is over, the teacher divides the board into two sections: goals and dreams. They paste the goal and dream cards from the boxes onto the appropriate side of the board alongside the students.

6. Students are invited to explain the reason for 1-2 selected cards:

   "Why do you think this is a goal or dream?"

   "Could another group interpret it differently?"

7. Students receive small cards:

   "The most important thing I learned today..."

   "If I want to turn a dream into a goal, my first step is..."

8. The cards are hung on the "First Step from Dream to Goal" board.

9. The teacher summarises as follows:

   "According to Carol Dweck's mindset theory, dreams inspire, but goals require action. Setting goals, making an effort, and moving forward without giving up is part of a growth mindset. Remember, talent is something that can be developed. And real success comes with a planned effort.

According to Carol Dweck's theory of mindset, the distinction between goals and dreams is a decisive factor in the individual's process of achieving success. While dreams provide direction and inspiration, they cannot be realized without a concrete plan and systematic effort. Conversely, goals are specific, achievable, and action-orientated and support the individual's development step by step.

While individuals with a fixed mindset tend to give up in the face of failure, believing that their abilities are immutable, individuals with a growth mindset see failure as part of the learning process, reorganize their strategies, and keep moving forward. In this context, a growth mindset enables individuals to achieve sustainable success by transforming dreams into concrete goals. It encourages the individual to see his/her abilities as a construct that can be developed. As a result, although dreams can inspire, real success is only possible through a systematic and determined goal-setting process.

Objective 2 - Activity 1: To be able to set concrete goals.

Duration: 30 min.

Material: "Goal Setting Activity"

Materials:

- Pencil
- Sample target board

METHOD

Discuss-Write:

1. The teacher enters the classroom and briefly references the previous lesson on "the difference between dreams and goals." He asks the students the following:

   "Does anyone remember what we discussed regarding the differences between goals and dreams in the last lesson?"

   "What steps should we take to turn our dreams into goals?"

2. Writes the answers from the students as short notes on the board.

3. Here, the teacher emphasizes the following:

   "Effort, planning, and learning are very important to be successful. Setting goals is the first step on this path. So the work we will do today is important regarding what we want and how we think about moving forward."

4. The teacher then proceeds to the activity step.

Explanation:

1. Activity sheets are distributed to the students.

WHERE DO I SEE MYSELF?	
1 DAY LATER	What will I be doing? / What do I need to do to reach this point?
1 WEEK LATER	What will I be doing? / What do I need to do to reach this point?
1 MONTH LATER	What will I be doing? / What do I need to do to reach this point?
6 MONTH LATER	What will I be doing? / What do I need to do to reach this point?
1 YEAR LATER	What will I be doing? / What do I need to do to reach this point?
5 YEAR LATER	What will I be doing? / What do I need to do to reach this point?

2. The teacher goes to his/her desk and addresses the students as follows:

"In the previous lesson, we introduced the concepts of dream and goal with a fun game. I want you to close your eyes and go on a dream journey. Take a deep breath. The calendar shows 2030... You are now a high school student. How is your life? Where are you? What are you doing? Now open your eyes and write these thoughts on this paper."

"In this exercise, I would like you to write down where you see yourself in 1 year, 5 years, and 10 years. Remember that each goal takes a different amount of time to be realized. I had to study for 4 years when I wanted to become a teacher. (An example is given with a smile or a warm gesture to attract the students' attention)."

"Also, don't forget to mention briefly what you must do to achieve these goals."

3. Students are given 20 minutes (this time can be extended according to the class level).

4. After 20 minutes (the time can be flexible according to the class level), the teacher asks the students to write their names on the papers and collects them back.

5. Then he/she says the following sentences to his/her students (This part helps students to increase their inner awareness)

"How did it make you feel to fill in this paper?"

"Did you have these goals in mind beforehand, or did they take shape here?"

"Do you think the outlined steps are sufficient to achieve these goals?"

6. After discussing this with the class in a brainstorming environment, he/she distributes the papers back to them and takes out the sample target board he/she prepared.

"On this board are images representing the process of achieving my goals. Since completing my PhD and seeing the Oxford Library were among my goals, I cut out the images of these and other goals and pasted them here. I used flowers and ribbon stickers to make it a bit fancy.

Next week, I would like you to bring visuals related to this work. These can be printouts from newspapers, magazines, or the Internet. We will use them to create your own target board. But remember to be careful when using scissors at home or ask for help from an adult."

7. When analyzing the student activity sheets, the objectives' realism, relevance to the time period, and the feasibility of the steps specified are taken into account.

Students' goals should be evaluated with a supportive approach, not in a judgemental tone. For example, if a student says, "I want to become prime minister in one year", this goal can be guided in the following direction without minimizing it:

"That's an awe-inspiring dream. Let's talk about the first steps. What do you think would be the first step?"

Mindset Theory Link:

This feedback process supports students to understand that effort and time are decisive in achieving their goals and to adopt a "how can I achieve?" approach instead of "I can't achieve" thinking.

Objective 2 - Activity 2: Set concrete goals.

Duration: 50 min.

Material: Unit objectives activity with "SMART" steps.

Ingredients:

- Big papers
- Coloured pencils
- Pictures related to the unit
- Adhesive
- Tape
- Needle (for hanging on the board

METHOD

Do:

1. This activity is related to SMART steps. The teacher first explains the concept of "SMART," an acrostic, to the students.
2. Then, he/she asks the students to write individual objectives by SMART regarding the topic of the day, Mitosis and Meiosis.

What students are asked to do with this activity is to plan to organize their learning outcomes in an activity by using SMART steps. At the same time, helping and encouraging students to set goals for their development on a subject can create a snowball effect and help them be more planned and goal-oriented in their daily lives.

Students may initially have too many questions about the target topic or ask for too much guidance. Teachers should remember that each student is an individual and that suggestions/ directions should be made accordingly.

3. In the last stage, group work is carried out.

- Students form groups of 4-5 students.
- Each group prepares a single group poster based on the individual objectives written by its members.
- Posters are prepared on large sheets of paper with colored pencils, images, and glue.
- The teacher shows the sample poster.
- Each group presents its poster to the class in 2-3 minutes.

Explanation:

1. The teacher writes "SMART" in capital letters on the board. The teacher makes the following explanations and writes the Turkish equivalent and example next to each letter:

S - Specific: To realize our goal, we must set a clear, specific goal. (Here, he/she gives a vocal example: "I want to learn about celestial bodies" instead of "I want to improve my science knowledge.") While answering this question, he/she tells them to look for answers by answering questions such as "who, why, and what."

M - Measurable: Our goal should be measurable. "How will we understand this goal? We can measure it by exam score, making a presentation, or answering questions."

A - Achievable: What steps must we take to reach our goal? "What should we do to achieve this goal? The goal should not be too difficult or impossible."

R - Relevant: Your goal should have a meaning. ("If getting detailed information about meteorites will not lead to any change for you, it is not a goal suitable for SMART steps. Think about the changes you might experience if you realize this goal and answer accordingly.") "Why does the goal interest you? What will change in your life when you learn this information?"

T - Time-bound: This step relates to the time you set to achieve the goal, and it should be appropriate for a goal that will be achieved within a realistic time frame. "How long will you achieve this goal? One week or three days?"

Zihniyet Kuramı Bağlantısı:

"According to Carol Dweck, students with a growth mindset plan, schedule, and maintain their efforts to achieve their goals. Today, you will attempt this model to foster this mindset. In our lesson, we discussed the topics of mitosis and meiosis."

2. We engaged in a question-and-answer activity to explore these types of cell division and their similarities and differences. Today, we will participate in an activity where you will apply this knowledge.

3. After ensuring the teacher has thoroughly explained the SMART steps to the students, they will distribute the activity sheet and instruct the students to work individually before forming five groups. (The number of groups and the number of students in each group can vary, but it is helpful to have no more than six students in the groups to facilitate the smooth progress of the activities.)

S - Specific:

M - Measurable:

A - Achievable:

R - Relevant:

T - Time-bound:

4. During the group work phase, the teacher makes the following explanations:

"You will evaluate the SMART papers that you prepared as groups. You will prepare a poster based on the papers you filled in. You can also take a look at the sample poster I brought. You have 15 minutes to prepare your poster. Remember that you will have 10 minutes to present it afterward. Good luck."

5. The teacher then analyzes the groups' posters and poster presentations. After listening to the presentation, each group is encouraged to make one positive and one improving comment.

6. The groups are asked to pay attention to the following criteria while making their evaluations:

- Are the objectives in line with SMART criteria?
- Is the objective relevant and achievable?
- Is the measurement and time expression of the target clear?

Concrete goals are clear, measurable, attainable, realistic, and dependent on a specific time (SMART criteria). For example, "I want to be more successful" is a dream or a general wish, but "I want to improve my exam grade from 80 to 90 by studying science for 30 minutes every day" is a concrete goal. Students' ability to set concrete goals makes their learning process more efficient.

It is important that students set appropriate and achievable goals for themselves during this process. The individual may feel unsuccessful and demotivated if a goal is too general or vague. Therefore, taking small but concrete steps supports long-term success.

These conditions should be taken into consideration when evaluating student activity sheets.

7. After this activity, the teacher asks the students their opinions about it, and the lesson is completed.

"Did writing your goals according to the SMART model make your work easier?"

"How does it help if a goal is measurable and time-bound?"

"What will be your first step to achieve the goals you wrote down today?"

Mindset Theory Connection:

"The step you take today will be the foundation of your ability to realize greater goals in the future. Remember, being a person with a growth mindset starts with taking action, not dreaming."

Objective 3: Apply the principle of small steps in the working process.

Activity Name: Goal Board: Small Steps to Big Goals

Duration: 80 min.

Material: "Goal Board" activity.

Ingredients:

- Big papers
- Coloured pencils
- Pictures brought by the students
- Adhesive colored visuals
- Adhesive
- Tape
- Needle (for hanging on the board)

METHOD

Do:

1. This activity is related to the last two activities.
2. Students were previously asked to prepare visuals for the target board.
3. Students learned to set goals with SMART principles.
4. In this activity, the teacher hangs the prepared target board on the board or on the notice board. Explains briefly.

   "On my dashboard, I have goals such as completing my PhD, going on a mountain hike, and writing a new book. For each of them, I have set small steps, and today I want you to think similarly."

5. Preparation of the panel is started.

Explanation:

1. The teacher enters the classroom, says hello, and gives a short reminder:

"Last week, we wrote and reflected on our SMART goals. Today we are making these goals 'visible'. We want them to inspire and motivate us as we look at them."

2. Since he had told his students about this activity beforehand, he expects them to come prepared. Without wasting time, he pastes the target board he prepared in a place where everyone can see it and turns to his students:

"Are we ready to visualize our goals? Let's see, everyone, take out the photos they brought, and let's get started."

3. The teacher gives the class 60-70 minutes to do this activity.

4. The students place their short, medium, and long-term goals on their boards.

They are encouraged to write a note under each goal in the following format:

Objective:

My first small step:

What will change in my life when I achieve this goal?

5. The teacher makes a statement:

The Mindset Theory Connection:

"Successful people don't achieve big goals all at once. They move towards them in small but regular steps. Write down these small steps today. Because the greatest achievements are the product of a determined process."

6. In the remaining time, volunteer students can introduce their target boards in short sentences in the classroom.

7. Other students are asked for a positive comment and suggestions for improvement according to the following evaluation criteria.

- The level of realism and feasibility of the objectives
- Concreteness of the first steps written under each target
- The visual is organized and carefully prepared

Important Note: Students' boards should never be judged. Even if the goals seem unattainable, the teacher's task is not to "reduce them to realism" but to help the student make them attainable by dividing the journey into steps.

Guidance such as "This is a difficult goal, but what can you do as a first step?" supports a growth mindset.

8. At the end of the activity, the teacher concludes the lesson with a closing sentence:

"Hang your board in a place at home where you can see it often. Every time you look at it, remember your small steps. The more consistent you are, the closer your goal will come to you."

Objective 4: Apply a chosen time management strategy in a learning process.

Activity Name: Prioritising Time: My Learning Strategy with Eisenhower Matrix

Duration: 80 min.

Material: "Eisenhower Matrix"

Ingredients:

- Flashcards
- Tape
- Paper
- Pencil

Note to Practitioner: Here, the things to be done to reinforce students' knowledge and to ensure prioritization in their lives are mentioned. In the remaining 10 minutes with the students, the teacher should talk about prioritization in daily life and provide students to learn better by giving examples of prioritization related to subjects such as lessons and school.

