AMERICA'S CAR MUSEUM CURRICULUM GUIDE

Science of Car Safety

(K - 3rd Grade)

Program Overview:

Students will receive a guided tour that highlights car safety features, especially those in the *NASCAR* exhibit. Visual thinking strategies will be utilized to compare and contrast the safeness of different vehicles. To further reinforce these concepts, students will conduct a simple experiment that illustrates inertia and the importance of seat belts.

Guiding Questions:

Why are safety features necessary in cars? How has car technology and road development changed over time? Why is it important to pay attention to the road, especially to specific colors, shapes, and directions?

Key Concepts/Themes:

- Force and motion
- Inertia
- Safety
- Colors and shapes
- Relative and cardinal directions
- Traffic signs

Suggested School Program Schedule:

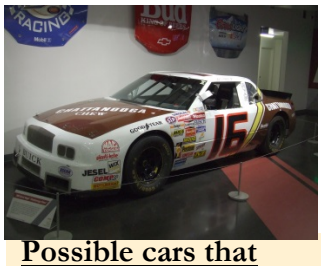
- 9:45am: Arrive at the museum. Lead teacher will check-in.
- 10:00-10:15am (10 minutes): Welcome and introduction to program. Students break into smaller groups of approximately 10 students and are matched with a museum educator for the guided tour.
- 10:15-11:45am (90 minutes): Guided Tour with hands-on gallery activities.
- 11:45-11:50am (5 minutes): Return to lobby.

If booked in advance for an additional fee, school groups may also participate in hands-on workshops and enjoy a test run on either the racing simulator or slot car track in the Speed Zone. Indoor space to eat lunch may also be available, if booked in advance.

How to Prepare for Your Museum Visit:

This curriculum guide includes background information, pre- and post-visit lesson plans, a glossary of terms, and additional resources to help enhance your museum experience. Each lesson corresponds to Essential Academic Learning Requirements (EALRs) and Common Core Standards (CCSS). Please modify these lessons as you see appropriate. Feel free to let us know if we can provide you with additional resources to better integrate your field trip into your classroom curriculum.

In addition to familiarizing yourself with this *Curriculum Guide*, please review the *Field Trip Guide* included in your confirmation letter. This includes detailed information for all chaperones.



Possible cars that will be highlighted:

1899 Baldwin Steamer: This car is the oldest car in the collection.

1906 Ford Model N: This is one of the earliest examples in the Museum of a vehicle with a crank shaft.

1930 Duesenberg Model J: This car's straight-eight engine could produce speeds over 115 mph.

1918 Cadillac Type 57: This car is one of the earliest examples in the Museum of a self-starter and a V-8 engine.

2012 No. 5 Farmers Insurance Chevrolet: Enumclaw native Kasey Kahne drives this type of car.

Images of these cars can be found near the end of this curriculum guide.

ACM Background Information

Safety on the Road

Vehicle Safety

Early cars could not reach the speeds of today's vehicles and safety wasn't a priority for many decades. In fact, early vehicles that featured seat belts were not popular. People thought that if a car needed a seatbelt, then it must not be as safe as cars without seatbelts. The first seatbelts were introduced in the late 1950s and padded dashboards and anti-lock brakes were introduced in the 1960s. Driver and passenger airbags were introduced and crash-testing began in the 1970s. It wasn't until 1984 that states began enacting passenger seat belt laws. However, during the past decade, car safety technology has not only focused on protecting people in crashes, but also preventing crashes altogether. Some new inventions include: electronic stability control (ESC), lane departure warning, collision warning with automatic braking, blind-zone warning, emergency brake assist, and adaptive headlights.

Driving Safely

According to the National Highway Traffic Safety Administration, car crashes are the leading cause of death for children 1 to 13 years old in the United States. Using the correct type of car seat and seat belt may curb this number. However, avoiding visual, manual, and cognitive distractions is also important. In 2008, nearly 6,000 people died in crashes that involved distracted driving. Drivers must pay attention to visual and audio cues on the road to avoid a crash.

School Bus Safety

Despite the fact that most school buses do not include seat belts, school buses have been proven to be seven times safer than passenger cars or light trucks, according to the National Highway Traffic Safety Administration. Instead of seat belts, children are protected through compartmentalization by being surrounded by strong, energy-absorbing seats. Most bus-related fatalities are actually caused by motorists illegally passing a stopped school bus.

NASCAR Safety Innovations

In the early days of stock car racing, neither seatbelts nor roll bars were required. Safety requirements evolved significantly over the years. In 1952, roll bars became mandatory and in 1960, the full roll cage developed. After "Fireball" Edward Glenn Roberts, Jr. died from burns in a 1964 car crash, leak- resistant cells, flame-retardant suits, and fire extinguishers became requirements. Later in 1994, roof flaps were added to prevent cars from becoming airborne. Safety requirements expanded further after Dale Earnhardt's fatal head injury during a crash in 2001. Now, drivers must wear full-face helmets and Head and Neck Support (HANS) devices. Steel and Foam Energy Reduction (SAFER) impact-absorbing barriers have also been added to the race car track. The knowledge gained from Earnhardt's crash also informed the design of the fifth-generation Sprint Cup car, known as the "Car of Tomorrow." It features and enlarged cockpit, shock-absorbing materials, and it moved the driver to a more central location in the car.

