Developing a CLIL Learning Unit

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CLIL: Content and Language Integrated Learning

Content first: curricular content leads language learning

A subject teacher is in any case also a language teacher, even in L1

Teachers should be aware of the use of common and specialised language both in L1 and L2
How can I teach a CLIL lesson?

A CLIL lesson or a CLIL learning unit must be planned.

Subject and language teacher should do it together, but most of the times this is not possible.

Language level and prior knowledge should be taken into account.
A CLIL unit plan should cover:

- Learning outcomes and objectives
- Subject content
- Thinking and learning skills
- Tasks
- Language
- Materials and resources
I need a CLIL planning form!

There a lot of very interesting template you can use
You can even create your own form according to your specific need

Best examples:
• Cambridge TKT for CLIL
  https://www.teachers.cambridgeesol.org/ts/teachingqualifications/clil

• ALI CLIL Progetto Lingue Regione Lombardia
  http://www.progettolingue.net/aliclil/
<table>
<thead>
<tr>
<th>Teacher's name</th>
<th>Date</th>
<th>Subject</th>
<th>Prior knowledge</th>
</tr>
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<tbody>
<tr>
<td></td>
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<table>
<thead>
<tr>
<th>Learning Outcomes and Objectives</th>
<th>Learners should know:</th>
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<tbody>
<tr>
<td></td>
<td>Learners should be able to:</td>
</tr>
<tr>
<td></td>
<td>Learners should be aware of:</td>
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<table>
<thead>
<tr>
<th>Content</th>
<th>Language (including subject specific)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>1 specific vocabulary:</td>
</tr>
<tr>
<td></td>
<td>2 grammar structures:</td>
</tr>
<tr>
<td></td>
<td>3 collocations:</td>
</tr>
<tr>
<td></td>
<td>4 functional language:</td>
</tr>
<tr>
<td>Cognition</td>
<td>Thinking and Learning skills</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td></td>
<td>Lots</td>
</tr>
<tr>
<td></td>
<td>Hots</td>
</tr>
<tr>
<td>Culture</td>
<td></td>
</tr>
<tr>
<td>Task</td>
<td>Activities</td>
</tr>
<tr>
<td>Group profile</td>
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<td>Timetable fit</td>
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<td>Materials/resources</td>
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<td>Cross-curricular links</td>
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<tr>
<td>Follow-up activity</td>
<td></td>
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<tr>
<td>Assessment</td>
<td>formative:</td>
</tr>
<tr>
<td></td>
<td>summative</td>
</tr>
</tbody>
</table>
Coyle’s 4 Cs

The 4Cs framework for CLIL (Coyle, 2005).
Bloom’s revised taxonomy

HOTS

(2001, Anderson)
<table>
<thead>
<tr>
<th>LANGUAGE</th>
<th>LEVEL</th>
<th>TITLE</th>
<th>AUTHORS</th>
<th>SUBJECT</th>
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<tr>
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<td>CLASSES</td>
<td>TIME</td>
<td>STEPS</td>
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<td></td>
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<td>STEP 1:</td>
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<td>STEP ...</td>
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</table>
CONTEST AND CONTENT

1. CONTEST
   • Subject:
   • Teacher:
   • Target:
   • Timing:

2. CONTENTS
   2.1 Detailed contents:
3.1 Content objectives
- General objectives:
- Specific objectives:
- Prerequisites:
- Learning outcomes:

3.2 Language
- General objectives:
- Specific objectives:
- Prerequisites:
- Learning outcomes:
ORGANIZATION and ASSESSMENT

4. ORGANIZATION
   • Activities
   • Materials
   • Lab activities

5. ASSESSMENT
   • Assessment test
ACTIVITIES

STEP X (for each step)
- Aims
- Methodology
- Activities
- Material

WORKSHEETS AND TESTS (when needed)
INSIDE and OUTSIDE the CELL

Carla Cardano
Giovanna Ferrari
Simona Santoro
Claudia Terzi
## INSIDE and OUTSIDE the CELL