METHOD

Do:

1. The teacher enters the classroom. After entering the classroom, the teacher turns to his/her students to start a conversation with them and says the following sentences:

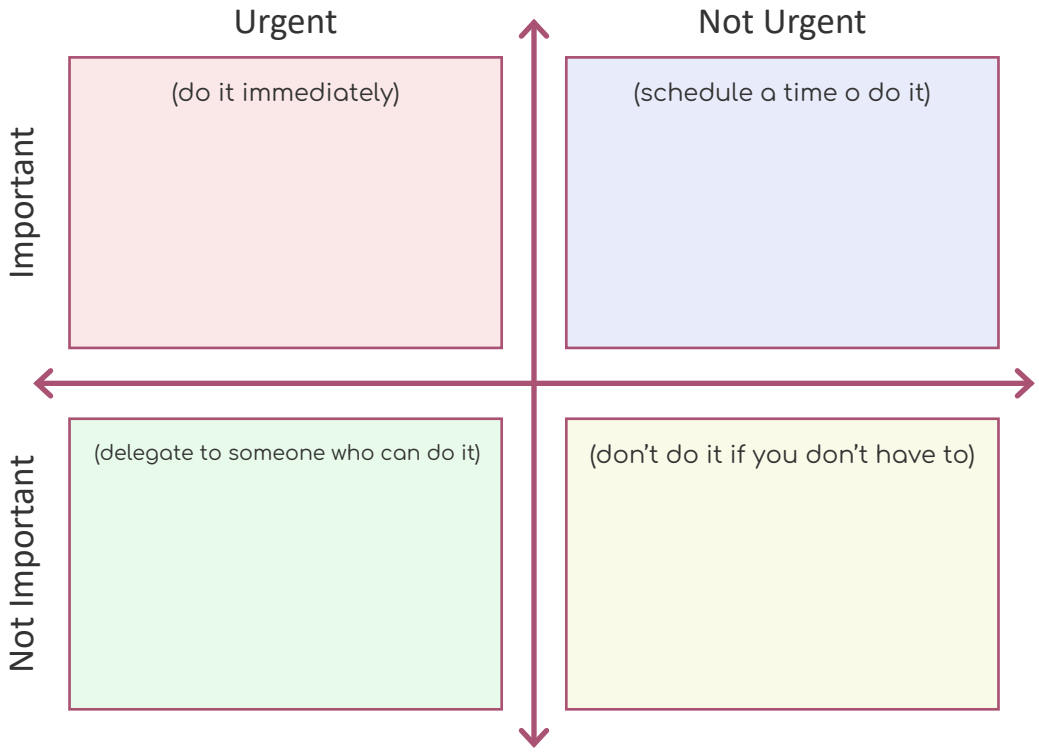
"Do you think everything is equally important in our lives? When you have a fever, do you first deal with the fever, or do you deal with your sore throat?"

2. After evaluating the students' answers, the teacher puts the Eisenhower Matrix table on the board.

3. Explain the working principle of this matrix to students.

4. Explaining this matrix to students provides more permanent learning by associating it with examples from daily life.

Ex: I have an exam, but my friend invited me for dinner. This is an example of a non-urgent situation because my exam is more important and urgent.



Eisenhower Matrix

Explanation:

1. The teacher explains the working principle of the Eisenhower Matrix with the following sentences:
   - What you see on the board is an example of the Eisenhower Matrix. This matrix helps us to prioritize our lives. It helps us to categorize whether something is really urgent enough to be done at the moment, whether it is urgent but can wait a little longer, or whether it is not urgent to be done at all.
2. The teacher gives an example while explaining the matrix:
   - **Urgent and Important:** "I have a science exam tomorrow."
   - **Urgent but Unimportant:** "My friend invited me to play a game."
   - **Important but Not Urgent:** "I have a presentation next week, I need to prepare."
   - **Neither Urgent Nor Important:** "Starting a new series."

The Theory of Mindset Connection:

"In the journey to success, it is important not only what we want but also what we focus on and when we focus on it. Today, we will experience this together."

3. Students are given flashcards containing situations, concepts, and examples related to mitosis and meiosis.

4. Each student glues these cards to the paper on which he/she has drawn the Eisenhower Matrix.

"Based on our unit, today we will classify the stages of a cell and the states written on the flashcards in this matrix. You will explain why you made these classifications on the papers I have given you."

For example: "I have put this situation in the red pane. This page is for urgent and important things. Because: ....."

Replication of DNA	Separation of Sister Chromatids	Reformation of The Nuclear Membrane	Meiosis Occurring in Reproductive Mother Cells
Cell Growth	Replication of DNA	Cell Reaching a Certain Size	Cell Preparing for Division
Cytoplasmic Division	Ensuring The Growth And Repair of Organisms	Hormones Triggering Cell Division	Maintaining The Flexibility of The Cell Membrane
Ensuring Genetic Diversity	Formation of Spindle Fibers	Increase in The Number of Organelles	Some Cells Stop Dividing (Nerve Cells Do Not Divide)
Chromosomes Aligning in The Center of The Cell	External Factors Such as Temperature, pH Affect Division	Stem Cell Studies	Division Time Varies in Different Organisms

5. A few students present their categorization.
6. The teacher pays attention to the following in the presentations during the activity:
    - Was the student able to place the flashcards in the correct compartments?
    - Was there logic and justification in their explanations?
    - Did he/she understand and apply the time management strategy?
7. The teacher asks guiding questions:
    - "Why did you consider it 'important'?"
    - "Where would I put this card if I were you?"

This sharing promotes different perspectives among students.

8. Finally, the teacher asks the students the following questions:
    - "Was it hard to decide today?"
    - "Is it enough just to know the information, or how you use it is also important?"
    - "Would you consider using this matrix during exam week or homework?"

Important Note:

The teacher helps the students during this activity. Although categorizing and explaining why is initially challenging, this activity is important for students to understand the prioritization process.

With the Eisenhower matrix, students can associate the knowledge they have acquired with daily life. Students gain the ability to distinguish between critical or complementary processes. Students are evaluated according to the way they apply these skills in the activity, and necessary feedback is given to students who have difficulties.

MODULE 4: STUDY SKILLS

Objective 1: Students will be able to develop awareness about the use of various learning strategies.

Unit: F.7.1. The Solar System and Beyond / Earth and the Universe

Learning Outcome:

F.7.1.1. Space Research

F.7.1.1.4. Explains the structure and function of a telescope.

a. Types of telescopes are mentioned.

b. Light pollution is discussed.

F.7.1.1.5. Infers the importance of telescopes for the development of astronomy.

a. The selection of observatory sites and the conditions these sites must have are discussed.

b. Contributions of Western and Turkish-Islamic astronomers are addressed.

Duration: 40 min.

Learning Strategy: Leitner Box

Materials: Paper, pencil, cardboard tubes, lenses, tape, instruction card, medium-sized box, concept cards

METHOD

Draw:

The teacher enters the class with a telescope model and asks students what a telescope is and what it is used for:

“Hello, children! Have you ever used a telescope? What do you think a telescope is for?”

Then, the teacher asks students to take out a piece of paper. They are asked to draw their telescope on the paper. Afterwards, the teacher asks:

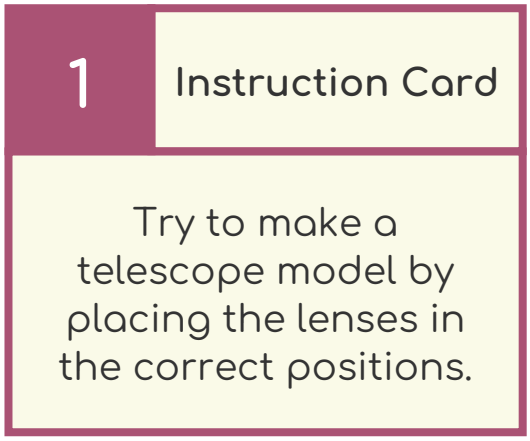
“Why are telescopes so important in space? How do they affect our observations?”

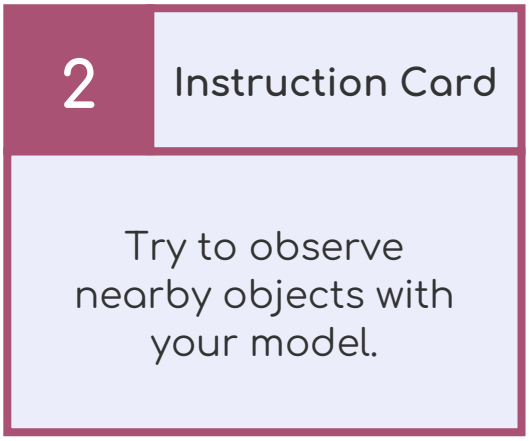
The questions are discussed in the classroom environment.

Apply:

The teacher has students carry out an experimental activity related to telescopes. The experiment is described below:

1. Students are divided into groups (3-4 students per group).
2. Each group is given materials to build a simple telescope (cardboard tubes, lenses, and tape) along with an instruction card. The instruction card contains the following directions:





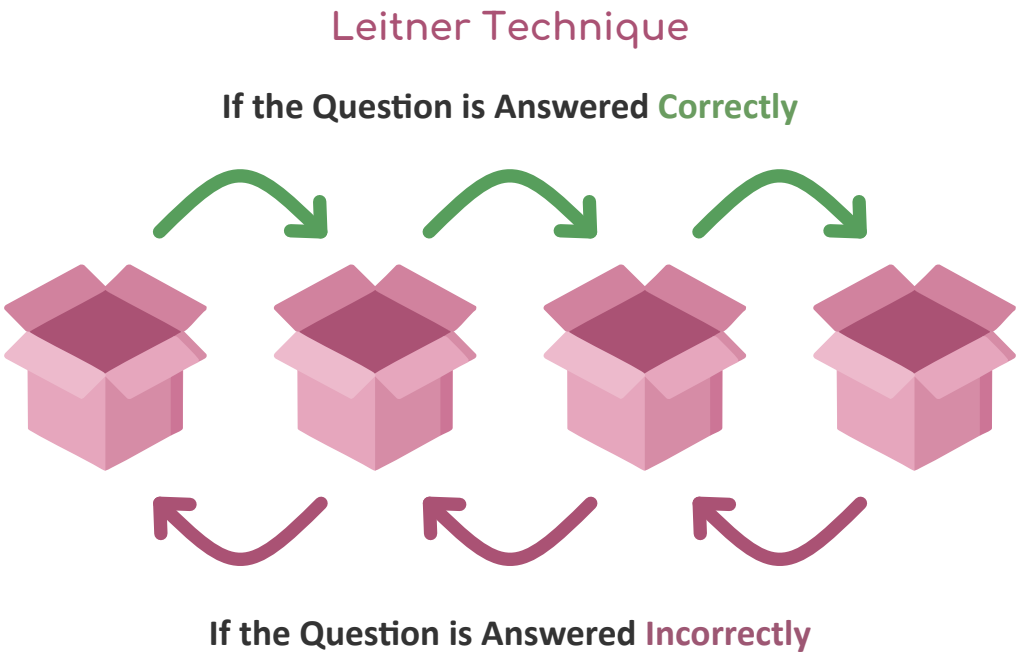
3. During the group work, the teacher circulates among the groups, providing guidance to the students. At this time, the teacher asks questions such as, “How did you decide on the position of the lens?” and “How did you decide on the length of the tube?” The teacher listens to the students’ answers and offers further guidance as needed.
4. 4. After the experiment, the teacher asks, “Why do you think lenses are important for the functioning of a telescope?” The answers to this question are discussed as a class.

Evaluation:

The teacher addresses the students:

“Now, we are going to benefit from a new method. This method is called the Leitner Box. If you are having difficulty learning certain concepts, I believe that this learning strategy will make it easier for you to master them. The Leitner Box is a learning system that allows you to repeat and review information in an organized and effective way. It is especially useful for subjects that require memorization (such as learning vocabulary, formulas, or definitions). If you like, we can even come up with our own Turkish name for this box.”

At this point, an image of the ‘Leitner Box’ is displayed on the smart board.



