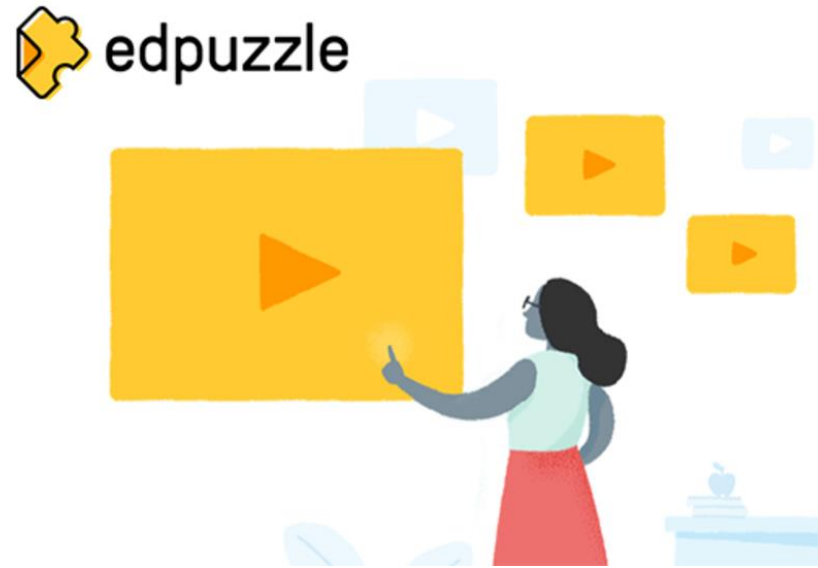


Using interactive EdPuzzle videos to facilitate student learning in a challenging STEM course



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What is EdPuzzle and why am I using it?

- App that allows you to record, edit, and annotate lecture videos (questions, notes)
- Used to make pre-recorded lectures for Human Physiology online
- Simulated interactive lecture format (lecture, pause, ask questions, think-X-share)
- Using in flipped classroom (online and in-person)

The screenshot displays the EdPuzzle interface. On the left, a sidebar titled "Video events" lists four questions with their timestamps:

- 01:02: Multiple-choice question: Which of the following would DECREASE blood osmolarity?
- 03:55: Multiple-choice question: An increase in water reabsorption by the kidney would ____ osmolarity and ____ blood pressure
- 05:15: Multiple-choice question: What does a diuretic do?
- 08:02: Open-ended question: How would you make a collecting duct cell MORE permeable to water? (hint: think about how...

The main video player shows a diagram titled "Endocrine Control of Water Reabsorption" with a play button in the center. The diagram illustrates the hormonal regulation of water reabsorption in the kidney, involving the hypothalamus, posterior pituitary (ADH), anterior pituitary (PTH), and parathyroid hormone-related protein (PTHrP). It shows the effects of these hormones on the distal tubule and collecting duct, including the insertion of aquaporin channels and the activity of Na⁺/K⁺ ATPase pumps. The diagram also indicates the role of aldosterone in the collecting duct.

Below the video player, a control bar includes a play button, a timer showing 00:51, an "Add cut" button, and "Undo" and "Reset" buttons. A progress bar is visible below the control bar, showing the current position in the video. The total new time is 32:41.

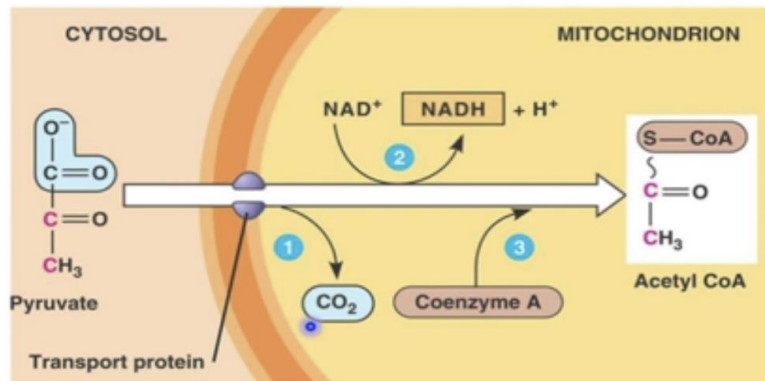
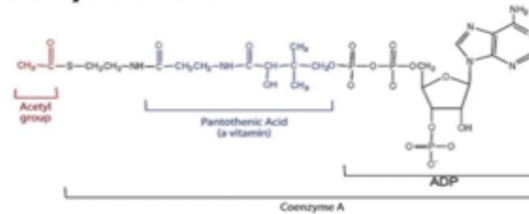
EdPuzzle Video Built-In Question Example

Topic 2 Lecture Video 2

Jane Khudyakov

Oxidation of Pyruvate

- Pyruvate is transported from cytosol into mitochondria
- Before entering citric acid cycle, must be:
oxidized = forms acetyl CoA
- Other products: *1 NADH and 1 CO₂ per pyruvate*



12

removed as carbon dioxide So the other products of this step is 1 NADH and one carbon dioxide molecule



MULTIPLE CHOICE QUESTION

Where do you think the CO_2 goes after it is generated in this step?