<table>
<thead>
<tr>
<th>LANGUAGE</th>
<th>ENGLISH</th>
<th>LEVEL</th>
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<td>TITLE</td>
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<td></td>
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<tr>
<td>SUBJECT</td>
<td>SCIENCE (Biology)</td>
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<td>CONTENTS</td>
<td>Passive and active transport across the cell membrane</td>
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<td>CLASS</td>
<td>3 Liceo Linguistico (Scuola Secondaria Superiore)</td>
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<tr>
<td>TIME</td>
<td>12 hours</td>
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INSIDE and OUTSIDE the CELL

STEP 1 Activities presentation (1 h)

STEP 2 Introducing passive and active transport across the cell, lessons with activities (2+2 h)

STEP 3 Lab activity: observation of osmosis in plant cells using microscopes (3 h)

STEP 4 Lab activity: observation of osmosis in animal cells watching and transcribing a video (2 h)

STEP 5 Assessment and final review (2 h)
CONTENT

Active and passive transport across the cell membrane
All the contents are taught in L2 (English)

DETAILED CONTENTS

• Diffusion and osmosis as physical phenomena
• Osmosis, diffusion and facilitated diffusion across the cell membrane
• Active transport across the cell membrane: sodium-potassium pump as the main example
• Endocytosis and exocytosis (phagocytosis and pinocytosis)
Content General Objectives

• To learn how to work in a team
• To develop analysis, synthesis, reprocessing and abstraction skills
• To develop a scientific way of reading facts
• To distinguish between passive transport and active transport
• To identify the involvement of membrane proteins in active transport processes and cell communication
• To explain passive transport across membranes by diffusion and osmosis
• To explain turgor and plasmolysis in plant cells
• To explain the meaning of the words hypotonic, isotonic and hypertonic with respect to solutions of different solute concentration
• To describe and explain the role of the ion pump in the active transport of materials in and out of cells
• To recognize that endocytosis and exocytosis are active transport processes that move material into and out of the cell
Content Prerequisites

- The student knows the general features of animal and plant cells
- The student knows the fluid mosaic model of the plasma membrane
- The student knows the function of ATP
- The student knows the meaning of hydrophobic and hydrophilic characters of molecules
- The student knows how to use a microscope
- The student knows how to prepare a wet mount
Content Learning Outcomes

At the end of the unit, students should be able to describe the role of the plasma membrane in separating and connecting the internal environment of the cell from and with the external environment.
Language general objectives

• To motivate and encourage the learner
• To promote the learner's language autonomy
• To guide and support the learner in the process of language-learning through scientific contents
• To develop self-confidence in using L2
• To get used to consult on-line monolingual dictionaries
• To recognize key-words
Language specific objectives

• To explain the main concepts of active and passive transport in English
• To recognize and explain the key words
• To build a specific glossary and define the terms in it
• To pronounce difficult words correctly
Language Prerequisites

• Students can understand simple written and spoken language (B1)
• Students can produce simple written texts
• Students can report on a given topic
Language Learning Outcomes

At the end of the unit students should be able:

• To read short scientific texts and analyse information for operative purposes
• To understand simple instructions to carry on experiments
• To produce lab reports using a given scheme
• To summarize information about the active and passive transport
• To report about the active and passive transport using a clear specialized lexicon (CALP) correctly
• To use and re-employ the acquired knowledge in L1 or in L2 independently of the language of acquisition
<table>
<thead>
<tr>
<th>Activities</th>
<th>Steps</th>
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<tbody>
<tr>
<td>Whole-class Lesson</td>
<td>1-2-3-4</td>
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<tr>
<td>Asking Questions</td>
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<td>Draw Schemes</td>
<td>1</td>
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<tr>
<td>Warm Up</td>
<td>1</td>
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<tr>
<td>Brainstorming</td>
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<td>Worksheet, Glossary + Schemes</td>
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<tr>
<td>Videos And Animations Watching And Listening</td>
<td>2-4</td>
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<tr>
<td>Individual Work</td>
<td>2</td>
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<tr>
<td>Text Writing</td>
<td>2-4</td>
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<tr>
<td>Working In Pair</td>
<td>2-3-4</td>
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<tr>
<td>Working In Team</td>
<td>2-3-4</td>
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<td>Texts Reading</td>
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<td>Lab Reports</td>
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<tr>
<td>Lab Experiments</td>
<td>3-4</td>
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### Material