The teacher says, “First, let’s talk about how to make and use the Leitner Box.” A medium-sized box and concept cards are shown to the students. It is explained that the front side of the concept cards contains the term, and the back side contains its definition. The box is divided into at least five compartments, each representing a level of learning. It is demonstrated that all concept cards are initially placed in the first compartment. When a student correctly answers the question on a concept card, the card moves to the next compartment. If the answer is incorrect, the card remains in the same compartment. The teacher explains that when a concept card reaches the fifth compartment, the information is considered learned.

Concept cards are listed below:

Ali Kuşçu	He is known for his studies in mathematics, astronomy, and linguistics.
Space Pollution	Rocket parts, fuel tanks, and space probes negatively affect space.
Galileo	He used the telescope for the first time to observe the sky.
Telescope	Enables detailed observation of celestial objects.
Edwin Hubble	Discovered that the universe is expanding.
Observatory	Places where telescopes are set up to observe the sky.
Western Astronomers	Conducted studies to understand the structure of the Solar System.
Turkish-Islamic Astronomers	Conducted pioneering work in the science of astronomy.
Light Pollution	At night, artificial light sources reduce the visibility of stars and other celestial bodies in the sky by emitting excessive light.
Ulugh Beg	Built an observatory in Samarkand and created a catalog containing the positions of stars.
Heliocentric System	The model that states the Sun is at the center of the Solar System and the planets revolve around it.
Kepler	German astronomer and mathematician.

First Activity:

1. The class is divided into two groups.
2. One group is called the “Science Ambassadors,” and the other is the “Rescue Team.”
3. Students assigned the role of “Science Ambassador” are given the task:

“Explain the importance of telescopes in astronomy with a few examples.”

4. Students assigned to the “Rescue Team” are given the task:

“Describe a problem that can be caused by light pollution and develop a creative solution to this problem.”

5. Both groups determine their answers and then present their ideas to the other group. The answers are evaluated by the students in the class.

Second Activity:

1. A quiz called “Astronomers and Their Contributions” is organized.
2. The class is divided into four groups, and each group prepares three questions.
3. The questions must be about astronomers and their contributions.
4. In the quiz, each group’s questions are posed to the other three groups.
5. Among the three groups, the first group to answer correctly earns a point.
6. The group that collects the most points at the end of the quiz wins the game.
7. The winning group is congratulated for their success by placing a star sticker on each member’s collar (with positive feedback).

Objective 2: Students will employ effective study skills during the learning process.

Unit: F.7.1. Solar System and Beyond / Earth and Universe

Learning Outcome:

F.7.1.2. Beyond the Solar System: Celestial Bodies

F.7.1.2.1. Recognizes the process of star formation.

a. The concept of a nebula is introduced.

b. Examples of nebulae are provided.

c. The concept of a black hole is introduced.

F.7.1.2.2. Explains the concept of a star.

a. Types of stars are mentioned.

b. The naming of star groups seen from Earth, known as constellations, is addressed.

c. The distance between celestial objects is expressed in light years.

Duration: 40 min.

Learning Strategy: Cornell Note-taking Technique

Materials: Paper, pencil, constellation visuals.

METHOD

Draw:

The teacher enters the classroom holding a large black cardboard (A0-A1 size, or uses the board divided in two if no cardboard is available). The teacher asks:

“Has anyone ever watched the night sky? Perhaps you’ve noticed the Big Dipper or Orion. Why do you think the night sky is so fascinating and mysterious?”

Students are encouraged to share their experiences. The teacher asks students to come to the board (or cardboard) and represent their sky-watching experiences through drawing.

Then, the teacher announces:

“Today, I will take you on a distant journey. We will discover one of the universe’s most mysterious subjects: how stars form and what constellations are.”

Apply:

The teacher shows the students a short video about star formation and nebulae (example link). During the video, the “Cornell Note-taking Technique” is used.

Before the video, the teacher explains:

“Now we will use a technique called the Cornell Note-taking Technique. Developed by Walter Pauk in 1949 at Cornell University, this technique aims to improve students’ reading and listening skills. On a sheet of paper, draw a line to separate the left and right sides. Write your main notes on the right. After reviewing these notes, summarize the main ideas or keywords on the left side. Later, cover the right side and use the keywords to recall the details. This process is repeated until the information can be recalled easily. The Cornell Method is more than just a note-taking system; it is a guide that supports effective study by organizing information.”

After explaining, the teacher distributes the worksheet and instructs students to use the Cornell technique to take notes during the video.

Cornel Technique Worksheet

Title	Meeting Date Other Dates
Key Words	Detailed Explanations
Summary	

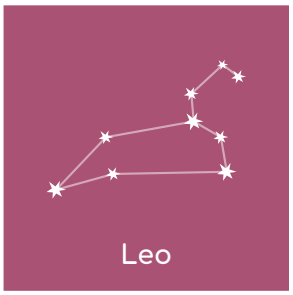
After watching the video, the teacher asks students the following questions and expects their answers:

- What is the role of nebulae in star formation?
- What did you learn about the formation of black holes?
- What types of stars did you see in the video?

The correct answers to these questions are discussed and clarified as a class.

Assessment:

The teacher says to the students “Let’s do an activity now and test ourselves to see if we have understood the learning outcomes of this unit.” the teacher then distributes printed images of constellations to the students.



Divide students into 6 groups. Assign each group a constellation (Leo, Ursa Minor, Orion, Ursa Major, Serpens, Gemini). Each group investigates their constellation, focusing on these questions:

- Which stars make up this constellation?
- What is its mythological or historical story?
- In which season and direction can it be seen today?

Groups present their findings to the class. Show the constellation's sky position as a visual aid during the presentation.

Discussion Questions (for class reflection):

- Why have constellations been important throughout human history?
- How might ancient civilizations have used these constellations?
- In your opinion, how might constellations be used in the future?

Ceative and Analytical Extension Activities

Activity 1: Design Your Own Constellation:

1. Students design their own imaginary constellation and write a story about it.
2. The story should explain how the stars formed and what the constellation represents.
3. Students summarize their ideas using notes they previously took with the Cornell Note-taking Technique, incorporating concepts like star formation, nebulae, and constellations.
4. Selected students present their stories to the class, followed by brief teacher feedback.

Activity 2: Paired Discussion:

1. Students work in pairs and discuss what they have learned.
2. They should ask each other the following questions:
    - What do you think about the size of the universe?
    - If you could witness the birth of a star, what would that experience be like?
    - What is a nebula, and why is it important for star formation?
    - How are constellations named, and what is their historical significance?
    - How long is a light-year?
    - How could you use what you learned today in your daily life?
3. Choose one pair to present their answers and reflections to the class. Facilitate a whole-class discussion to ensure key points and correct answers are addressed.

Concept cards prepared as an evaluation tool for the relevant section are listed below.

Nebula	A structure made of dense clouds of gas and dust where stars are formed.
Star	An astronomical object that produces its own light and emits energy through the conversion of hydrogen into helium.
Black Hole	A cosmic object with extremely high density from which not even light can escape.
Constellation	Groups of stars that form specific shapes when viewed from Earth.
Light Year	A unit of length that expresses the distance light travels in one year (approximately 9.46 trillion kilometers).
Supernova	A massive explosion that occurs during the final stage of a star's life.
Protoplanetary Disk	A disk of gas and dust orbiting around a newly formed star.
Main Sequence Star	Most stars spend the majority of their lifetimes in this phase, burning hydrogen.
Neutron Star	An extremely dense celestial object formed after the supernova explosion of massive stars.
Red Giant	A large and bright type of star that forms when stars expand after exhausting their hydrogen fuel.
White Dwarf	The hot and dense core that remains after stars have exhausted their fuel.
Milky Way Galaxy	The galaxy in which the Solar System is located.

Objective 3: Students will be able to employ effective study skills during the learning process.

Unit: F.7.3. Force and Energy / Physical Phenomena

Learning Outcome:

F.7.3.1. Relationship Between Mass and Weight

F.7.3.1.1. Defines the gravitational force acting on mass as weight.

a. Emphasizes that weight is a force.

b. Has students measure weight using a dynamometer.

F.7.3.1.2. Compares the concepts of mass and weight.

Duration: 40 min.

Learning Strategy: Leitner Box, Pomodoro Technique

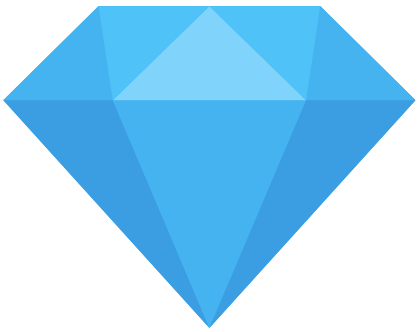
Materials: Pencil case, water bottle, dynamometer, scale, concept cards, question cards, medium-sized box, alarm.

METHOD

Draw:

The teacher says, “Today we will learn about the difference between mass and weight. Let’s imagine for a while that we are away from planet Earth and living on the Moon. Do you think your weight would remain the same on the Moon as it is on Earth?” The teacher asks this question, receives answers from the students, and creates an environment for classroom discussion.

The teacher draws pictures of a diamond and a tennis ball on the board and asks which one is “heavier.” Meanwhile, the teacher introduces the idea that mass and weight are different things.



Apply:

The teacher has the students conduct an experiment so that they can understand through experience that weight is a force.

The teacher asks the students to use a dynamometer (provided by the teacher) to measure the weights of various objects brought into the classroom (such as a pencil case and a water bottle) and record these weights. Then, the students are asked to measure the mass values of the same objects using a scale (provided by the teacher) and to compare these mass values with the weight values obtained from the dynamometer. The students write the values in the table below, and the teacher creates an environment for classroom discussion.

	Mass	Weight
Pencil Case		
Water Bottle		

Evaluation:

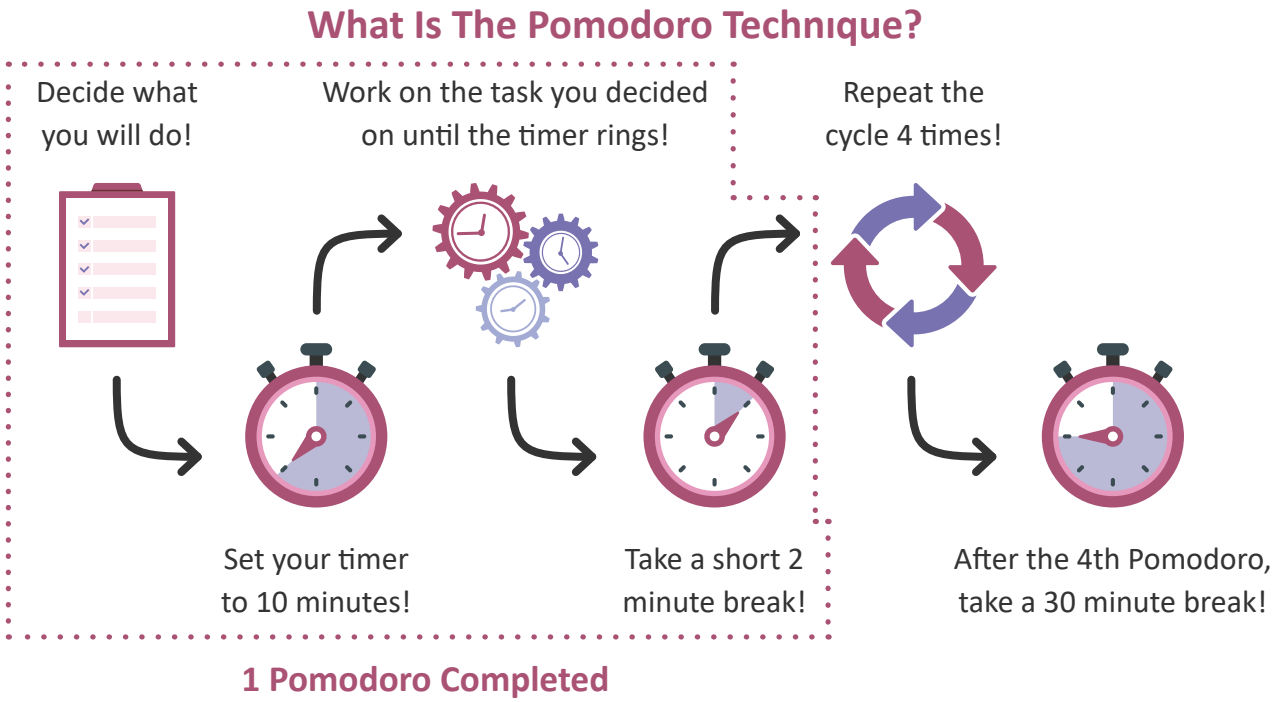
At this stage, the teacher utilizes the Leitner box method. The teacher asks the students, “We have learned the Leitner box before. Now I think we can use this box for this topic as well. Who remembers? How did we use the box?” and gives the students a chance to respond. After recalling the Leitner box method through classroom discussion, the activity is carried out. The teacher provides each group with a medium-sized box (from the required materials) and this time gives them blank concept cards. The students are divided into eight groups, and each group is asked to create two concept cards. The students are reminded to write the concept on the front of the card and its explanation on the back. This time, the Leitner box method is applied using the concept cards prepared by the students. A mini competition is organized among the students.

