

It’s OK to be Nervous: Homeostasis & the “Fight/Flight” Response

Objective: Students will be able to write a short paragraph describing what homeostasis is and how the nervous system is involved, including an explanation of the *idea* of a negative feedback loop. In addition, students will be able to write a short explanation of why the “fight or flight” response is important to organisms’ survival ability.

Instructional Materials:

Teacher brings:

1. CD player
2. CD w/ Lauryn Hill’s “Can’t Take My Eyes Off Of You”
3. CD with Eminem’s “Lose Yourself”
4. 6 flashlights
5. 1 airhorn

Students bring:

1. Classroom writing journals
2. A pencil

Special Considerations:

1. Classroom management is key today, in terms of transitioning students from one activity to another quickly. This is especially true with the transitions after the balancing experiment and after the airhorn gets blown.
2. It is also important to make sure that no student volunteers for the flashlight experiment are epileptic.

Procedures:

Time (min.)	Teacher	Students	Learning/literacy Strategies/modalities addressed
3	Take Attendance while students do the “DO NOW” exercise: “Stand up right now, and try to balance on one foot until I say stop. As you’re doing it, try to pay close attention to what your body’s feeling and what it’s doing. It’s OK to talk to other people about what they’re noticing.” Also written on the board are vocabulary words: Homeostasis; Negative Feedback Loop; “Fight or Flight”.	Try to stand on one leg, try to keep balanced, fall, laugh, talk w/ each other about balancing.	Kinesthetic learners allowed a chance to think about the physical processes of homeostasis Vocabulary words on the board helps ELL students & others focus on key

			concepts addressed in class
2	Gather quick responses from students: what did they observe about themselves? If necessary, guide them to observe that if they were falling forward, they pushed backwards, etc.	Respond in journal, then respond orally	Students increase literacy skills by recording ideas in writing, and by expressing them orally.
2	Teacher distributes flashlights (1 to each "island" of 4 students), turns off lights, and asks for a volunteer from each group to raise hand: this volunteer is to be the "eye opener". Teacher then asks for another volunteer: this volunteer is to be the flashlight operator.	Receive flashlights; volunteer	
5	Teacher explains that the volunteer is to be ready to keep eyes open, while flashlight operator is to be ready to shine the flashlight in the eye opener's eyes. Other group members are expected to look closely at the eye-opener's eyes when the flashlight is turned on. Ask students to guess (to themselves) what they think is going to happen. When everyone's ready, teacher plays "Can't Take My Eyes Off Of You" by Lauryn Hill.	Listen, get in position, and get ready to watch. Hypothesize.	Scientific method is encouraged, asking students to hypothesize about probable results of the experiment.
5	Repeatedly ask flashlight operator to turn on/off the flashlight and ask the other group members to observe how the pupil/iris respond.	Do experiment	Visual learners see homeostatic response
2	Gather quick responses from students: what did they observe? Ask if they can guess why it happened.	Respond in journal, then respond orally	Students increase literacy skills by recording ideas in writing, and by expressing them orally.
10	<p>Direct Instruction: Homeostasis defined as the body's ability to maintain a basic constancy within a range of acceptable variation. Tell students that they can think of it as the body's ability to "fix" itself when things go a little wrong. Examples include: too hot, sweat; too cold, shiver; falling on your face, correct balance; build up pressure in your stomach, burp; in bowels, pass gas (fun topics for 9th/10th graders).</p> <p>Explain idea of negative feedback loop, leading students through one word at a time: Negative; feedback; loop.</p>	Listen, take notes	<p>Auditory/symbolic learners benefit from direct instruction, and teacher gets to correct misconceptions students may have.</p> <p>Focusing on individual</p>

