Family Science/Math Night Lesson Plan

Presenter's Name: Mae Ricci
Age Group: 5^{th} – 6^{th} Grade
Activity Title: Hearty Heartbeats
Topic: Circulatory System & Exercise

Lesson Overview: The lesson will begin with a short discussion of the circulatory system and the scientific method. Students will perform an experiment to measure how varying amounts of physical activity affects heart rate. Students will use the Investigation Journal provided to record their data and make a conclusion.

Sources Consulted:

1. McCarty, B. *Hearty Heartbeats*. Accessed 22 January 2006
2. Discovery Communications Inc. *Your Gross and Cool Body: Circulatory System*. Accessed 22 January 2006
3. Wikipedia. *Scientific Method*. Accessed 22 January 2006 <https://en.wikipedia.org/wiki/Scientific_method>

Objectives:

1. Explain what happens to their heart when they increase physical activity.
2. Explain why their heart rate increases when they increase their physical activity.
3. Apply the scientific method to an investigation.

Materials Needed:

Per group: stopwatch, chairs, big open space, Investigation Journals
overhead projector
laptop (for music, heartbeat sounds)

Room Arrangement: need an open area in which students can do jumping jacks.

Procedure

Attention-Getter: I want everybody to put their fists in the air and look at how big it is. That's the size of your heart.

I. Introduction -

Welcome to Family Science Night, Family Science Night is put on by the Western U.P. Center for Science, Math, and Environmental Education. My name is Mae and I'm graduating from Michigan Technological University this spring with a degree in Biology. After graduation I'll be attending Eastern Carolina University in North Carolina to get my Doctorate of Physical Therapy, which is the study of exercise to make patients healthy. So today we're going to learn about exercise and how it benefits your heart. We're going to have a crash course on the circulatory system, review the scientific method, and do an experiment with exercise. (3 minutes)

II. Discuss Circulatory System -- Today we're going to learn about the circulatory system. Put up overhead of circulatory system. Questions to ask:

- What is the circulatory system? **Moves blood throughout the body.**

- Does anybody know the main purpose of the circulatory system? **Oxygen Delivery**
- How is this done?
  Heart pumps blood through body via Arteries and Veins
- Why is this important for us?
  We need oxygen in all parts of our body to function
- What is our heart rate?
  The amount of times our heart beats per minute
- Why would we want to know this?
  To measure how healthy our heart is
- Why would this increase when we are exercising?
  Our body needs more oxygen
- Show them how to take pulse, may need parents help. (3-4 minutes)

III. List steps of Scientific Method (2 minutes)–
Now that we know about the circulatory system, we're going to begin an experiment, but first we need to discuss the scientific method. There are 7 steps in the scientific method, does anybody know them?
Write on board:

1. **Statement of the problem**
2. **Review of Literature**
3. **State Hypothesis**
4. **Design Experimental Procedure**
5. **Conduct the Experiment and Collect Data**
6. **Analyze Results**
7. **Develop a Conclusion.**

IV. Experiment/Activity –Today we're going to test the effects of exercise on heart rate. We're going to follow the activity in our investigation journals. Explain procedure. Presenter will keep time using music as the students' way of knowing when time is up, starting with slower music and building up to faster songs for the jumping jacks trials. (19 minutes)

V. Graph Results & Discuss. (2 minutes)

VI. Discuss Questions in Journal – Go through summary section in journal together. (5 minutes)

VII. Assess Student Learning
What is the purpose of exercise? Why should we exercise? How does exercise affect heart rate? Why is this important. (4 minutes)

Thank You for coming.