Alternative Activity:

The teacher enters the classroom and says, “Today I am going to tell you about a wonderful technique called the Pomodoro Technique, which will help you use your time more efficiently while studying or doing your homework. This technique will help you both concentrate and make studying easier. The Pomodoro Technique is a time management method that allows you to work on a task or assignment in short, focused intervals. In this method, the study period is divided into short breaks in a certain order. In this way, you can work without losing your focus and refresh your mind during the breaks.” The teacher then explains how to implement the Pomodoro technique in the classroom:

1. **Setting a Goal:** First, determine the question you want to work on or the task you want to complete. This will be an individual activity. You can ask yourself a question and aim to find its answer. But while doing this, you will use a technique. Now, everyone should set a total of four goals (questions). You will first tackle your initial goal. Then, we will move on to the other goals one by one. At this point, the teacher shares sample goals/questions that students can set:
    - Is weight always the same?
    - What is the difference between mass and weight?
    - How do mass and weight change if you go from the Earth to the Moon?
    - How can we notice in daily life that weight depends on gravity?
    - What are the consequences of weight being a force in daily life?
    - How does weight affect a moving object?
    - If gravity disappears completely, what would be the effects on weight and mass?
    - In what situations is it important that mass remains constant in daily life?
    - Is the force of gravity the same everywhere on Earth? Why?
    - Can two objects made of different materials have the same mass and weight?
    - How could you design an experiment to understand the difference between mass and weight?
    - How does the fact that weight is a force affect the movement of objects?
    - Is it possible to measure weight on different surfaces?
    - Why does your weight show small differences at different points on Earth?
    - Is it possible to measure weight in an environment where gravity is weak?
    - Can different results be obtained by measuring an object with constant mass using a dynamometer?
2. **10 Minutes of Study:** I will set the timer to 10 minutes. I will bring an alarm to the class. During this period, focus completely on your first goal/question. This period is called a pomodoro. You can use your resources during this time.
3. **2 Minutes of Rest:** After studying for 10 minutes, be sure to rest for 2 minutes. During this break, we can all listen to and sing a favorite song together.

4. **4 Pomodoro Cycles:** After repeating what we did in the first three steps four times (you will work on the other goals/questions set in the previous steps), we will take a longer break (15-30 minutes). This period is intended to fully refresh your mind.

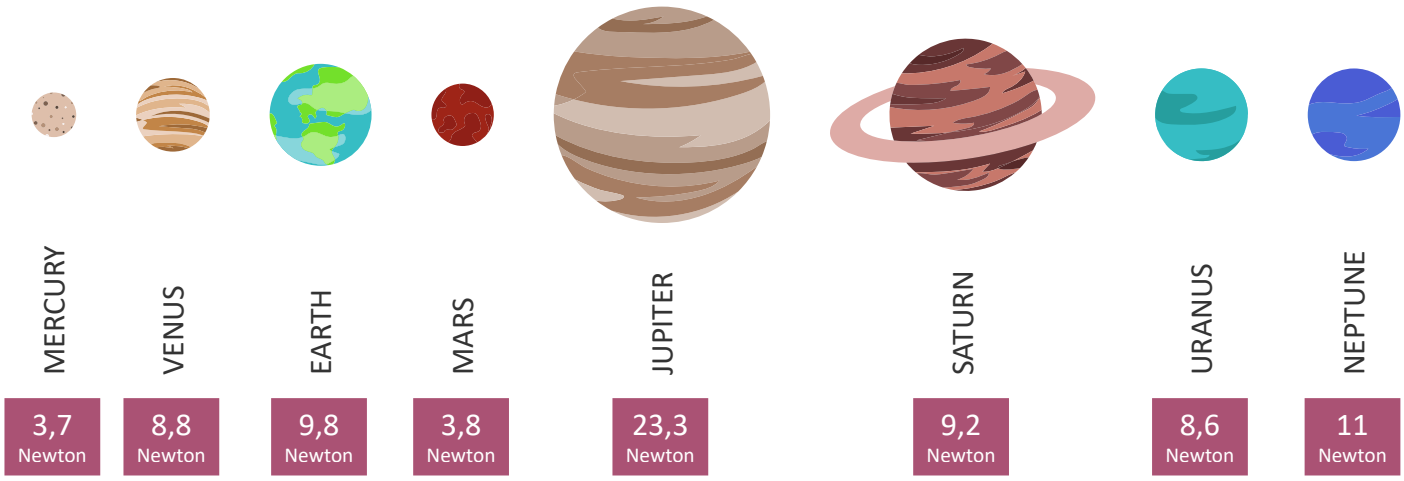


At the end of the Pomodoro activity, the teacher asks the students to share their experiences and whether they would like to use this method in other subjects.

The teacher then continues the process by having the students engage in two additional activities to encourage them to apply concepts in real-life situations.

Activity 1:

1. The teacher asks the students the following question: “If you lived on a different planet, what would your mass and weight be? Which measurement would change, and which one would remain constant?”
2. The answer to this question is discussed in the classroom environment.
3. Afterwards, the teacher shares the gravitational forces of various planets and asks the students to calculate their own weights. For example, a person with a mass of 90 kg on Earth has a weight of approximately 882 N on Earth (Weight is calculated by multiplying mass by the gravitational force). In the visual below, you can see the approximate gravitational force values applied to a 1 kg object by different planets.



Activity 2:

1. The teacher explains, with examples, how the concepts of weight and mass are often confused in daily life, such as: “The kilogram measured on the scale at the market is actually mass. However, in everyday language, we often use the unit of weight as well.”
2. The teacher asks the students to find other examples where the concepts of weight and mass might be confused.
3. Three students are invited to the board, and the examples are discussed in the classroom environment.

Afterwards, the teacher has the students play a game. The progress of the game is as follows:

1. Four different circles are formed in the classroom.
2. The students are divided equally among these circles.
3. In each circle, there is a question card (to be duplicated in 4 copies).

Questions in the circles:

Circle 1: What is weight?

Circle 2: Write two differences between mass and weight.

Circle 3: Calculate the weight on Earth of a person who has a mass of 60 kg on the Moon. (Gravitational force: Earth = 9.8 N/kg, Moon = 1.6 N/kg)

Circle 4: Give an example of confusion between weight and mass in daily life.

4. Students can solve the question in the circle to which their group is assigned.
5. Students write the answer on the back of the card and present it to the teacher. If the answer is correct, the group receives feedback from the teacher and can move from their current circle to the next one. For example, the group in circle 2 proceeds sequentially to circles 3, 4, and 1 (see the diagram).
6. The group that correctly answers the questions in all circles in the shortest time wins the game.

Concept cards prepared as an evaluation tool for the relevant section are listed below.

Mass	The unchanging amount of matter in an object.
Weight	The effect of the gravitational force on an object.
Gravitational Force	The attractive force that the Earth exerts on objects.
Dynamometer	A tool used to measure force.
Newton	The unit of weight, since weight is a force.
Difference between Mass and Weight	"The amount of matter is constant." and "It depends on the force of gravity and is variable."
Weight on the Moon	The gravitational force on the Moon is about one-sixth that of the Earth.
Gravitational Force (G Force)	The force that causes masses to attract each other.
Measuring Mass	Measured by a balance scale or an electronic scale.

Objective 4: Students will be able to experience proactive ways of studying.

Unit: F.7.3. Force and Energy / Physical Phenomena

Learning Outcome:

F.7.3.2. Relationship between Force, Work, and Energy

F.7.3.2.2. Classifies energy as kinetic and potential energy by relating it to the concept of work.

a. Potential energy is classified as gravitational potential energy and elastic potential energy.

b. It is stated that potential energy depends on mass and height, and kinetic energy depends on mass and velocity.

c. Mathematical relationships are not included.

Duration: 40 min.

Learning Strategy: Two Slow, One Fast

Materials: Toy car, spring, ball, ruler, wedge, paper, pencil.

METHOD

Draw:

The teacher brings a toy car, a spring, and a ball to the classroom. Then, the teacher asks the students three questions. The students' answers are listened to, and each answer is written on the board along with an explanatory drawing.

Questions:

- What happens when we push this toy car?
- What happens when we lift this ball up and then release it?
- What happens when we compress this spring and release it?

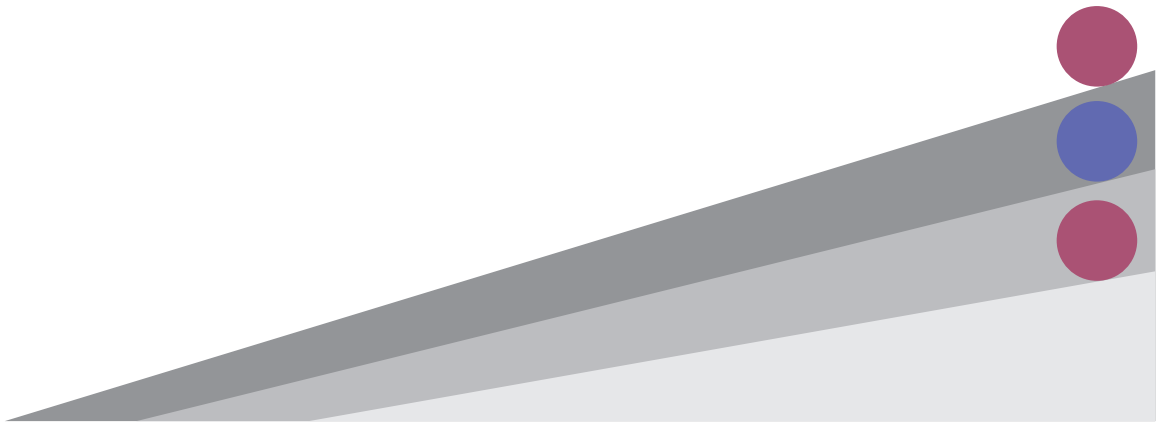
Apply:

The teacher uses reinforcing statements about kinetic and potential energy. The teacher says, "Children, when we think about an object, the types of energy it possesses depend on its movement or position. For example, a ball standing on top of a hill has potential energy because it is elevated. If the ball starts to roll, this energy turns into motion and is called kinetic energy. Potential energy depends on the object's mass and height, so a heavier object or an object dropped from a higher place has more potential energy.

Kinetic energy depends on the object's mass and speed. As its speed increases, its kinetic energy increases. We can see these transformations in many areas of daily life. For example, when you are on a swing, your potential energy increases as you go up, and as you go down, this energy transforms into kinetic energy. Thus, energy is constantly being transformed, enabling movement and work." Then, the teacher divides the students into three groups and gives each group an experiment set. The experiment set contains a ball, a toy car, a spring, a ruler, and wedges. Each group shares their experiment results with the other groups.

1. **Group:** Observes how far a ball rolls when dropped from different heights and records the results in a table.

	Height 1	Height 2	Height 3
Distance			

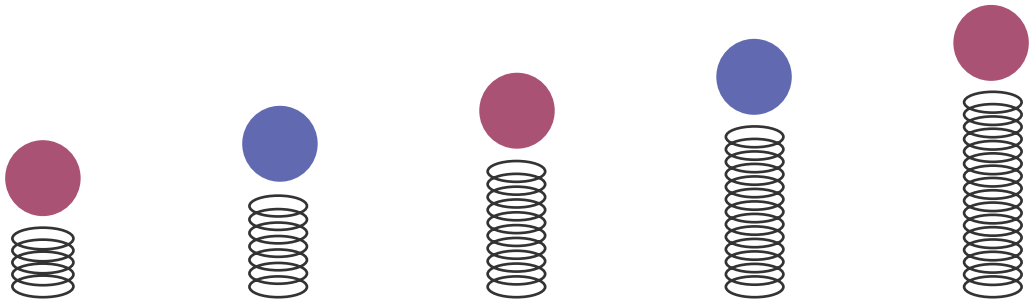


2. **Group:** By pushing the toy car with different amounts of force, record and compare the distances it travels in a table.

