The Country Mouse and the City Mouse- Student Page

The Country Mouse is filled with terror and says, *"safety is preferable to a life…tortured by fear."*

Science Spark: What happens to a person's body when they are scared?

List some of things that happen when someone is frightened. How does the body react?

One of the reactions a body has to fear is an increase in heart rate. The brain involuntarily (automatically) releases chemicals that increase the blood flow to the organs to prepare it to flee to safety. *But how much faster than normal does the heart beat?*

Make a hypothesis. How much faster does the heart beat when someone is scared? Be sure to include a measurable amount in your hypothesis.

Test it! Find your resting heart rate. Use your pointer and middle fingers on the inside of your wrist or on your neck below your jaw line. Do you feel your **pulse**?
Get ready…count the beats (for ten seconds.) Your teacher will say 'start' and 'stop.'

_____ X 6 = _____
# of beats in ten seconds X 6 = beats per minute *bpm*

What would YOUR heart rate be if you were "tortured by fear" like the Country Mouse? Being scared, angry or getting *a little* exercise all get your heart rate going. To test this hypothesis, get ready to move! Follow your teacher's instructions.

* * *

Now that you are done moving, count your pulse again and record it below.

_____ X 6 = _____
# of beats in ten seconds X 6 = beats per minute *bpm*

My resting heart rate=_____
My active/fearful heart rate= _____

How are the two heart rates related? **How much faster is your 'fearful' heart rate?** Evaluate your original hypothesis. Was it accurate? Why or Why not? Record your thoughts below.

The Country Mouse and the City Mouse- Teacher Page

Why does the heart beat faster when a person is scared?
It is the natural 'fight or flight' reflex of the body. The brain anticipates the need for more blood to help the body move to safety. Adrenaline is released and blood pressure rises.

In addition to an increased heart rate, other body reactions that students may list are:
sweating, clammy hands, increased respiration, nausea, dry mouth, stomach tightening (less function in the gastrointestinal system)

There is a range for what is considered normal for heart rates. Infants have normally rapid heartbeats of 100, on average. **Normal heart rates** for school age children are as follows:
6-8 year olds= 70-115 bpm
9-16 year olds= 60-110 bpm
16 years and older= 50*-90 bpm

*Trained athletes' hearts are capable of pushing more blood to the system with fewer beats/contractions of the heart muscle. Therefore some athletes' resting heart rate may be as low as 35!

Show students how to find their pulse. Remind them not to use their thumb, as it has a distinct pulse of its own.
Students will count the beats of their pulse for ten seconds. Talk them through the equation to calculate their *bpm*, beats per minute.
10 seconds X 6= 60 seconds/one minute.

Get students to move. Being afraid and exercising both increase the heart rate. You may run around (the trailer) outside a couple times, or have them do 15 jumping jacks in place. Again, have them find their pulse and calculate their active/fearful heart rate.

Being frightened (or angry!) can elevate a person's heart rate from 10% to 30%. An increase of 40-50% is not as common but not unheard of. The increase depends on the person's health and the severity of the event- whether it's the dentist or a stranger encounter.

Have students examine their data and look back at their hypothesis. Allow them to use a calculator to 'crunch the numbers' and find the increase in their own heart rate.
For example:
Hypothesis: *I think the heart will beat 30% faster when someone is scared.*
Resting heart rate: 15 (beats per 10 seconds) x 6= 90 Active heart rate: 22 x 6= 132

90 x .30= 27
90 + 27(+ 30%) = 117 bpm
My hypothesis was inaccurate. My estimate was too low. My heart beat faster than I thought it would!

Students should reflect on their data, their findings and write their final thoughts about their hypothesis and their 'fearful' heart rate.

The Scientific Method Meets Fairy Tales, Aesop, and Nursery Rhymes

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NOTES:

A. Integration/Implementation

B. The Scientific Method
   1. Research supports scientific discovery with hands-on projects
   2. Review of the steps in the Scientific Method

C. The Lessons
   1. Read/Review the story
   2. Discuss proper use of materials
   3. Hands-on 'experiments'
   4. Data Collection
   5. Analysis and reflection of hypothesis

D. Extensions
   1. Student developed projects
   2. Other literature
   3. Rewrites based on the findings

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References

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