Unplugged Activity

Title: System Deadlock

Educational level: **Third Cycle of Primary Education**
Curricular areas: **Natural Science.**
Timing: **one 45-minute session (any term).**

Summary

In this activity, we review vocabulary associated with the human body systems and organs, simulating an information flow similar to that of a computer. Sometimes, a blockage or deadlock may occur. In Computer Science, this term refers to situations where two or more tasks are waiting for each other to complete or continue working. To avoid these “traffic jams” we must work cooperatively.

Aims

- Identify and classify different organs and body parts according to the systems they belong to (e.g., circulatory, respiratory, digestive, nervous systems).
- Practise collaborative and communication skills by working together to solve problems.
- Understand how information flow works in computer systems and the concept of deadlock.
- Relate the activity to everyday life situations.

Key competencies to develop: mathematical and scientific competence, technological and engineering; digital; personal, social and learning to learn; citizenship and entrepreneurship.

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Unplugged Activity

How do we do it?

1. **Activity presentation:** We are going to play a game in which we will need to solve a problem cooperatively. Cards with the names of different organs and body parts will be randomly distributed. The goal is for each word to reach the correct category (system or organ of the human body).
2. **Team organisation:** We set up teams of 5 or 6 members (see examples of arrangement in the resources section) seated in a circle or line. They can use chairs or sit on the floor.
3. **Preparation and card distribution:** Each student is assigned a system or organ and places the corresponding category card in a visible spot (see materials in resources section). Word cards associated with each participant's categories are chosen. Each category has two words associated with it. E.g., Lungs and trachea are associated with the respiratory system. The cards are shuffled, and one card is removed at random. Words are then distributed randomly. Each participant visibly holds two words, one in each hand, except for one participant who holds only one word (since we removed one card).
4. **Sharing Predictions:** What do you think will happen? What difficulties might you encounter? What will be the best strategy to follow?
5. **Start of the game***:* They must take turns passing words until each participant holds the two words associated with their category. To exchange cards, they must follow these rules:
    - They can only hold one word in each hand.
    - They can only pass a word to the person directly to either side of them.
    - They can only pass a word if the person next to them has an empty hand.
    - They can pass any of their two words to the person next to them if they have an empty hand.
6. **End of the game:** the problem is solved when all participants have the words for their category.
7. **Reflection***:* What strategies did they use to solve the problem? They will have realised that teamwork is essential. If one person has their cards but the rest do not, a blockage may occur, and it may be necessary to cooperate. Where could these types of blockages arise in real life? E.g., when there is a traffic jam, if many people try to go through the same door at once, trains needing to pass on the same track, etc. We can explain that in Computer Science, this situation is callblockage or deadlock. It means that two or more tasks are waiting on each other to finish or continue their work.

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Suggestions

The difficulty of the activity can be adjusted by adding or removing people and categories (systems).

Students can create their own category and word cards to expand the vocabulary.

Resources

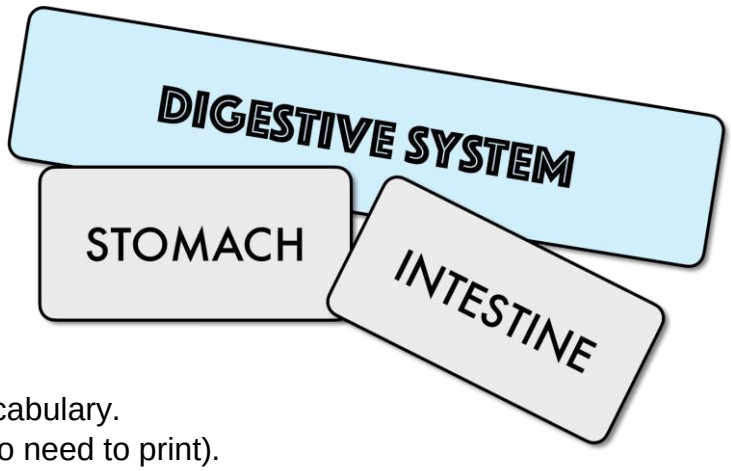
- **Human:** teachers and students.
- **Material:** category and word cards.

Space: classroom with room for group work.

Type of activity: in teams of 5 or 6.

Printable cards:

Link



The file includes:

- Category cards (systems).
- Word cards.
- Blank cards for adding new vocabulary.
- Team arrangement diagram (no need to print).

What have we learned?

The rubric for the activity is shown below.

Assessment Criteria	4 Excellent	3 Satisfactory	2 Needs improvement	1 Insufficient
Understand how the game works and make reasoned predictions.	Demonstrates a complete understanding of how the game works and makes logical and well-justified predictions.	Shows a good understanding of how the game works and makes reasonable predictions, although with less depth.	Shows a partial understanding of how the game works. Predictions are sometimes reasonable.	Does not understand how the game works, and predictions are illogical or nonexistent.
Design possible solutions to the problems posed.	Proposes creative and practical solutions, considers different approaches, and justifies choices well.	Presents adequate and reasonable solutions, though could explore more options.	Solutions are somewhat unoriginal and do not address all aspects of the problem.	Does not present viable or relevant solutions to the problem posed.
Communicate the results by explaining the steps taken and providing arguments.	Clearly explains all the steps and provides solid arguments. The communication is very effective.	Communicates the steps and arguments appropriately, but it could be clearer in some areas.	The communication is confusing. Some steps are explained, but important details and arguments are missing.	Does not communicate the steps taken nor provide arguments. The presentation is very unclear.
Know the vocabulary associated with the different systems and organs of the human body.	Demonstrates complete mastery of the vocabulary. Uses precise and appropriate terms at all times.	Knows most of the vocabulary and uses correct terms, although with some minor errors.	Demonstrates limited knowledge of the vocabulary. Uses some terms but often confuses them.	Does not demonstrate knowledge of the vocabulary related to the topic. Uses incorrect or irrelevant terms.

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Computational Thinking

Logic (prediction and analysis): thinking to make predictions, solve problems and make decisions based on available information.

Algorithms (steps and rules): is a step-by-step process that solves a problem or completes a task.

Decomposition (breaking down into smaller parts): breaking down problems into smaller and more manageable parts, which are easier to understand and solve.

Patterns (recognise and use similarities): recognising similarities or patterns in problems or data, which means come up with solutions quickly and effectively.

More information

This proposal is based on the CSUnplugged activity *Routing and Deadlock.*

In this link, you can watch a video where a group carries out the activity, categorising fruits by colours.

QR code to the activity resources:

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