	Force 1	Force 2	Force 3
Distance			

3. **Group:** By compressing a spring to different extents and then releasing it, measure the distance traveled by the objects it moves and record these in a table.

	Spring 1	Spring 2	Spring 3	Spring 4	Spring 5
Distance					



After the students express the results of the experiment, the teacher says: "While conducting your experiments, which types of energy can you mention? Can you define potential and kinetic energy by thinking about your experiment?"

The teacher listens to the students' answers, and then proceeds to the next stage.

Evaluation:

The teacher conducts an activity using the "Two Slow, One Fast" strategy. The teacher tells the students: "Today, I will introduce you to a learning strategy called 'Two Slow, One Fast' that we will be using in our lessons. This strategy will help us study more effectively and understand topics better. The 'Two Slow' part means that we need to study a topic slowly and carefully twice to understand it properly. This helps us absorb the information. During the first reading, you become familiar with the new information and get a general idea. In the second reading, you focus on details and try to understand the key points. The 'One Fast' part refers to the phase where we review what we've learned and test ourselves. In this step, we quickly go over the information to see how much we remember. This helps reinforce the topic and identify our gaps."

Then, the teacher carries out an activity based on the "Two Slow, One Fast" strategy.

Slow Phase 1: The activity begins with the first "slow" phase. The teacher asks a guided question and allows about 30 minutes for all students to respond individually: "How would you describe the energy used to lift a ball upwards, and how does potential energy increase when an object is raised? Explain with an example."

Slow Phase 2: Next, the teacher asks the students to discuss the change in energy within a system involving a compressed spring: “How does potential energy turn into kinetic energy when the spring is released?”, “What kind of energy is transferred to the object when a compressed spring is released?”. Again, the teacher gives students around 30 minutes to respond individually.

Fast Phase: The teacher then presents three real-life examples to the students. Each student chooses one and analyzes it in terms of energy transformations. They are given seven minutes to answer.

Examples:

The energy changes a cyclist experiences when going uphill and downhill

The energy transformations of a person sliding from the top of a waterslide

The changes in potential and kinetic energy when you kick a football

During each phase of the “Two Slow, One Fast” activity, the teacher acts as a guide to help students arrive at the correct answers and encourages discussion in the classroom.

As a final step to reinforce the topic, the teacher leads a "Story Completion" activity about energy:

1. The teacher starts a story: "Ali was holding a ball. He lifted the ball up and then let it go..."
2. The students are asked to complete the story.
3. While completing it, students are expected to emphasize potential and kinetic energy. Then, students are encouraged to create their own story starters for other classmates to complete.

Concept cards prepared as an auxiliary assessment tool for this section are provided below.

Energy	The capacity of an object to do work.
Kinetic Energy	The energy possessed by moving objects.
Work	The transfer of energy when a force moves an object in its direction.
Potential Energy	The energy an object has due to its position or condition.
Gravitational Potential Energy	The energy possessed by an object at a high position due to gravity.
Elastic Potential Energy	The energy possessed by an elastic object (such as a spring or rubber band) when compressed or stretched.
Energy Transformation	The conversion of energy from one form to another.
Relationship Between Mass and Energy	A heavy object has more potential energy than a light object.
Relationship Between Height and Potential Energy	A book on a table has more potential energy than a book at floor level.
Relationship between Speed and Kinetic Energy	A speeding car has more kinetic energy than a slow-moving car.
Compressed Spring	A spring drawn to shoot an arrow.
Relationship Between Motion and Energy	A running athlete has kinetic energy.

Objective 5: Students will be able to develop independent study skills.

Unit: F.7.3. Force and Energy / Physical Phenomena

Learning Outcome:

F.7.3.3. Energy Transformations

F.7.3.3.2. Explains the effect of frictional force on kinetic energy with examples.

a. When exemplifying the effect of frictional force on kinetic energy, frictional surfaces, air resistance, and water resistance are taken into account.

b. It is emphasized through a simple experiment that surfaces in contact heat up, and that the loss of kinetic energy is transformed into heat energy.

Duration: 40 min.

Learning Strategy: Review survey

Materials: Toy car, a wooden board, surfaces covered with different materials (sandpaper, carpet, smooth plastic), balls, thermometer, review survey.

METHOD

Draw/Write:

The teacher brings a toy car to the classroom and sets it in motion by pushing it on the desk. Then, by asking the following questions, initiates a classroom discussion:

- Why did this car stop after a while?
- Which force caused it to stop?

After receiving the students' answers, the teacher writes the phrases "Kinetic Energy", "Frictional Force", and "Energy Transformation" on the board. Students are asked to write or draw the meanings of these concepts and their thoughts or situations encountered in daily life on the board.

Apply:

The teacher brings materials for a simple experiment and distributes them to students who are divided into four groups:

- A wooden board (to be used as a flat surface).
- Surfaces covered with different materials (sandpaper, carpet, smooth plastic).
- Toy car or balls.
- Thermometer.

Each group is given three instructions:

1. Move the toy car with the same force on different surfaces.
2. Note on which surface it stopped more quickly and why.
3. After the experiment, measure each surface with the thermometer to observe the effect of friction.

At the end of the experiment, groups are asked to record their observations and answer the following questions. The answers are discussed collectively in class.

Questions:

- On which surfaces was the frictional force greater?
- What happened to the temperature of the surface as the frictional force increased?

Evaluation:

The teacher begins with a question: “What would happen if all surfaces on Earth were smooth?” and initiates a class brainstorming session. To guide the discussion, the teacher also asks:

- How does the frictional force make our lives easier?
- Which daily activities could we not perform if there were no frictional force?
- Can you give examples of situations where we want to reduce or increase frictional force?

After collecting the answers, students are divided into four groups and given a problem-solving task: “What precautions can be taken to enable vehicles to move safely on snowy or icy roads?”

Groups develop their own solutions and present them, creating a discussion environment in the class. While evaluating the solutions, the teacher ensures the discussion addresses "the importance of frictional force in safety, and why features such as tire design, chains, or salting are necessary."

The teacher then assigns three questions as homework and asks students to work on the answers by the next lesson:

Questions:

- How does the frictional force affect kinetic energy? Explain with an example.
- Express the energy transformation you learned in this lesson with a diagram.
- If there were no frictional force, what changes would you encounter in your daily life?
- Research how frictional force is used to solve a problem in daily life (for example, sole materials used in sports shoes, techniques to reduce wind resistance). Explain with an example.

At the next lesson, the teacher collects the answers. The students' answers are discussed in class, and then the teacher says: "Yes, you have all completed your tasks, but I am curious about how you did them. Now, I would like each of you to evaluate your own individual study process. Please indicate on the form I distribute which behaviors you exhibited while completing the tasks at home. Then, let's discuss what we can change to study more effectively." The "Review Survey" is then distributed. Students are asked to answer the survey individually. Once the survey is completed, the teacher collects it.

Review Survey

1. How many hours do you study independently on your research? (….. hours)

2. What types of activities do you do? Use the table below to answer:

		Always	Sometimes	Never
I read the notes taken in class.	C			
I use the resources on the school's digital learning platform (EBA).	C			
I use the textbook.	C			
I learn by creating diagrams.	C			
I study by highlighting my notes with colored pens.	C			
I study by preparing my own flashcards.	C			
I study by creating a poster from what I have learned.	C			
I learn by trying to answer exam questions within a certain time.	S			
I study by reading sample answers.	S			
I use past exam questions and think about possible answers.	S			
I prefer to study in groups with my friends.	F			
I compare sample answers with my own work.	F			
I create my own exam questions.	F			
I learn by discussing one-on-one with the teacher	F			

*C: Content techniques, S: Skill techniques, F: Feedback techniques

3. You may write any additional study activities you would like to add apart from those listed above:

		Always	Sometimes	Never

4. Write a brief explanation of what you do when you do not understand a topic (for example: trying again, reading textbooks, checking the school's digital learning platforms, consulting the teacher, consulting other students, etc.).

After the survey is collected by the teacher, the following question is asked to the students, and they are asked to answer based on the responses they gave in the review survey:

1. Which student would be more successful? (Is the time spent important, or is the quality of the activity completed in a short time more important?)

The answer to the question is discussed in the classroom environment, and the teacher summarizes the students' views and concludes the activity.

Concept cards prepared as an auxiliary assessment tool for this section are provided below.

Friction Force	The force that opposes the motion of an object moving on a surface.
Relationship between Kinetic Energy and Friction	A vehicle that brakes slows down due to friction, and its kinetic energy decreases.
Air Resistance	The force that opposes the motion of an object moving through the air.
Water Resistance	The force that opposes the motion of an object moving through water.
Kinetic Energy	The energy possessed by a moving object.
Energy Transformation	The conversion of energy from one form to another.
Frictional Surfaces	Rough surfaces create a frictional force against the motion of an object.
Smooth Surfaces	Surfaces that apply less frictional force to a moving object.
Heat Energy	A type of energy, produced from kinetic energy by the frictional force.
Loss of Kinetic Energy	Due to the frictional force, there is a decrease in the kinetic energy of an object.
Heated Surfaces	Due to the frictional force, kinetic energy is converted into heat energy, and the surfaces become warmer.
Relationship Between Friction and Motion	Frictional force slows down motion and reduces kinetic energy.

MODULE 5: THE POWER OF YET

Objective 1: Reflect on the feedback given by the teacher to the learning process.

Event Name: The Power of Yet

Duration: 40 min.

Materials:

- "Student Feedback Card"
- A photograph showing the modern atomic model (example below) ,
- Balls of different sizes (can be fabric or plastic) ,
- Playdough
- Adhesive
- Wooden skewers
- Straws
- Beads (but not to be used if they may pose a swallowing hazard among students),
- Plastic plates.

Note to the Practitioner: Certain sentences are more effective in guiding students toward the theory of the mindset. These sentences are italicised throughout the file. As teachers, be sure to use these sentences.

METHOD

Watch–Do:

1. The teacher enters the classroom. Using a smart board (or a similar video-playing device), he/she switches on the video on the link https://www.youtube.com/watch?v=E_6Ps-kE3zfQ. Before starting the video, the teacher gives some information to the students about the activity of that day. The information is given under the heading "Apply".
2. After watching the video with the students, the teacher conducts a post-video Q&A to ensure that they grasp its main purpose. (The main purpose of the video is not for students to quit when they receive feedback but rather to learn the concept of "yet" and understand the importance of continuing to improve.)
3. The teacher then divides the students into groups of up to 5 people and gives each group the necessary materials.

4. They make sentences that support them in this model development process. These sentences are given under the title "Explanation.” The teacher who gives feedback to his/her students should not forget to emphasize the concept of “yet.”

5. If a student makes a mistake, the teacher will show the student how to correct it instead of doing it himself/herself.

Explanation:

1. After greeting the students, the teacher prepares the video and talks to the students before starting:

   - "Today, we will create a model by examining modern atomic theory. I will provide the necessary materials, observe you during the activity, and give you directions. First, I want you to watch this video cautiously. After discussing it, we will start our activity."

2. After watching the video, the teacher asks the following questions to ensure that the students have grasped the main purpose of the video.

   - "Do you think the butterfly drawn by the students here is similar to the butterfly shown at the beginning?
   - "Would it be enough to categorize these butterfly drawings as successful or unsuccessful?"

