Program Information	*[Lesson Title]* ***Scientific Processes***	**TEACHER NAME** **Kathleen McDonnell**	**PROGRAM NAME** **Parma City School District**
	[Unit Title] ***Science***	**NRS EFL(s)** **1 – 4**	**TIME FRAME** **60 minutes**

Instruction

ABE/ASE Standards – English Language Arts and Literacy

Reading (R)		Writing (W)		Speaking & Listening (S)		Language (L)	
Foundational Skills	**R.1.3** **R.2.2** **R.3.2**	Text Types and Purposes		Comprehension and Collaboration		Conventions of Standard English	
Key Ideas and Details	**R.1.4, 2.3, 3.2** **R.1.6, 2.5, 3.7**	Production and Distribution of Writing		Presentation of Knowledge and Ideas		Knowledge of Language	
Craft and Structure	**R.1.7, 2.6, 3.8**	Research to Build and Present Knowledge		Benchmarks identified in RED are priority benchmarks. To view a complete list of priority benchmarks and related Ohio ABLE lesson plans, please see the Curriculum Alignments located on the Teacher Resource Center (TRC).		Vocabulary Acquisition and Use	**L.1.3** **L.2.4** **L.3.4** **L.4.4**
Integration of Knowledge and Ideas							

LEARNER OUTCOME(S)

- Students will learn the steps of the scientific method or process and apply the steps to an everyday activity.

ASSESSMENT TOOLS/METHODS

- Formative: While the students are paired up, ask them what is their hypothesis? Ask if they need a control for their situation? Ask them if their situation will be solved in one step?
- While *Texting while Driving – How Dangerous Is It?* is

		being real aloud, ask the students to describe the controls in the experiment. Ask them to explain the results. • Summative: Students will fill out a chart with the correct definitions for hypothesis, experiment, control and data collection with 75% accuracy.
	LEARNER PRIOR KNOWLEDGE • Students can read at level 3 or 4. • Students can relate personal experiences to scientific processes.	
	INSTRUCTIONAL ACTIVITIES 1. Teacher will ask the students if they ever lost anything. a. Then ask them what they do to find their lost item(s). 2. Teacher will explain the steps of the scientific method or process and apply them to "finding lost objects." a. Refer to teacher copy of *Example of Scientific Method* (attached). b. Teacher will define hypothesis, control, observation, experiment, data collection and conclusion. 3. Students will read from student copies of *The Scientific Method* (attached) showing the steps of the scientific method. 4. Students will pair up and discuss a situation where they	**RESOURCES** Teacher copy of *Example of Scientific Method* (attached) Student copies of *The Scientific Method* (attached) Student copies of *Texting While Driving – How Dangerous Is It?* (attached) Daniels, H., & Steineke, N. (2011). *Texts and lessons for content-area reading*. Portsmouth, NH: Heinemann. (available from the Ohio ABLE PDN Library)

	use hypothesis, observation, experiment and conclusion. a. Students volunteer to share their situations to the class. b. Class members may add steps to the students' examples. 5. Students and the teacher will read aloud from student copies of the article *Texting While Driving – How Dangerous Is It?* (attached). a. Teacher will stop and point out the control (stopping time without looking at a text) b. Point out the experiment. (Two drivers, different ages, different speeds.) **6.** Students will interpret the results, i.e., how texting slows down the reaction time and how far the car travels compared to the non-texting time. 7. Students will label the six steps of the Scientific Method with correct definitions for hypothesis, experiment, control, and data a. Collect and check for 75% accuracy.	
	DIFFERENTIATION • Students take turns reading aloud. • The better readers will be asked to read more often. • In the small groups or pairs students can share their ideas without "pressure" from other students.	

Reflection	**TEACHER REFLECTION/LESSON EVALUATION** Students relate well to the “finding something that is lost” and applying the scientific method. The data in the article about texting and driving made an impression on the students. The actual distances a car traveled while the driver is distracted showed the potential for many accidents.
	ADDITIONAL INFORMATION

EXAMPLE OF SCIENTIFIC METHOD

Missing items

Whenever something is missing, the very **first thing most of us do is shout** instead of look for the missing object. There is a more effective way to deal with this problem– the scientific method.

Let's say I have a problem: My wallet is missing. How could I use the scientific method to solve this problem?

AT HOME

- **Problem:** Missing wallet
- **Data:** I went to the market to buy some goods with my friend Mae Ann. When I reached home I noticed that my wallet was gone.
- **Hypothesis:** My first hypothesis was: I lost it in the market while we were buying goods. The second hypothesis was: Mae Ann got my wallet. The third was: I had misplaced it in the house.
- **Experiments:** I searched all over the house for my wallet, but I could not find it. Then I went to Mae Ann to ask if she got my wallet. She answered in the affirmative. She said she found it while she was on her way home near the market.
- **Conclusion:** I lost my wallet in the market and Mae Ann found it and gave it back to me.

- **What would the next step be if Mae Ann did not have the wallet?**

CAR AND DRIVER

TEXTING WHILE DRIVING

How Dangerous Is It?

