Krebs Cycle Karaoke: User’s Guide

Introduction:
*Krebs Cycle Karaoke?* Why in the world would I bother to make such a thing? And why would I expect anyone to use it?

It’s all about learning – deep, substantial, permanent learning – informed by insights emerging from cognitive science (explained in the book *Make it Stick*). My hypothesis is that

1. If you become familiar with my original *Krebs Cycle Rap,* and
2. Then try to sing it yourself following the fill-in-the-blanks lyrics on the screen of the *Krebs Cycle Karaoke* then
3. Your path to memorizing the material in the song will be much more efficient than just about anything else that you can do.

That’s because interacting with the song in this way is *effortful.* This is not an easy task. But if you do the hard work of trying to memorize the lyrics in this guided way, you’ll learn a lot about Krebs Cycle. Fill-in-the-blanks karaoke is going to help you to transfer the information to where you need it: into long term memory, where it will be available for that upcoming discussion session or test.

There are, of course, alternatives to remembering this material. Flashcards are another great way that forces you to recall what you know, and thereby encodes your learning in long-term memory. I have *Krebs Cycle flashcards* set up for you at my website.

Give it a try. It’s going to be difficult. You won’t get it right the first time. Keep on going back and forth between the fill-in-the-blank lyrics on the next page, and the original lyrics (with all the blanks filled in) that follow. Eventually, you’ll be able to sing the Karaoke version fluently. And my hypothesis is that if you can do that, you’ll have learned a lot about Krebs Cycle in a fairly permanent way.

Please leave me a comment letting me know what you think.
Krebs cycle, Karaoke Version
View it at www.sciencemusicvideos.com
Glenn Wolkenfeld © 2015

D
In the _____ of the _____ in all our cells
Bm
Is the _____ of reactions that won Hans _____ the Nobel
G
Prize,
This cycle takes the _____ in food
A
And makes it into other forms your _____ can use.

Krebs Cycle makes the _____ carrier NADH
Which later brings electrons to the _____ _____ chain.
And Krebs makes _____ its _____ is the same,
Krebs also makes some _____ another claim to fame.

CHORUS
(we’re talking) KREBS!
It’s the _____ _____ cycle
KREBS!
_____ acid cycle
Krebs- each cycle makes
_____ ATP, _____ NADH, _____ FADH2

Right before the cycle’s a _____ part
Links Krebs to _____, so Krebs can start
Enzymes break a _____ off a _____
Yields an _____ and _____ -CoA

Acetyl-CoA carries _____ two
With all the energy that derives from _____
It’s a highly _____ molecule with energized _____
It fuels up the _____ cycle as it cycles on.

Now at the start of Krebs this Acetyl _____
Has the 2 _____ it carries in _____ away
Enzymes put these on _____ with carbons _____
Makes _____ carbon _____ acid who could ask for more?

Notice three _____ groups on that citric acid
It’s why the cycle’s also named for _____ acid
Or _____ cycle, if it’s acronyms that you prefer
Or _____ in honor of its discoverer!

CHORUS

Enzymes work on citric acid and remove a _____
and other enzymes modify and _____ it too,
The _____-carbon result is alpha-_____.
Krebs cycle, it’s so great!

Every oxidation, can power the _____
of _____ plus which gains _____ carrying function,
Becoming _____, that energy sensation
Which later on in _____ powers _____ creation

Another _____ follows, ‘nother CO2 removed
Leaving us with a four _____ molecule
Another _____ results from this _____
As Krebs does its energy _____

This four carbon molecule (Succinyl CoA),
Still has lots of energy, _____ can take away
A series of reactions yield one _____
The cell’s main _____ currency.

Leavin’ just ‘nough energy for _____ to _____
An _____, to _____
And one last _____, will also get _____
As the final _____ carrier _____ gets produced

We’ve _____ what energy came in at Krebs’s start,
Now we have _____ at this final part
Oxaloacetate is the _____ and finale
Ready to meet _____ -CoA and here at the final tally

BRIDGE
Krebs goes round and round, such an ancient _____
_____ like the wheels of my bicycle.
Krebs is like the _____ of _____ respiration,
I breathe out its _____ with every _____!