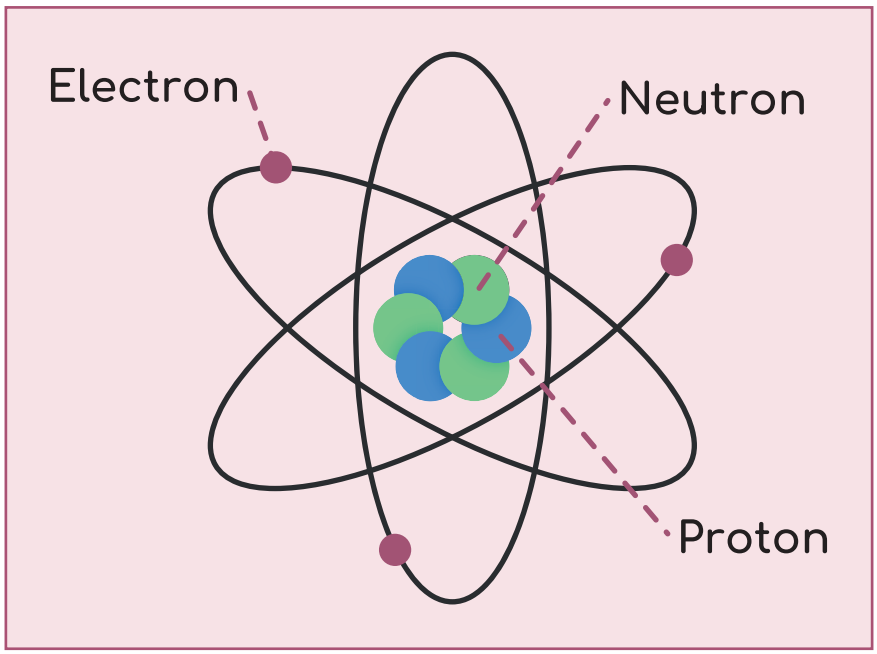
   (The answers to be given according to the answers expected here may be similar as follows:

   - "Butterflies don't look alike yet. For us, "yet" means to keep trying and keep working. It doesn't look like a proper butterfly drawing yet, but it doesn't mean we should categorize it as a success or failure. It's the best of the current state of working. It may not be perfect yet, but that doesn't mean it's wrong."

3. "This is what we will look for when studying modern atomic theory and making a model." Getting feedback helps us to improve. We'll try to make the best version by experimenting and listening to feedback, even if we don't reach perfection.

Emphasis: Learning is a process. It is important not to fail but to say, "I have not learnt yet.”

4. The teacher hangs a picture of the modern atomic theory sequence on the board.



5. He shows the students the materials and tells them they can start repairing them.
6. Students create their own models based on the modern atomic model shown on the board.
7. In the process, the teacher visits the classroom, observes, and, if necessary, says the following:
    - "It may not be what you wanted yet, but you're off to a good start."
    - "This piece may be incomplete, but everything incomplete has a chance of completion."
    - "The version you're working on now might be the best version of you. Let's try some more."
8. At the end of the activity, the teacher gives the groups feedback cards after the students have written down their strengths, weaknesses, and areas for improvement.

The teacher writes short notes on the cards prepared for each group:

- "The electron distribution of the model is successful."
- "Think again about the structure of protons and neutrons."
- "The bond structure is not yet clear, but you're making good progress.

Student Feedback Card
Strengths:

Areas for Improvement:

Suggestions:

Student Feedback Card
Strengths:

Areas for Improvement:

Suggestions:

Student Feedback Card
Strengths:

Areas for Improvement:

Suggestions:

Student Feedback Card
Strengths:

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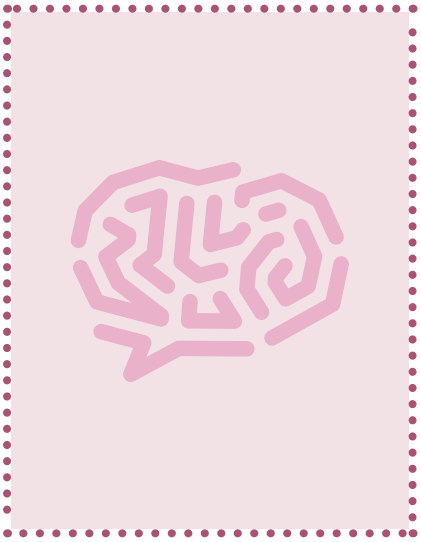
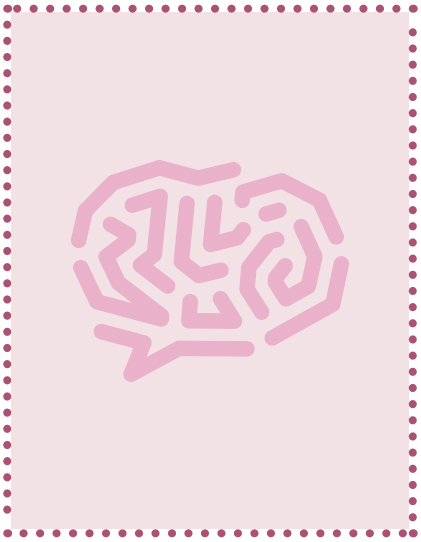
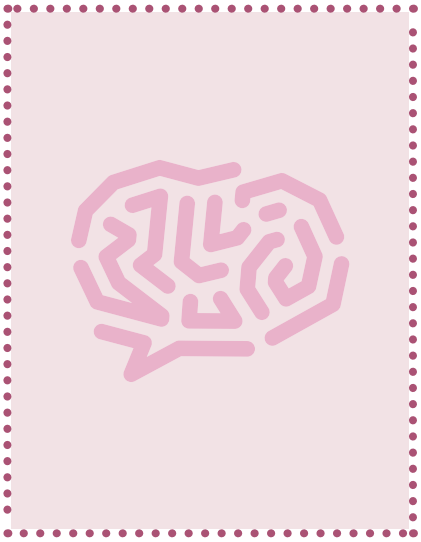
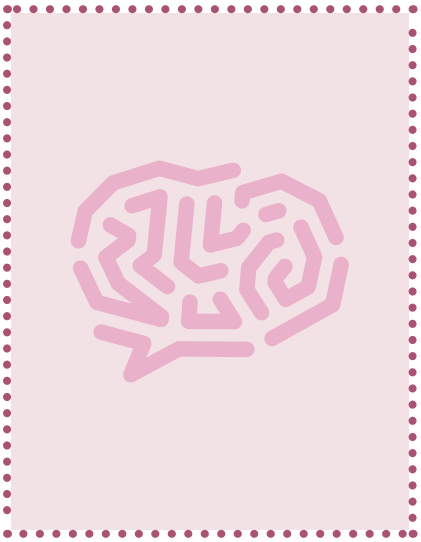
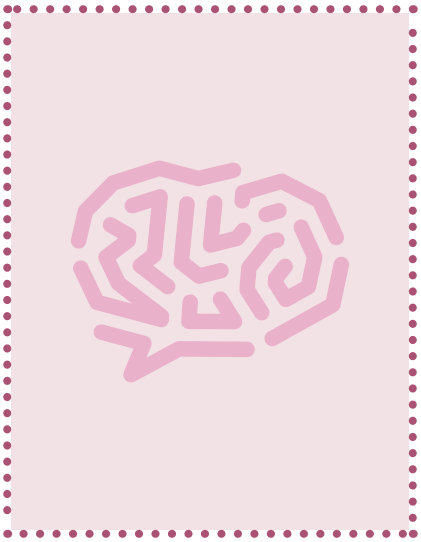
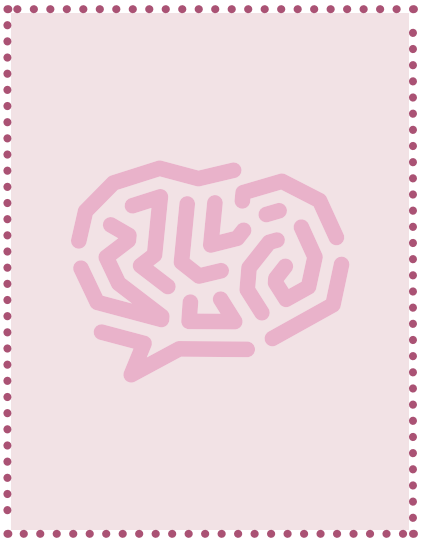
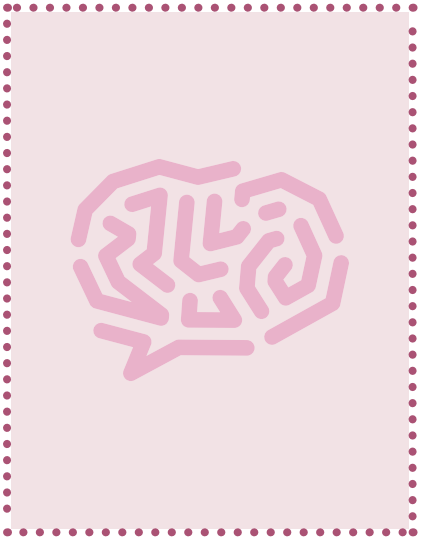
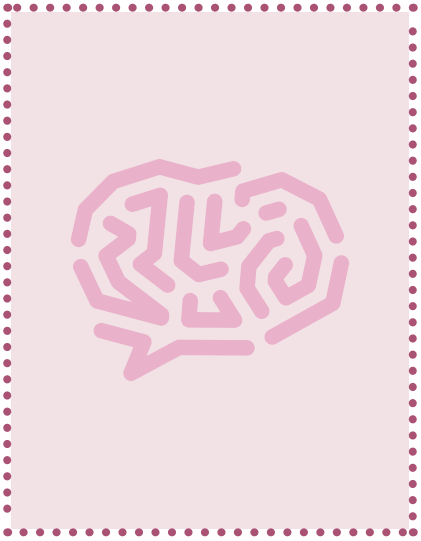
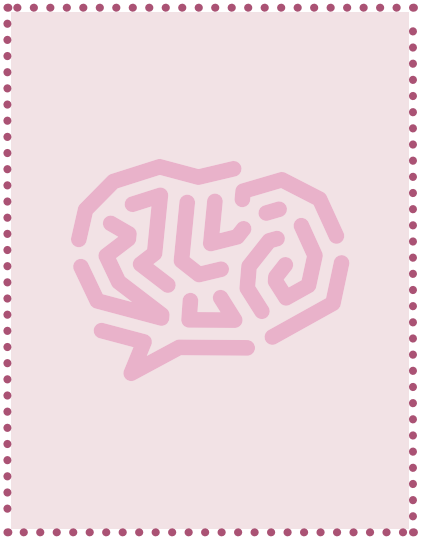










9. The teacher observes the groups during this process:

- Did the student try to improve their product after receiving the feedback?
- Has the concept of "yet" been internalized by the student?
- The attitude of the student: give up immediately or keep trying?

10. Introduces the 1-2 group model as a class. Then, a short discussion is held:

- "Was there a difficult moment when you were modeling?""How did you feel when something was missing?"
- "It's not perfect yet, but what have we learned today?"

11. The teacher tells the students about the scientists who designed these models:

- "When scientists started working on the first atomic models, they knew little about subatomic particles. According to Dalton, atoms were indivisible small and hard spheres, and he created an atomic model accordingly. It was the first atomic model put forward for that period and was nearly perfect. Then Thomson came and put forward the atomic model, which we know as grape cake. This model was not saying that the previous model had failed, but that it needed more development because Thomson discovered electrons. In Rutherford's atomic model, unlike Thomson's, it was revealed that most of the atom was hollow and there was a nucleus in the middle, and it was revealed that the grape cake model was incorrect. However, the fact that the model is incorrect does not show that the scientist who put it forward is faulty. Our knowledge and experiences shape us. We find ourselves striving for more, even though the fact that we have studied a subject a lot does not mean that we know everything. Just because we are not yet perfect does not mean that we are not doing the right things. Like these scientists, you will try to make mistakes, and maybe you will want to give up, but in the end, you will become an adult and have a profession. You may make mistakes in your profession. This is very normal. Although it is too early to think about this issue, when you reach that age, do not forget to say, "I may not have succeeded yet, but I am more knowledgeable today than yesterday", "I may not be at the point I want yet, but 3 years ago I could not even imagine this moment.", "I may not have done what you said yet, but I know that you want to help me, so I will try to do it."

12. Finally, the teacher concludes the lesson with the following message:

- "Scientists did not find the perfect atomic model all at once. They said "yes" and proceeded based on their shortcomings. If you look at learning in this way, your development will be much stronger."

MODULE 6: EFFECTIVE STUDY HABITS

Overall Aim: Individuals will become aware of effective study habits.

Activity Name: I Learn to Study

Learning Outcomes: Students will be able to express their knowledge of what constitutes effective study habits. Students will be able to express their belief that they can acquire effective study habits.

Duration: 40 min.

Materials: Smart board or projector, Appendix 2.

Preliminary Preparation: Duplicate EK 2 for each person.

Process:

The table images provided in Appendix 1 are projected onto the board, and students are asked which table they prefer to work at. After the answers are collected, it is explained that everyone's working environment may be different and that an effective environment for one person may not be effective for another.