BY MICHAEL AUSTIN, June 2009

Texting is on the rise, up from 9.8 billion messages a month in December '05 to 110.4 billion in December '08. Undoubtedly, more than a few of those messages are being sent by people driving cars. Is texting while driving a dangerous idea? We decided to conduct a test. Previous academic studies—much more scientific than ours—conducted in vehicle simulators have shown that texting while driving impairs the driver's abilities. But as far as we know, no study has been conducted in a real vehicle that is being driven.

To keep things simple, we would focus solely on the driver's reaction times to a light mounted on the windshield at eye level, meant to simulate a lead car's brake lights. Wary of the potential damage to man and machine, all of the driving would be done in a straight line. We rented the taxiway of the Oscoda-Wurtsmith Airport in Oscoda, Michigan. Given the prevalence of the BlackBerry, the iPhone, and other text-friendly mobile phones, the test subjects would have devices with full "qwerty" keypads and would be using text-messaging phones familiar to them. Intern Jordan Brown, 22, armed with an iPhone, would represent the younger crowd. The older demographic would be covered by head honcho Eddie Alterman, 37, using a Samsung Alias.

Our Honda Pilot (four-wheel-drive SUV) served as the test vehicle. When the red light on the windshield lit up, the driver was to hit the brakes. The author, riding shotgun, would use a hand-held switch to trigger the red light and monitor the driver's results. Each trial would have the driver respond five times to the light, and the slowest reaction time (the amount of time between the activation of the light and the driver hitting the brakes) was dropped.

AVERAGES AT 35 MPH	Reaction Time (sec)		Extra Distance Traveled (ft)	
	Brown	Alterman	Brown	Alterman
BASELINE	0.45	0.57	–	–
READING	0.57	1.44	6	45
TEXTING	0.52	1.36	4	41

AVERAGES AT 75 MPH	Reaction Time (sec)		Extra Distance Traveled (ft)	
	Brown	Alterman	Brown	Alterman
BASELINE	0.39	0.56	–	–
READING	0.50	0.91	11	36
TEXTING	0.48	1.24	9	70

First, we tested both drivers' reaction times at 35 mph and 70 mph to get baseline readings. Then we repeated the driving procedure while they read a text message aloud (a series of *Caddyshack* quotes). This was followed by a trial with the drivers typing the same message they had just received. Both of our lab rats were instructed to use their phones exactly as they would on a public road.

The results, though not surprising, were eye-opening. Intern Brown's baseline reaction time at 35 mph of 0.45 second worsened to 0.57 while reading a text, and improved to 0.52 while writing a text. At 70 mph, his baseline reaction was 0.39 second, while the reading (0.50) and texting (0.48), numbers

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TEXTING WHILE DRIVING

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were similar. But the averages don't tell the whole story. Looking at Brown's slowest reaction time at 35 mph, he traveled an extra 21 feet (more than a car length) before hitting the brakes while reading and went 16 feet longer while texting. At 70 mph, a vehicle travels 103 feet every second, and Brown's worst reaction time while reading at that speed put him about 30 feet (31 while typing) farther down the road.

The key element to driving safely is keeping your eyes and your mind on the road. Text messaging distracts any driver from that primary task.

Alterman fared much, much worse. While reading a text and driving at 35 mph, his average baseline reaction time of 0.57 second nearly tripled, to 1.44 seconds. While texting, his response time was 1.36 seconds. These figures correspond to an extra 45 and 41 feet, respectively, before hitting the brakes. The results at 70 mph were similar: Alterman's response time while reading a text was 0.35 second longer than his base performance of 0.56 second, and writing a text added 0.68 second to his reaction time.

As with the younger driver, Alterman's slowest reaction times were a grim scenario. He went more than four seconds before looking up while reading a text message at 35 mph and over three and a half seconds while texting at 70 mph. Even in the best of his bad reaction times while reading or texting, Alterman traveled an extra 90 feet past his baseline performance; in the worst case, he went 319 feet farther down the road. Moreover, his two-hands-on-the-phone technique resulted in some serious lane drifting.

The prognosis doesn't improve when you look at the limitations of our test. We were using a straight road without any traffic, road signals, or pedestrians, and we were only looking at reaction times. Even though our young driver fared better than the balding Alterman, Brown's method of holding the phone up above the dashboard and typing with one hand would make it difficult to do anything except hit the brakes. And if anything in the periphery required a response, well, both drivers would probably be unable to react.

Both socially and legally, drunk driving is completely unacceptable. Texting, on the other hand, is still in its formative period with respect to laws and opinion. A few jurisdictions have passed ordinances against texting while driving. But even if sweeping legislation were passed to outlaw any typing behind the wheel, it would still be difficult to enforce the law.

In our test, neither subject had any idea that using his phone would slow down his reaction time so much. Like most folks, they think they're pretty good drivers. Our results prove otherwise, at both city and highway speeds. The key element to driving safely is keeping your eyes and your mind on the road. Text messaging distracts any driver from that primary task. So the next time you're tempted to text, tweet, e-mail, or otherwise type while driving, either ignore the urge or pull over. We don't want you rear-ending us.

The Scientific Method