<table>
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<tr>
<th>Tool</th>
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<tbody>
<tr>
<td>IWB</td>
<td>2</td>
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<tr>
<td>Computer</td>
<td>2</td>
</tr>
<tr>
<td>Video and Animation</td>
<td>2-3-4</td>
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<tr>
<td>Internet</td>
<td>2-3-4</td>
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Assessment

In CLIL the primary focus of assessment is on content, even if language is always present.

Language evaluation should be closely linked to the achievement of content objectives using performance-based assessments.
Evaluation is based on:

- Knowledge of the main concepts
- Comprehension of the main concepts
- Ability in logical elaboration (analysis, synthesis, interpretation)
- Communication
- Use of a specific lexicon (CALP- Cognitive Academic Language Proficiency)

Assessment Test:
- Intermediate
- Final
STEP 1: WARM UP

BRAINSTORMING

ACTIVITIES

AIMS

PRIOR KNOWLEDGE
Students worksheet step 1

CELL GLOSSARY

Cell: A basic unit of living matter separated from its environment by a plasma membrane; the fundamental structural unit of life.

Plasma (or cell) membrane: Thin, two-layered film that surrounds entire cell and acts as a selective barrier. Consists of two layers of phospholipic molecules embedded with proteins.

Phospholipids: Molecules that constitute the inner bilayer of biological membranes, having a polar, hydrophilic head and a nonpolar, hydrophobic tail.

Cytoplasm: The fluid like material inside the plasma membrane and outside the nucleus of the cell. Various organelles are found here and many reactions occur here.

Cytoskeleton: A network of microtubules, microfilaments, and intermediate filaments that branch throughout the cytoplasm and serve a variety of mechanical and transport functions.

Nucleus: Structure containing the chromosomes and DNA of the cell, which carry hereditary information and direct the biochemical activities. This is separated from the rest of the cell by the nuclear membrane.

Another scientific meaning: the positively charged central portion of an atom that comprises nearly all of the atomic mass and that consists of protons and usually neutrons.

Origin of the word: New Latin, from Latin, First Known Use: 1704. The origin explains the most used plural form, nuclei.

Chromatin: The complex of DNA and proteins that makes up a eukaryotic chromosome. When the cell is not dividing, chromatin exists as a mass of very long, thin fibres that are not visible with a light microscope.

Nucleolus: Structure within the nucleus that is involved in the synthesis of RNA found in ribosomes.

Origin of the word: New Latin, from Latin, first used in 1845 nuclo BDS

Endoplasmic reticulum (ER): A network of channels in the synthesizing, transporting, and storing substances made in the ribosomes.

Smooth ER: That portion of the endoplasmic reticulum that

Ribosomes: Small structures made of RNA and protein; there are large numbers of ribosomes in the cell, which are to the surface of the endoplasmic reticulum.

Rough endoplasmic reticulum (RER): That portion of the ER ribosomes.

Mitochondria: Sites of aerobic (requiring oxygen) cellular energy is made in the mitochondria.

Coined in 1898, from Greek mitos, "thread" and "khondron" Sing: mitochondria
STEP 2: NEW TOPICS

lesson

research
Students Worksheet on Passive Transport step 2

1a) Listen to the lesson on Passive transport: diffusion, osmosis, facilitated diffusion on the IWB.

2a) Perform the following class activities:

1) Remember this short description of passive transport:
   In passive transport, a solute moves down its concentration gradient and no energy input is required. Diffusion, facilitated diffusion and osmosis carry out passive transport.