			components of key terms allows students to build understanding.
3	Ask for any additional examples from students. At the end, re-emphasize that homeostasis is about keeping the internal environment stable.	Give new examples	
1	HOAX: tell students that we're going to take our pulse as part of another homeostasis experiment. Students already know how to do this from our circulatory system unit.	Students prepare to take pulse for 1 minute	
1	Teacher "times" the students as they take pulse, while walking to the back of the room to pick up a hidden airhorn. At the end of the minute, teacher blows airhorn.	Students take pulse	Scientific method literacy is again reinforced as students conduct their own experiments.
2	Teacher directs students to keep their heads, and continue to take pulse.	Students freak out, but hopefully return to take their pulse.	
4	Gather quick responses from students: what did they observe? When have they noticed their heart rate rising before? Under what circumstances? Ask if they can guess why it happens.	Respond in journal, then respond orally	Students increase literacy skills by recording ideas in writing, and by expressing them orally.
5	Lecture on "fight/flight" response. Not very detailed, but explain that nervous system is key in terms of both receiving stimuli and helping body to rapidly change its internal environment to respond. Note how this is the opposite role of the nervous system than in homeostasis.	Listen	Auditory/symbolic learners benefit from direct instruction, and teacher gets to correct misconceptions students may have.
2	Explain that a song is about to be played, and you want students to carefully listen to the words at the beginning, to see if they can identify 2-3 other body reactions in the "fight or flight" response.	Listen	
4	Play Eminem's "Lose Yourself" (words attached)	Listen	Critical listening skills refined.
6	Pass out end-of-class writing assignment: Write a short paragraph describing what homeostasis is and how the nervous system is involved.	Write responses	Written communication skills encouraged.

	<p>Students should try to explain the <i>idea</i> of a negative feedback loop. Paragraphs should also recall 3 examples of how the human body maintains homeostasis.</p>	<p>Also, end-of-class written mini-assessment allows for quick re-teaching of material if necessary.</p>
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Sample Student Products: As a result of this lesson, students will produce:

1. In-class written assignment: Write a short paragraph describing what homeostasis is and how the nervous system is involved. Students should try to explain the *idea* of a negative feedback loop. Paragraphs should also recall 3 examples of how the human body maintains homeostasis.
2. Homework assignments:
 - A. 5 points: Think of 3 NEW (i.e., not discussed in class) ways in which their bodies could be physically uncomfortable, and how they respond to make it more comfortable (e.g., hungry: eat; out of breath: breathe heavily; hand hurts from writing: stretch it out; noise is too loud: cover your ears; thirsty: drink; eyes are dry: blink). Write how you think each of these things is an example of homeostasis and a negative feedback loop.
 - B. 5 points: Think of a time when you have experienced a “fight or flight” response (maybe when you were asked to speak in class, maybe when you were about to be in a fight, maybe when you were thinking of asking somebody out on a date). Describe *in detail* what happened to you when you had this response: How did you feel? Could you think properly? What did you do? Full credit will require at least a paragraph.
 - C. 5 points: How could knowing about the “fight/flight” response make it easier to confront those things you are nervous about?

Assessment: The in-class written assignment can receive a maximum of 10 points, broken down as follows:

- ❑ 5 points for explaining the idea of homeostasis as the body’s ability to maintain internal constancy.
- ❑ 2 points for explaining the idea of a negative feedback loop as occurring within a range of acceptable values.
- ❑ 3 points (1 apiece) for listing 3 examples of homeostasis.

The homework assignment can receive a maximum of 15 points, broken down as follows:

- ❑ 5 points (2 apiece) for Part A: describing and explaining the negative feedback loop in 3 new examples of homeostasis.
- ❑ 5 points for Part B: Full credit is given to a thoughtful response with details (about physical sensations, thoughts or lack thereof, and description of action taken).
- ❑ 5 points for Part C: Again, full credit is given to a thoughtful response. This would include either a) an acknowledgement that knowing about the “fight/flight” response might not help, since it’s a programmed response; b) noting that avoiding highly stressful situations might be good; or c) thinking about your actions beforehand may make it easier to act the way you want to, despite stress.

Reflections: I would expect that this will be a highly active class, with a fair amount of classroom management skills employed. There are many transitions, with activities requiring student interaction, and with a particularly disruptive moment in the middle of the lesson. All of these factors will definitely require that the teacher has already developed strong classroom management techniques, and that the students know them well. If there are particular classes where management is more of an issue, the teacher will likely have to adjust the lesson in two places

- A. Eliminating the standing on one leg introduction; and
- B. Altering the flashlight experiment (maybe by making it a classroom demonstration, rather than individual group experiments).

Also, it will be important to acknowledge the profanity in the Eminem lyrics, to make sure that students are prepared for them, and don't focus on these lyrics at the expense of the key ideas relevant to the lesson.