Additionally, it is mentioned that there are certain rules for studying, and the "List of Effective Study Habits" in Appendix 2 is distributed to the students.

After giving students enough time to review the list, they are asked to pair up and discuss how applicable the items are to them. After discussing within their pairs, they are asked to select another pair to form a group of four and discuss the list in groups of four.

After sufficient time has been allowed, the large group is asked to discuss in which situations the recommendations on the list could be effective. If there are additional recommendations, these are also discussed. The educator writes the answers on the board, creating a list of the group's everyday study habits.

Students are asked to evaluate whether there are any habits on the list that they have not yet adopted. Discuss what prevents them from doing this habit and whether they will do it in the future. The group leader must emphasize that students can acquire the habits on this list if the conditions and motivation are sufficient.

Students are asked to implement one habit from the list for one week, and the activity is concluded.

Notes to Practitioner: If desired, the facilitator can also show participants different images of tidy and messy desks.

Appendix 1: Table Images

Appendix 2: List of Effective Study Habits

List of Effective Study Habits	
1	Find a suitable place to study.
2	Minimise distractions.
3	Take breaks.
4	Study intermittently.
5	Set learning goals for each study session.
6	Reward yourself.
7	Work in a group.
8	Solve problems.
9	Express topics in your own words.
10	Ask for help.
11	Do not neglect your self-care.

Activity Name: My Work Map

Learning Outcomes: Students will be able to apply effective study habits in their daily lives.

Duration: 40 min.

Materials: Appendix 1 Table, smart board or projector, coloured cardboard, paint pens.

Preliminary Preparation: Appendix 1 is duplicated for each person.

Process:

Students are asked the following questions:

- What does a baby need to develop healthily in the womb?
- Why are nutrition, oxygen, and avoiding harmful substances important?

It is explained that factors such as nutrition, environmental conditions, healthy habits, and protection from harmful influences are essential for embryo development.

The following analogy is provided to students: "The embryo needs the right nutrients and environment to grow healthily. Similarly, your brain needs the right habits and a study environment to learn effectively!"

The table below is given to students or drawn on the board to encourage them to consider the similarities between the development of an embryo and their academic growth. Students are divided into groups, and each group selects a key factor for embryo development (e.g., nutrition, oxygen, environment, harmful substances). They discuss how the factors they chose might relate to the study process and prepare a small poster. Each group then presents their poster to the class, explaining the connection between embryo development and effective studying. The class engages in a discussion about which effective study habits can be applied more easily in their daily lives. Students are asked to write down three habits they can implement in their study routines, create Study Maps, and display the maps on their desks for daily reference.

Notes to Practitioner:

If students struggle with preparing posters, the following examples can be provided:

- Nutrition = Eating healthy and drinking enough water improves focus.
- Oxygen = Taking regular breaks for fresh air while studying enhances mental performance.
- Harmful Substances = Social media and smartphones can distract attention and hinder effective learning.

Appendix 1: Embryo and Effective Study Habits Table

Requirements for Embryo Development	Requirements for Effective Studying
Balanced nutrition	Establish a peaceful, orderly workspace.
Oxygen and fresh air	Ensure clean air to enhance concentration.
Steering clear of harmful substances	Minimize distractions while studying (such as phones, noise, etc.)
Consistent development and maintenance	Repeat regularly, work according to a plan
A comfortable and safe environment	Create a quiet, organised workspace

MODULE 7: SELF-REGULATION

Overall Aim: By the end of the module, individuals can gain awareness of their ability to exercise control.

Activity Name: Responsible Me

Learning Outcomes: Students will be able to express their knowledge of self-regulation skills.

Duration: 40 min.

Materials: Pen, paper, plant seeds, pot, soil.

Process:

Students are asked the following questions:

- What is necessary for a plant or animal to grow healthily?
- What is necessary for us to develop as human beings?

Plant and animal growth processes require consistent care, an appropriate environment, and careful monitoring. This highlights the importance of planning and awareness, akin to our academic and personal development.

Students are assigned the task of growing their plants or caring for an animal as a class project. Weekly care tasks are established, including watering, providing sunlight, adding nutrients, and cleaning. Each student maintains a diary or digital report to document the growth process.

Students are encouraged to follow these steps to enhance their self-regulation skills:

- Goal Setting:
    - "How much do you expect the plant to grow in two weeks?"
    - "What kind of care will you provide to make the animal healthier?"
    - They are asked to establish a similar academic or personal development goal.
- Planning:
    - A plan is prepared for watering, care, and feeding tasks.
    - Discuss how they can plan for their study or personal development processes.

- Self-monitoring and evaluation:
    - Students report what they did right and what they can improve each week.
    - They are encouraged to consider how stress, motivation, and attention affect their developmental processes.

Once students have finished the planning outlined above, they are asked the following questions:

- What is the most important factor in ensuring the growth of a plant or animal?
- In what ways are self-regulation skills similar to caring for plants or animals?
- What can you do daily to enhance your self-regulation skills?

At the end of the activity, students create a mini plan for their personal development goals. Similar to how they set step-by-step goals for the growth of a plant or animal, they are asked to develop a plan that outlines what they can do to achieve their science class goals, what obstacles they might encounter, and how they can overcome these challenges. Volunteer students share their plans, and the activity concludes.

Activity Name: Green Light - Red Light

Learning Outcomes: Students will be able to apply self-regulation skills in their daily lives.

Duration: 40 min.

Materials: Picture paper (or flipcharts), paint pens, Appendix 1.

Preliminary Preparation: Duplicate Appendix 1 for each person.

Process:

Teachers are informed that they should divide into small groups and draw a picture of a microscope. The teachers divide into groups of five.

The group leader secretly selects one person from each group and, at the beginning of the activity or during it, gives them one of the tasks listed below in a way that no one else can hear:

- Talk about other things while the picture is being drawn to slow down the artists
- Sing loudly
- Trying to persuade others in the group to go to the toilet, etc.

Not like any of the ideas or drawings.

The above tasks can be varied according to the dynamics of the group. The aim here is to have one member in each group who distracts the others. The groups are given 10 minutes to complete the pictures, and at the end, one person from each group is asked to come and present their picture. During the process, the group leader can ask the following questions:

- How was the experience of working as a group and creating a single picture?
- How did you decide what picture to draw?
- Were there any challenging aspects of the process?

After all groups have shared their experiences, the group leader explains that they assigned a distracting role to one person in each group and discusses self-regulation and its importance using the following questions:

- Who focused solely on the task and resisted distractions from their group members?
- How did you handle the presence of someone who was distracting in the group?

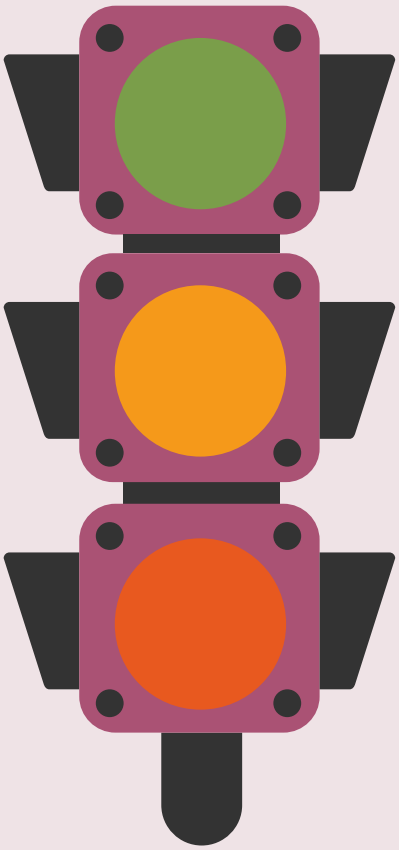
After the discussions, the group leader emphasises the importance of self-regulation in completing a task on time. They mention that self-regulation can be done in three steps: planning - monitoring - evaluation. If there are groups that follow these steps in their group work, their behaviour is reinforced and the next activity is started.

Teachers are given the metaphor that self-regulation is like following traffic lights, and prepared traffic light papers (Appendix 1) are distributed to all participants. They are asked to review the form, think about a recent event they experienced, and write down how they could have used self-regulation in that situation. Once all teachers have completed the form, voluntary participants can share their responses. Similarities and differences among the responses are highlighted, and the activity is concluded.

Notes to Practitioners:

- Anger can arise within the group towards a member who distracts others during group drawing. Therefore, participants should move between groups throughout the activity, and if tension is high in a particular group, a member selected in secret should be asked to reduce their role slightly.
- The facilitator can provide detailed information about self-regulation using the following: *"Self-regulation is a process in which individuals set their own goals and attempt to regulate their thoughts, motivations, and behaviors within the limits set by their goals and the conditions of their environment." In self-regulation, individuals need to set goals and develop various strategies to achieve them. In self-regulation, individuals make efforts to control and manage processes, even if they seem complex to them.*

Appendix 1:



PLAN:

MONITORING:

EVALUATION:

Think about a recent task you were given and needed to complete. Reflect on how you could accomplish this task by following the steps of self-regulation below, and write the appropriate behaviors on the corresponding parts of the traffic light:

Red – Stop – Planning: This is the stage where you set your goals, determine the steps to take, and manage your time in order to complete the task.

Yellow – Get Ready – Monitoring: At this stage, you begin to implement the strategy you selected during the planning phase.

Green – Go – Evaluation: After the task is completed, you evaluate yourself and the work thoroughly from all aspects.

MODULE 8: SELF-RESPECT

Overall Aim: Individuals can gain awareness of their strengths and areas for improvement by the end of the course.

Activity Name: I Know Myself

Learning Outcomes: The student will be able to express their strengths and areas for improvement.

Duration: 40 min.

Materials: Angel and Devil cards.

Preliminary Preparation: Make copies of the Angel and Devil cards equal to the number of people.

Process:

Participants are asked to think of a teacher who has left a positive or negative mark on their educational life. Then, they are asked to choose an object from various items brought to the classroom (pen, eraser, paper, scissors, glue, test tube, etc.) that they think represents the teacher they were thinking of. Once all participants have completed their selections, they are asked to share which teacher they were thinking of and which characteristic led them to choose the corresponding object representing that teacher. The positive and negative traits of the teachers who left a mark on their lives are emphasized.It is pointed out that a teacher can have both bad and good behaviors.

Participants are given a picture of a person with one side angelic and another devilish. They are asked to draw speech bubbles above the angel and the devil. Then, they are told, "Now imagine that this person is you. Think about what the angel and devil inside you are saying about your studies, and write them in the speech bubbles."

When all participants have written their notes, volunteers are asked to share the thoughts of the angel and devil within them. If they have ruthless statements against themselves, these will be emphasized.

Participants are asked to answer the following questions based on their written angel and devil statements.

1. What effect do the angel's statements have on me?
2. What impact do the devil's words have on me?
3. How much do the angel and devil's words reflect the real me?

Ask participants, ‘If an angel and a devil were to list your characteristics, what would they say?’ and ask them to write their strengths on the angel side and areas for improvement on the devil side of the paper.

Collect the volunteers' contributions and conclude the activity by emphasising that every person has both strengths and areas for improvement, and that what matters is to recognise this, using a statement similar to the following:

"Every person has both strengths and areas for improvement. What is important is to evaluate ourselves objectively, recognise these aspects, and consciously manage their impact on our lives. Discovering our strengths and using them in the most effective way increases our sense of success and satisfaction, while accepting and working on the areas that need improvement supports our personal growth. Focusing on continuous self-improvement rather than striving for perfection contributes to a more fulfilling and meaningful life at both the individual and societal levels."

Notes to Practitioners: If the practitioner prefers, instead of the terms Angel and Devil, they can use different binary expressions such as the Light side, the Dark side, or my strengths and areas for improvement.

Appendix 1: Angel and Devil Paper

Activity Name: Superhero

Learning Outcomes: Students will believe that they can improve the areas they need to develop.

Duration: 30 min.

Materials: Angel and Devil cards.

Process:

Students are informed that the negative criticism we direct toward ourselves sometimes affects us and prevents us from realizing our potential. It is emphasized that everyone can make mistakes and love ourselves despite our mistakes. Then, they are asked to imagine a superhero who can stop or destroy the devil in the pictures they distributed in the previous activity whenever they want and draw it.

After the pictures are completed, participants are asked to form pairs and discuss their superheroes' characteristics. The following questions can be asked to facilitate the pair discussion:

- What are the characteristics of my devil side? What are the characteristics of my superhero?
- What does my superhero do to prevent the characteristics of my devil side from harming me? Which of these can I do?
- What will my plan be to reduce the influence of my devil side from now on?