- it is removed in the urine
- it is stored in the liver
- it is used to regenerate glucose
- it is exhaled from the lungs

Rewatch

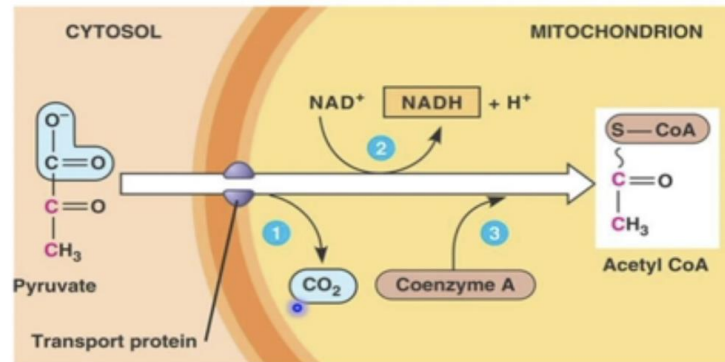
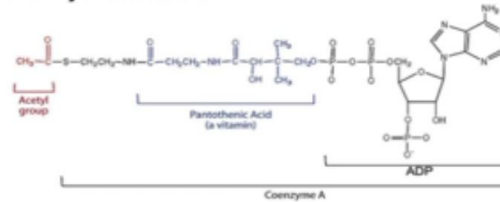
Skip

Submit

EdPuzzle Video Built-In Question Example

Oxidation of Pyruvate

- Pyruvate is transported from cytosol into mitochondria
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oxidized = forms acetyl CoA
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removed as carbon dioxide So the other products of this step is 1 NADH and one carbon dioxide molecule



MULTIPLE CHOICE QUESTION

Where do you think the CO₂ goes after it is generated in this step?

- it is removed in the urine
CO₂ is a waste product and it is removed from the body by being exhaled from the lungs.
- it is stored in the liver
CO₂ is a waste product and it is removed from the body by being exhaled from the lungs.
- it is used to regenerate glucose
CO₂ is a waste product and it is removed from the body by being exhaled from the lungs.
- it is exhaled from the lungs
CO₂ is a waste product and it is removed from the body by being exhaled from the lungs.

Rewatch

Skip

Continue

EdPuzzle Video Assessment






Multiple choice question

63 out of 94 right

Where do you think the CO₂ goes after it is generated in this step?

- ✗ it is removed in the urine
- ✗ it is stored in the liver
- ✗ it is used to regenerate glucose
- ✓ it is exhaled from the lungs

EdPuzzle Video Assessment

| edpuzzle | | | | |
|------------------|---|--------|-----------|---------------------|
| student 1 |  | 56/100 | Jan. 26th | Jan. 26th - 11:45pm |
| student 2 | 100%  | 67/100 | Jan. 27th | Jan. 27th - 11:00pm |
| student 3 |  | 33/100 | Jan. 28th | Jan. 28th - 10:19am |
| student 5 |  | 67/100 | Feb. 4th | Jan. 28th - 11:35am |
| student 6 |  | 89/100 | Jan. 27th | Jan. 27th - 4:16am |

Grade

56 /100

Video watched

100 %

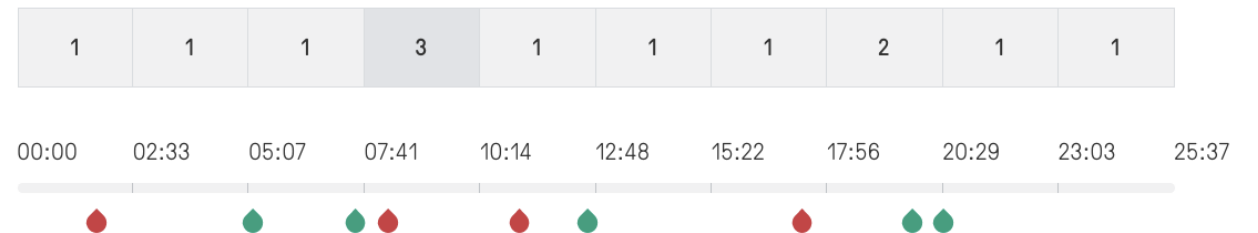
Correct responses

5 / 9 questions
(9 answered)

Time spent: 33 min

Turned In: Jan. 26th - 11:45pm

Number of times student watched each section of your video



EdPuzzle Video Assessment

Why do you think cells of the thyroid gland and cells of the parathyroid glands make different hormones? What makes these cells different?