We’ve walked through the cycle, so now lets review
_____ is _____ Co-A with carbons _____
The carbons get _____, releasing _____
_____ sends this CO2 out of you.

The cycle’s function’s transformation
3 _____, 1 _____ creation
And also synthesis of _____ ATP
Which cells directly utilize for _____

For every _____ cells absorb the cycle runs _____ times
As long as cells get _____, Krebs is running just fine,
It precedes _____ transport chain, it follows _____
It’s spinning round and round in the _____ _____

CHORUS
Krebs Cycle Song
View it at www.sciencemusicvideos.com
Glenn Wolkenfeld © 2012

D
In the matrix of the mitochondria in all our cells
Bm
Is the cycle of reactions that won Hans Krebs the Nobel Prize.

This cycle takes the energy in food
A
And makes it into other forms your cells can use.

Krebs Cycle makes the electron carrier NADH
Which later brings electrons to the electron transport chain.
And Krebs makes FADH$_2$ its function is the same.

CHORUS
(we’re talking) KREBS!
It’s the Citric Acid cycle
KREBS!
Tricarboxylic acid cycle
Krebs-- each cycle makes
One ATP, three NADH, one FADH$_2$.

Right before the cycle’s a transitional part
Links Krebs to glycolysis, so Krebs can start
Enzymes break a CO$_2$ off a pyruvate
Yields an NADH and acetyl-CoA

Acetyl-CoA carries carbons two
With all the energy that derives from food
It’s a highly reduced molecule with energized electrons
It fuels up the Krebs cycle as it cycles on.

Now at the start of Krebs this Acetyl Co-A
Has the 2 carbons it carries in ripped away
Enzymes put these on oxaloacetate with carbons four.
Makes six carbon Citric acid who could ask for more?

Notice three carboxyl groups on that citric acid
It’s why the cycle’s also named for tricarboxylic acid
Or TCA cycle, if it’s acronyms that you prefer
Or Krebs in honor of its discoverer!

CHORUS
Enzymes work on citric acid and remove a CO$_2$
and other enzymes modify and oxidize it too,
The five carbon result is alpha-ketoglutarate.
Krebs cycle, it’s so great!

Every oxidation, can power the reduction,
of NAD plus which gains electron carrying function,
Becoming NADH, that energy sensation
Which later on in respiration powers ATP creation

Another oxidation follows, ‘nother CO$_2$ removed
Leaving us with a four carbon molecule
Another NADH results from this oxidation
As Krebs does its energy transformations

This four carbon molecule (Succinyl CoA),
Still has lots of energy, enzymes can take away
A series of reactions yield one ATP
The cell’s main energy currency.

Leavin’ just ‘nough energy for enzymes to reduce
An FAD$_2$ to FADH$_2$
And one last NAD$^+$ will also get reduced
As the final electron carrier NADH gets produced

We’ve harvested what energy came in at Krebs’s start,
Now we have oxaloacetate at this final part
Oxaloacetate is the commencement and finale
Ready to meet Acetyl-CoA and here at the final tally

BRIDGE
Krebs goes round and round, such an ancient cycle,
Spinning like the wheels of my bicycle.
Krebs is like the axle of aerobic respiration,
I breathe out its CO$_2$ with every exhalation!

We’ve walked through the cycle, so now let’s review
Input is Acetyl Co-A with carbons two
The carbons get removed, releasing CO$_2$
Exhaling sends this CO$_2$ out of you.

The cycle’s function’s transformation
3 NADH, 1 FADH$_2$ creation
And also synthesis of one ATP
Which cells directly utilize for energy

For every glucose cells absorb the cycle runs two times
As long as cells get fuel, Krebs is running just fine,
It precedes electron transport chain, it follows glycolysis
It’s spinning round and round in the mitochondrial matrix

CHORUS