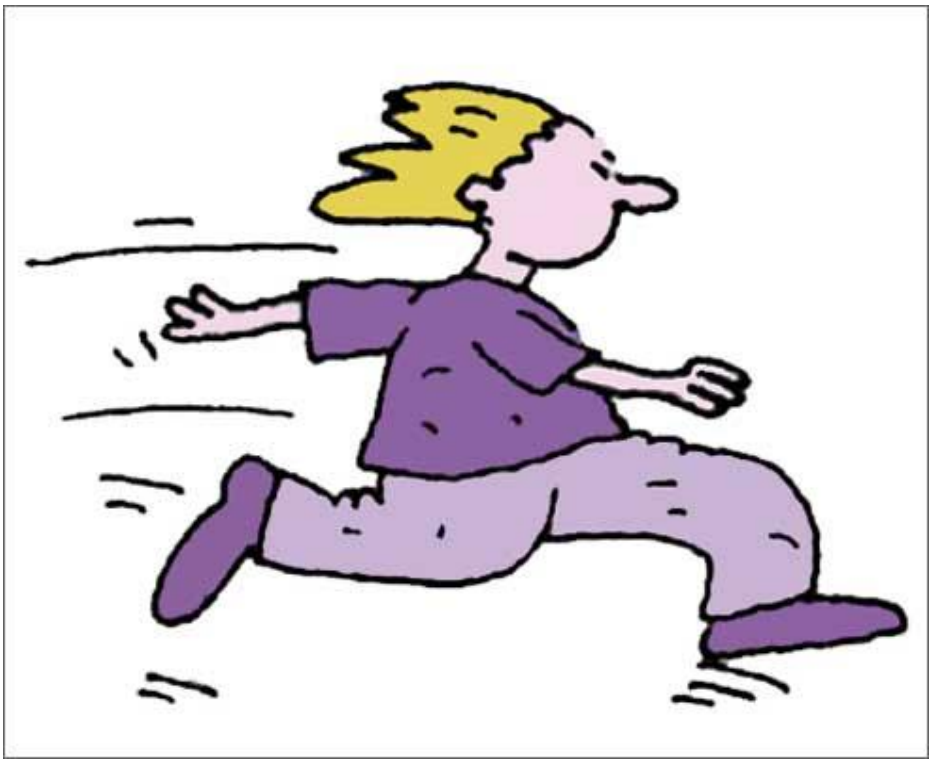
Filler: students can test other types of movement on their heart rate.

Take Home Handouts: Students take their investigation journals with them.

Cleanup: None

Safety Considerations: Students with a serious heart defect might want to avoid the final trial in the activity, but we could easily revise the activity to suit their needs. Also, because some movement will occur, it's important to have enough space so students aren't running into each other.

Investigation Journal On Hearty Heartbeats



Name _____ Date _____

Question: Does the amount of movement affect the heart rate?

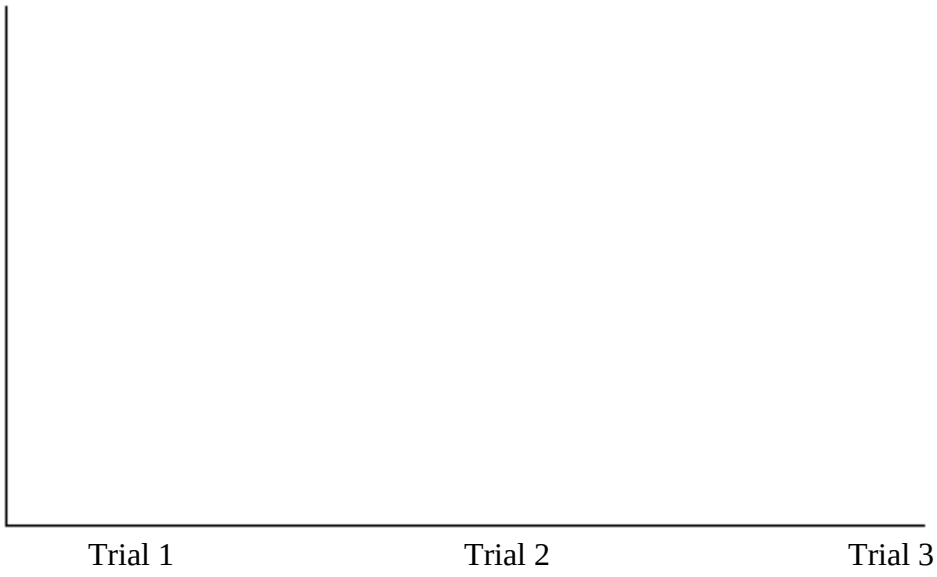
Hypothesis: If the _____ is _____,
Then the _____ will _____.

Procedure:
1. Sit motionless in a chair for 1 minute.
2. Find pulse, take for 15 seconds and multiply by 4 to get heart beats per minute.
3. Record results on data table.
4. Repeat steps 1-3 two more times for a total of 3 trials.
5. Repeat steps 1-4 after a minute of walking and then one minute of jumping jacks.

Data Table Title: The effect of _____ on _____.

Independent Variable	Dependent Variable			Mean
	Trial 1	Trial 2	Trial 3	
Sitting				
Walking				
Jumping Jacks				

Graph:
Title: The effect of _____ on _____.



Summary:

What was the purpose of this investigation?

_____
_____
_____

What were your results?

_____
_____
_____

Why do you think you obtained these results?

_____
_____
_____

Did your results support your hypothesis? Explain.

_____
_____
_____

What is your conclusion?

_____
_____
_____

Name two problems you encountered and how you could fix the problems:

_____
_____
_____