Literacy Aspect: There are several different forms of literacy addressed in different facets of this lesson:

1. Written literacy skills. Students will practice their writing skills in two key areas:
 - a. Factual writing. As students record detailed, written observations in their classroom journals, they exercise factual writing/observation skills, which are critically important in science.
 - b. Expressive writing. As students work through their homework writing assignments, they are required to exercise their ability to write expressively about their own experiences: in this exercise, students are required to identify internal emotional/physical states and motivations, and describe those realistically.
2. Oral literacy skills. Students will practice their oral literacy skills by repeatedly explaining their own scientific hypotheses and observations to the class.
3. Scientific method literacy skills. Science in some ways has its own language and discourse, requiring different literacy skills, in part centered around the scientific method (including forming hypotheses, performing well-designed experiments, observing results accurately, reaching conclusions). In this class lesson, students are repeatedly required to practice all of these skills.

From:

http://www.ohhla.com/anonymous/eminem/rm_bside/yourself.mnm.txt

[Intro]

Look.. if you had.. one shot, or one opportunity
To seize everything you ever wanted.. in one moment
Would you capture it.. or just let it slip? Yo..

[Verse 1]

His palms are sweaty, knees weak, arms are heavy
There's vomit on his sweater already, mom's spaghetti
He's nervous, but on the surface he looks calm and ready
to drops bombs, but he keeps on forgetting
what he wrote down, the whole crowd goes so loud
He opens his mouth but the words won't come out
He's chokin, how? Everybody's jokin now
The clock's run out, time's up, over - BLAOW!
Snap back to reality, OHH - there goes gravity
OHH - there goes Rabbit, he choked
He's so mad, but he won't
Give up that easy nope, he won't have it
He knows, his whole back's to these ropes
It don't matter, he's dope
He knows that, but he's broke
He's so sad that he knows
when he goes back to this mobile home, that's when it's
back to the lab again, yo, this whole rap shit
He better go capture this moment and hope it don't pass
him

[Chorus]

You better - lose yourself in the music, the moment
You own it, you better never let it go (go)
You only get one shot, do not miss your chance to blow
This opportunity comes once in a lifetime
You better - lose yourself in the music, the moment
You own it, you better never let it go (go)
You only get one shot, do not miss your chance to blow
This opportunity comes once in a lifetime
You better..

[Verse 2]

Soul's escaping, through this hole that is gaping
This world is mine for the taking
Make me king, as we move toward a, new world order
A normal life is boring; but superstardom's
close to post-mortem, it only grows harder
Homie grows hotter, he blows it's all over
These hoes is all on him, coast to coast shows
He's known as the Globetrotter
Lonely roads, God only knows
He's grown farther from home, he's no father
He goes home and barely knows his own daughter
But hold your nose cause here goes the cold water
These hoes don't want him no mo', he's cold product
They moved on to the next schmoe who flows

He nose-dove and sold nada, and so the soap opera
is told, it unfolds, I suppose it's old partner
But the beat goes on da-da-dum da-dum da-dah

[Chorus]

[Verse 3]

No more games, I'ma change what you call rage
Tear this motherfuckin roof off like two dogs caged
I was playin in the beginning, the mood all changed
I've been chewed up and spit out and booed off stage
But I kept rhymin and stepped right in the next cypher
Best believe somebody's payin the pied piper
All the pain inside amplified by the
fact that I can't get by with my nine to
five and I can't provide the right type of
life for my family, cause man, these God damn
food stamps don't buy diapers, and there's no movie
There's no Mekhi Phifer, this is my life
And these times are so hard, and it's gettin even harder
Tryin to feed and water my seed plus, teeter-totter
Caught up between bein a father and a primadonna
Baby momma drama screamin on her too much for me
to wanna
stay in one spot, another day of monotony
has gotten me to the point, I'm like a snail I've got
to formulate a plot, or end up in jail or shot
Success is my only motherfuckin option, failure's not
Mom I love you but this trailer's got to go
I cannot grow old in Salem's Lot
So here I go it's my shot, feet fail me not
This may be the only opportunity that I got

[Chorus]

[Outro]

You can do anything you set your mind to, man