2) Read about concentrations of solutions: Isotonic, Hypotonic, and Hypertonic Solutions.
   Water moves readily across cell membranes and if the total concentration of all dissolved solutes is not equal on both sides, there will be net movement of water molecules into or out of the cell. Whether there is net movement of water into or out of the cell and which direction it moves depends on whether the cell's environment is isotonic, hypotonic, or hypertonic.

PASSIVE AND ACTIVE TRANSPORT GLOSSARY

Passive transport: a form of transport that requires no energy from the organism, i.e., diffusion of a substance from an area of high concentration to one of a lower one.

Active transport: the movement of a substance across a cell membrane against its concentration gradient, which requires energy from the cell and specific transport proteins.

Carrier proteins: proteins that bind a specific molecule on one side of the membrane, change shape, and release it on the other.

Channel proteins: proteins forming a pore that a specific ion (or other substance) can pass through.

Concentration gradient: change in concentration of a solute across distance, as a gradient within a cell or across a membrane; if molecules are free to move, they will diffuse along the gradient from higher to lower concentrations.

Diffusion: the movement of a substance from an area of high concentration to an area of lower concentration until equilibrium is reached.

Dissolving: the process by which a substance breaks apart into distinct particles (atoms, molecules, or ions) upon encountering or being placed in a solvent.

Evaporating: the process by which molecules of a liquid change state and become molecules of a gas; the molecules themselves remain unchanged; the speed of the molecules and the space between them increases significantly.

Facilitated diffusion: a form of passive transport that requires protein carriers to cross cell membranes. A solute moves down its concentration gradient and no energy input is required.

Hypertonic: having a higher concentration of solutes compared to another solution. From Greek hyper: "over, beyond, evermuch, above measure."

Hypotonic: having a lower concentration of solutes compared to another solution. From Greek hypo: "under."

Isotonic: two solutions having the same concentrations of solutes. From Greek iso: "equal to, the same as."

Osmosis: the phenomenon whereby water flows across a selectively permeable membrane from a hypotonic environment to a hypertonic environment.

Semipermeable (selectively permeable) membrane: a physical barrier which only allows certain particles (based on size and charge) to pass through it; membranes of organelles and cells are semipermeable membranes through which small, uncharged molecules such as water, oxygen and carbon dioxide pass freely. From Latin semi-: "half."

Saturated solution: condition when a solvent contains so much dissolved solute that no more solute can be dissolved.
STEP 3 AND 4: LAB ACTIVITIES

- lab
- data collection
- lab report
- virtual lab
- video transcription

Liceo Torricelli Faenza
### LAB REPORT

<table>
<thead>
<tr>
<th>Date</th>
<th>Class</th>
<th>Name of the student/students:</th>
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</thead>
<tbody>
<tr>
<td>Title of the experiment</td>
<td>Objective(s) of the experiment</td>
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<tr>
<td>Context, topics, cell types</td>
<td>Materials:</td>
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<tr>
<td>Lab tools:</td>
<td>Procedure:</td>
<td></td>
</tr>
<tr>
<td>Data collection:</td>
<td>Data analysis:</td>
<td></td>
</tr>
<tr>
<td>Data processing:</td>
<td>Conclusion (related to the objective(s)):</td>
<td></td>
</tr>
</tbody>
</table>

1. Hypotonic (x100)  
2. Isotonic (x100)  
3. Hypertonic (x100)

Lab activities  
Liceo A. Moro Reggio Emilia
Egg A In WATER
Mass = 82.6 g

Egg B In sugar
Mass = 88.3 g
Step 5: ASSESSMENT

- listening
- reading
- writing
- speaking
- multiple choice questions
- fill-in-the-blanks
- presentations
Reading activities:
Step 2  Texts to read from *Pearson Education, Inc. or its affiliates* and
http://learn.genetics.utah.edu/content/cells/insidestory/

Step 5  Texts of final tests

Language Skills: reading and writing

Writing activities

• Step 1  Taking notes, building a glossary
• Step 2  Transcribing videos and building a glossary
• Step 3  Taking notes, answering assessment questions and filling lab report scheme.
• Step 4  Transcribing a video
• Step 5  Answering the final written test
Language Skills