Cells in the thyroid gland produce enzymes that convert tyrosine to T3 and T4. Cells in the PTH gland do not produce these enzymes. PTH is actually a protein hormone, so cells in the parathyroid gland make it just like they make other proteins (transcription of the PTH gene followed by translation of the PTH protein).

Student 1

The parathyroid gland and the thyroid gland make different types of hormones because of the cells that composed them and what nutrients they need to produce their hormones. The thyroid gland uses iodine to produce T3 and T4 to regulate metabolism, while the parathyroid gland uses Ca^{2+} ions to regulate calcium ion concentration. Therefore, they have different receptors attached to their cells.

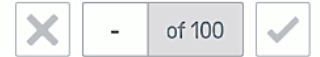


high effort, mostly correct

Comment

Student 2

Each of these cells probably make different hormones in order to more efficiently regulate Ca^{2+} levels in the blood. Regarding what makes these cells different, it is most likely the receptors that bind to the hormones that induce them to produce a response.

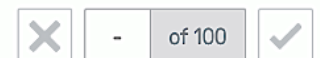


high effort, correct

Comment

Student 3

different enzymes



lower effort, correct

Comment

Student 4

d



no effort

Comment

Students like EdPuzzle videos because ...

- ... they allowed me to **take more time to digest the material**.
- ... I was **able to pause** and **re-watch** parts of the lecture that I was unsure about.
- ... I **did not have to rush** at taking lecture notes. They made **taking notes less stressful**.
- ... they allowed me to **test my knowledge** on new and old material throughout the semester.
- ... the lectures **were not too long**.
- ... they were **graded based on completion**, which reduced pressure on me and helped me focus on learning.
- ... they had a due date. Making these lectures assigned **helped me to stay on top** of the class material.
- ... they let me **set my own schedule** and incorporate them into my schedule in a way that **worked for me**.

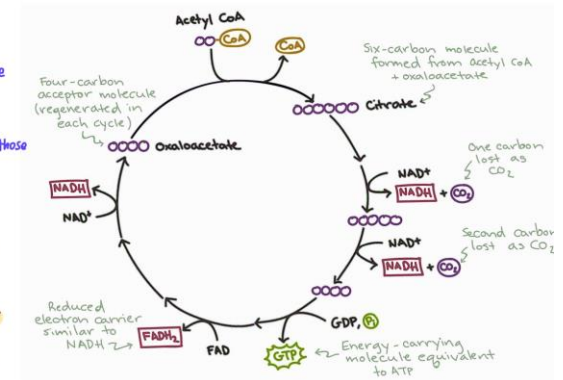
Citric Acid Cycle Summary

- Where does it occur in the cell?
Mitochondrial matrix

- Requires O_2 ?
*NOT directly used as reactant in any of the steps, BUT bc it's final e^- acceptor of ETC, w/o O_2 $FADH_2$ / $NADH$ made from the cycle **CAN'T** be oxidized back to NAD^+ / FAD for reuse \rightarrow lack of those reagents cause citric acid cycle to stop*
(it uses "bioreactors" to separate them by reducing pressure to vacuum)

- Where do all the carbons go?
made into CO_2 & exhaled from lungs
- Where does all the bond energy go?
transferred to $NADH$ & $FADH_2$

- Products per cycle: $3 NADH$, $1 FADH_2$, $1 ATP$, $2 CO_2$ per Acetyl CoA
- Products per glucose molecule:
form 2 acetyl CoA, so $\times 2$
 $\rightarrow 6 NADH$, $2 FADH_2$, $2 ATP$, $4 CO_2$ per glucose



Why is it called a cycle?
the reactant (Oxaloacetate) is REFORMED in last step

I like EdPuzzle videos & flipped teaching because ...

- It makes teaching live more fun, less exhausting, and less time-consuming.
- Students still get lecture content even if they miss class (sick, traveling, etc).
- I can tell when/which students fall behind, even in a large class.
- I can spend class time interacting with students, who ask more questions.
- It shifts office hours, which not all students can attend, to scheduled class time.



Drawbacks to EdPuzzle & Flipped Teaching

- Requires some amount of student **self-efficacy, motivation, and time management**
- Many students rush through videos just before class, some fall behind and “binge”
- Some students think the videos take too much time
- Some students don’t come to class to review and practice material and ask questions