When the pair discussions are finished, the group returns to the large group, and the entire group discussion is conducted with the following questions:

- What characteristics did you think a superhero would have to prevent the characteristics of your devil side from affecting your daily life, and what were their strategies?
- How did you feel when you heard your partner's superhero and strategy? Was it similar or different from yours?
- What did you hear from your partner that could work for you?
- What are your plans moving forward?

After the volunteer students' answers are collected, the activity is concluded.

MODULE 9: MOTIVATION

Overall Aim: By the end of the course, individuals will be aware of different sources of motivation, which will help them stay motivated.

Activity Name: My Sources of Motivation

Learning Outcomes: Students will be able to express that they have different sources of motivation at the end of the lesson.

Duration: 40 min.

Materials: Cardboard, board, board pen, story paper, motivation card.

Preliminary Preparation: Read the literature information in the notes section for the instructor. Duplicate the puzzle template according to the number of groups. Print and cut out the internal dialogues in the story.

Process:

The process begins by asking teachers the following questions.

- Why are you here today?

The answers are written on the board without any intervention. (My family made me come because I like science and want to learn, get good grades, etc.)

After everyone who wants to share has done so, the teacher emphasizes that the students came here today for different reasons and, therefore, have different sources of motivation.

The group leader explains that motivation can be divided into internal and external and provides definitions.

The educator hangs two cards with internal and external written on them in a place where students can see them and starts a discussion about which motivations written on the board are internal and which are external. The group writes their decisions on the relevant cards due to the discussion.

Then, students are divided into five groups, each given the same half-story and separate internal dialogue cards (Appendix 1). They are asked to complete the story according to the internal dialogue written on the card.

When all groups had completed their stories, group spokespersons came to the board and read their groups' stories to the whole group. After each story, Ali's source of motivation for the lesson is discussed. The identified sources of motivation are written on the board.

Brainstorming determines which of these motivation sources needs to be changed. Then, the groups are asked, 'What can we change in Ali's life so that he has internal motivation to learn?'

The students discuss what Ali and the school can do. (At this point, it is emphasised that some circumstances cannot be changed (e.g., compulsory education) but that it is important to focus on what we can control.)

The teacher observes that each student possesses distinct motivations for attending class.

Students are requested to contemplate their motivations for attending school and document them on a sheet of paper.

Students are organised into groups of four and tasked with creating a word puzzle pertaining to student motivations for another group.

The prepared riddles are randomly assigned to another group, and each participant solves the puzzles of a different group.

Upon resolving the riddles, the potential motivations of the pupils are examined, and each individual presents the motivation they identified to the group.

The instructor closes the lesson by reiterating that students' sources of motivation within the educational environment may differ and that motivation is categorised into two types: intrinsic and extrinsic.

Notes to Practitioners:

Teachers are asked to record their motivation for entering the classroom before the next session.

Educators can use the following **definitions of motivation** when explaining the topic.

1. Motivation is the sum of internal and external factors that determine the level of effort, direction, and persistence an individual exhibits in achieving a specific goal.

Source: Ryan, R. M., & Deci, E. L. (2000). 'Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being.' American Psychologist, 55(1), 68–78.

2. Motivation is the totality of internal and/or external factors that enable an organism to engage in behavior directed toward a specific goal.

Source: Schunk, D. H., Pintrich, P. R., & Meece, J. L. (2014). Motivation in education: Theory, research, and applications. Pearson Higher Ed.

3. Motivation is the driving force that an individual feels to satisfy their needs, achieve their goals, or maintain behavior.

Source: Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. Springer Science & Business Media.

4. Motivation is the psychological mechanism that directs the process of expending energy towards a specific goal.

Source: Robbins, S. P., & Judge, T. A. (2019). Organizational behavior. Pearson.

Intrinsic Motivation

Intrinsic motivation occurs when an individual engages in a behavior solely for the pleasure, interest, and satisfaction derived from the activity, without relying on external rewards or incentives (Ryan & Deci, 2000). Individuals motivated intrinsically participate in specific activities to satisfy their curiosity, enhance their competence, and achieve personal growth.

Examples:

- A student practicing regularly because they enjoy learning a new language.

  An artist continuing to paint because they love art.

- A researcher continuing their work because of their passion for discovering new things.

Extrinsic Motivation

Extrinsic motivation is when an individual performs a behaviour due to external factors such as gaining a reward or avoiding punishment (Deci & Ryan, 1985). This type of motivation is driven by external incentives such as money, rewards, recognition, social status or obligation.

Examples:

- An employee working overtime to increase their salary and bonuses.
- A student studying for exams to get high grades.
- An athlete training intensively to win a medal.

These two types of motivation help us understand how individuals behave in different situations. Intrinsic motivation fosters long-term and sustainable commitment, while extrinsic motivation can serve as a powerful driving force to complete specific tasks. The ideal is to balance both types of motivation to support individual and professional development.

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behaviour. Springer Science & Business Media.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55(1), 68–78.

Appendix 1:

Case: Ali woke up that morning feeling restless. The road to school, which he always took, seemed to be closing in on him, and his feet didn't want to move. He made his way to the door of his classroom, 7-A, where his first lesson of the day was to be held...

Internal Dialogue
"I'm not going to go to high school anyway, so why bother trying?"
"I really enjoy what I'm learning in science class."
"If I don't go to class now, my parents will give me an earful."
"What I'm learning in this class is really useful in real life."
"I need to go to class to get good grades."

Appendix 2: Word Searsch Puzzle Template

MOTIVATIONAL WORD SEARCH PUZZLE

WORD SEARCH GAME

C	V	D	A	D	K	O	Z	S	Ü
Ö	I	Ü	C	F	N	X	J	N	A
Z	Z	Z	B	J	Z	M	I	L	I
B	E	C	P	L	I	V	G	I	Y
E	L	E	B	Y	E	O	A	H	L
K	E	H	P	R	R	N	C	X	S
M	R	X	S	I	I	T	B	C	E
Y	B	I	T	L	C	M	H	D	P
G	T	M	I	X	Ö	D	E	V	W
E	A	M	R	V	E	R	Z	U	H

- ANIL
- ÖZBEK
- DÜZCE
- ÜNİVERSİTE
- ALGORITMA
- ÖDEV
- VİZELER

Activity Name: I Manage My Motivation

Learning Outcomes: At the end of the lesson, students will be able to activate different sources of motivation.

Duration: 30 min.

Materials: Transparent cups, cold water, hot water, stirrers, sugar.

Preliminary Preparation: Twice as many cups and water as the number of students are prepared in advance.

Process:

The activity starts by reminding students that we have both intrinsic and extrinsic motivation and that it is crucial to utilize them in a balanced manner to achieve our goals. Students are asked:

'How do you think motivation works in achieving a goal?

What factors increase or decrease our motivation?'

After the students have answered, they are told that they will conduct an experiment.

Each student is given two transparent cups. They are asked to put sugar in the cups and stir one of them without touching the other.

They are encouraged to notice that the sugar dissolves faster in the stirred cup. The teacher then says, 'Think of the stirrer you used to mix the glass as an external source of motivation. You are intervening from the outside to dissolve the sugar. Just like here, external sources of motivation (rewards, praise, a supportive environment) speed up the process. For example, a teacher's praise or a friend's help makes it easier to achieve success. The important thing is to realise that no matter when or how fast you stir, you will get the result you want at the time you want.' This connects the factors affecting the rate of dissolution with the topic of external motivation.

Then, cups with hot water in one and cold water in the other are distributed to the students. The same amount of sugar is added to both cups, and the rates of dissolution are observed. The students are asked to note that the sugar dissolves faster in hot water. The teacher says, 'This hot water is actually our internal state. Passion and interest strengthen internal motivation. We progress faster when we are doing something we love and are excited about,' thus establishing a link between the effect of temperature on dissolution and internal motivation.

It is emphasised that if intrinsic and extrinsic are balanced, we can reach our goals much faster, just like when sugar is stirred into hot water. The importance of using the motivation sources that students listed in the previous activity in a way that aligns with their goals is highlighted, and the activity is concluded.

Notes to Practitioners: If there are not enough materials, students can conduct this experiment in groups rather than individually. If the experiment involving hot water poses a physical hazard to students, the teacher can conduct the experiment themselves in a way that everyone can see.

MODULE 10: STRESS MANAGEMENT

Overall Aim: At the end of the course, individuals can gain awareness of how to cope with stress.

Activity Name: Stress Management Techniques

Learning Outcomes: Students will be able to describe stress management techniques.

Duration: 30 min.

Materials: Battery, light bulb, connecting cables, wires made of different materials (long/short).

Preliminary Preparation: Preparation of experiment materials.

Process:

Students are asked: *"What do you think about stress? Is stress always a bad thing?"*

After the volunteer students share their thoughts, the teacher explains that stress is actually a motivating force, but when there is too much of it, it becomes overwhelming. The teacher says, 'Now, we will discover how to balance stress using an electrical circuit,' and proceeds with the experiment.

The batteries are connected to the circuit, and the light bulb becomes brighter as the voltage increases. The teacher explains, 'Voltage, like stress, is a force that motivates us. However, too much voltage (stress) can burn out the circuit, just as it can burn us out.' This establishes a connection between electrical circuits and stress.

Different resistors are added to the circuit, and the light bulb's brightness changes are observed. The teacher establishes a connection between the experiment and stress management strategies by saying, 'Resistance is a coping mechanism that helps balance the effects of stress. For example, methods such as deep breathing, time management, or exercise act as resistance and prevent stress from overwhelming us.'

The teacher also mentions the effect of changes in current and emphasizes the importance of coping with stress: 'If the voltage (stress) is too high but the resistance (coping methods) is insufficient, the current (performance) increases significantly, and the system may be damaged. However, with the right amount of resistance, it is possible to work at an ideal current level.' This statement emphasizes the importance of coping with stress, and the experiment concludes.

Students are then asked the following question: 'Is stress something that must be completely eliminated, or is it a force that must be managed correctly?'

Volunteer students share their thoughts, and a brainstorming session is held on methods for coping with stress in daily life, with students sharing their own strategies.

Notes to Practitioners: If the necessary materials for the experiment cannot be provided, the teacher can explain the experiment using the textbook or by showing a video.

Activity Name: What's Inside Me and Me

Learning Outcomes: Students will be able to apply strategies for coping with stress in their daily lives.

Duration: 30 min.

Materials: Appendix 1, pencils, coloured pencils.

Preliminary Preparation: Appendix 1 is multiplied according to the number of participants.

Process:

Distribute Appendix 1 to the students. Ask them to color or mark the activities they have completed on the list. Inform them that they can write any strategies not included in the list in the empty boxes. After everyone has marked their list, volunteers are invited to share what they do to cope with stress. The group leader highlights common and differing strategies. Students are then asked if there is a strategy they have never tried before, and they discuss whether there is. are there any obstacles to trying it, and how could they overcome them?

Students are instructed to sit comfortably in their seats and close their eyes. They should relax all their muscles as much as possible and remain in the most comfortable position. The teacher guides the students step by step to visualize a peaceful place, a beach, or a forested area. The teacher continues the visualization by asking them what they see, smell, and hear around them. Next, the students focus on how relaxed their bodies feel during the visualization. When they're ready, they're asked to return to the present and open their eyes.

The teacher explains that this relaxing place is always within them and that they can recapture the feeling of calm and peace they experienced there. They clarify that when they feel stressed, they can take two minutes to close their eyes and go to this peaceful place to regain control of their bodies and emotions. They're advised that they can do this exercise, especially during exam periods when they might feel stressed, such as while studying at home before an exam or while sitting in their seats waiting for their exam papers. They are informed that this exercise will allow them to send a message to their bodies that ‘there is no danger’ and that they will be able to control their emotions more easily before exams.

Notes to Practitioners: If the environment is not suitable for sitting comfortably or is thought that closing the eyes will be difficult due to a lack of trust among students, a relaxing floor exercise can be done by drawing pictures.

Appendix 1: Stress Management Techniques

Breathing Exercises	Yoga	Walking
Getting Enough Sleep	Listening to Music	Having Shower
Eating a Balanced Diet	Exercising	Spending Time With Loved Ones
Writing Dairy	Meditation	Praying
Painting	Colouring mandalas	Cooking

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