Speaking activities:
- step 1: answering questions during warm up activities and guiding the teacher to draw a scheme in the end
- step 2: answering questions at the end of the other activities
- step 3: speaking to each other during the experimental procedure
- step 4: speaking during transcription of video

Listening activities
- step 1: Listening to the teacher’s whole class lesson /interactive lesson
- step 2: videos and animations, in both whole class activities and team work.
- step 3: Listening to the teacher’s whole class lesson /interactive lesson
- step 4: video to listen to and transcribe partially.
- step 5: video to listen to, in order to reinforce what learnt in the unit.

Eventually distinguish between
- listening only
- listening and transcribing.

speaking and listening
Assessment step 1

Content: recall of previous knowledge about the cell structure, the difference between eukaryotic animal and plant cell, the structure of the cell membrane and hydrophilic/lipophilic characters of molecules,

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Evaluation</th>
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<tbody>
<tr>
<td>Asking questions</td>
<td>formative</td>
</tr>
<tr>
<td>Draw on the blackboard a scheme of the eukaryotic animal and plant cell, and a scheme of the structure of the cell membrane.</td>
<td>formative</td>
</tr>
<tr>
<td>Working in group, the students have to built a list with terms related to parts of the cell using the book and their notes.</td>
<td>formative</td>
</tr>
<tr>
<td>The students build a glossary using the textbook and/or online dictionary.</td>
<td>formative</td>
</tr>
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</table>
**Assessment step 2**

Content:
- **Passive transport** (with animations) - How Diffusion Works; How facilitated diffusion works.
- **Active transport** - How the Sodium Potassium Pump Works; Endocytosis and Exocytosis; Pinocytosis; Phagocytosis.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in group students read texts and watch and listen to an animation on the topic, write the keywords on the transports and build a glossary.</td>
<td>formative</td>
</tr>
<tr>
<td>Focus on words and on structures.</td>
<td>formative</td>
</tr>
<tr>
<td>Intermediate test (reading and listening comprehension, questions, definitions) to check concepts, glossary and structures</td>
<td>summative</td>
</tr>
<tr>
<td>The students build a glossary using the textbook and/or online dictionary.</td>
<td>formative</td>
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## Assessment step 3

**Lab activity: osmosis in plant cells**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Evaluation</th>
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<tbody>
<tr>
<td>Team work: notes of the oral instructions on the lab procedures, on the materials and on the lab tools, photos.</td>
<td>formative</td>
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<tr>
<td>Answer the questions on the lab activity</td>
<td>summative</td>
</tr>
<tr>
<td>Write a lab report</td>
<td>summative</td>
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## Assessment step 4

Content: osmosis in animal cells (egg)

<table>
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<tr>
<th>Assessment</th>
<th>Evaluation</th>
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</thead>
<tbody>
<tr>
<td>Reading a text</td>
<td>formative</td>
</tr>
<tr>
<td>Transcribing a video</td>
<td>summative</td>
</tr>
<tr>
<td>Making a list of significant words use a monolingual on line dictionary</td>
<td>formative</td>
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<tr>
<td>Listening and repeat the pronunciation of some words</td>
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# Assessment step 5

**Content:** Active and Passive transport

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Evaluation</th>
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<tbody>
<tr>
<td>Team work: students using interactive speaking, produce a final paper with the discussion and the integration of the results and observations of the lab activities of steps 3 and 4 on osmosis in plant and animal cells.</td>
<td>formative/summative</td>
</tr>
<tr>
<td>Individual work:</td>
<td>summative</td>
</tr>
<tr>
<td>a- answer to multiple-choice questions;</td>
<td></td>
</tr>
<tr>
<td>b- fill-in-the-blanks questions</td>
<td></td>
</tr>
<tr>
<td>c- complete a crossword scheme.</td>
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</tr>
<tr>
<td>Final review: watch and listen to a video.</td>
<td>formative</td>
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</table>
References