Possible cars that will be highlighted:

2009 Dodge Charger #9 Budweiser: Richard Petty Motorsports built this car for standout driver Kasey Kahne. Its Car of Tomorrow consturction features new safety innovations.

1989 Buick Regal Chattanooga Chew : During the 1989 season, Larry Pearson ran the Buick in all 29 races, and his best finish was 6th at the Richmond International Raceway. David Pearson, nick-named The Silver Fox, was a 3-time NASCAR Sprint Cup champion and racked up 105 victories.

Images of these cars can be found near the end of this curriculum guide.

ACM Background Information

NASCAR History and Teamwork

NASCAR Origins

Many of the pioneers of stock car racing got their start running moonshine. Often driving family sedans on bumpy dirt roads, these mountain men would take on this dangerous job to help support their family income. Thanks to prohibition (which outlawed alcohol), bootlegging corn whisky began a significant source of revenue in many regions of the South throughout the Great Depression. Even after the repeal of the 18th amendment, the market for low-cost, high-strength alcohol didn't dry up completely. To be a successful moonshine driver, horsepower under the hood and skill behind the wheel were required. For the right price, mechanics would modify unassuming cars into high-speed liquor haulers that could outrun any government-issue car. They added and enlarged features to give the ability to carry heavier loads in hidden compartments at faster speeds. To show off their car and driving abilities, these risk-takers held informal races to see who was most likely to escape the police. As time went on, the races became more organized. In 1948, the National Association for Stock Car Racing was founded by William France Sr. in Daytona, Florida. NASCAR became an overnight success and continues to be the fastest growing spectator sport in the world.

NASCAR Team

With all the attention that stock-car drivers receive, it is easy to forget that NASCAR is a team sport. After an owner hires a team, a team manager will use money from sponsors to organize the operation. A crew chief makes the decisions about how the car will be built and the car chief makes sure things are done correctly. Other team members, dressed in matching uniforms, may include a fabricator, engine builder, engine tuner, parts specialist, and truck driver. Clarity, focus, and collaboration are necessary to make a team successful.

During a race, drivers rely on pit crew professionals to take care of their race cars and get them back on the track. Pit stop work such as refueling, changing tires, and making repairs generally requires seven or more mechanics working on a strictly planned schedule to complete their task in a matter of seconds. Early pit crews communicated with drivers using large signs or chalk boards and drivers responded using hand signals. When walkie-talkies were first used, they were seen as an illegal advantage and were banned, but now two-way radios are common in the car and driver's helmet. Today, the fans can listen to these conversations and sometimes even watch from in-car cameras.

Another important person that a driver must communicate with during a race is the spotter. Visibility from the sides and rear of the car is often hindered by helmets, restrictive seat belts, and a lack of side mirrors. Spotters serve as a second set of eyes that help the driver know when and where cars are passing and how to avoid crashes and other cautions. To get the best view, spotters often watch on top of the press box or grandstand. They serve as one of the simplest, yet effective safety measures that have been added in the last three decades.

ACM Pre-Visit Lesson Plan #1

Car Safety Features

Learning Objective:

Students will practice visual thinking strategies that encourage them to compare and contrast the safety features of various vehicles.

Materials:

- Copies of "Car Safety Comparison" (one per student)
- Images of early unpaved roads and plank roads
- Computer and projector

Activity:

1. Display the image of the 1899 Baldwin Steamer. Introduce the car by name and then ask the following questions:
   - Describe what you see. What makes you say that?
   - What about this car makes it safe? Why?
   - What about this car makes it unsafe? Why?
   - What is it missing that could make it safer?

2. Repeat the same questions with images of the 1906 Cadillac Model M, 1909 Regal 30, and the 1930 Duesenberg Model J.

3. Show images of early roads and explain that car technology has evolved over time, just as roads. Early cars were called "horseless carriages" because they often were built by the same craftsperson and were designed to go at a similar speed as a horse-drawn carriage. The speed limit in many cities in the 1910s was 10-15 mph. Cars are much safer now, but they also go much faster than cars in the early twentieth century.

4. Today, the Insurance Institute for Highway Safety conducts a variety of tests on new vehicles to assess their occupant protection. On the Consumer Report website athttp://www.consumerreports.org/cro/video-hub/cars/iihs-crash-tests/676195405001/, students can choose a car and watch its crash test video. Discuss the following questions:
   - What is the purpose of crash tests?
   - What safety features are available in cars today that were not available in earlier vehicles?
   - What could be added to cars to make them even safer?

5. Hand out the "Car Safety Comparison" worksheet to each student. Allow students to work individually or in teams to complete the sheet. Discuss student answers as a class.

Learning Objective:

Students will practice reading and demonstrate comprehension skills while becoming familiar with some of the scientific terms associated with Newton's first law of motion.

Materials:

- "The Physics of Cars - Teacher Background Information" (teacher or advanced reader resource)
- Copies of "Force and Motion" sheet (1 per student)
- Copies of "A Few Words About Force and Motion Fill-in-the Blank" (1 per student)
- Dictionary (optional)
- Pencils

ACM Pre-Visit Lesson Plan #2

Car Physics Introduction

Activity:

Use this activity to introduce new vocabulary for younger students and to review physics concepts for older students.

1. Tell students about Isaac Newton and his first law of motion.
2. Give your students a copy of "Force and Motion." Have students read individually or make an overhead transparency of the "Force and Motion" for the whole class to read together. For some students, using a dictionary may be helpful. Older students may read "The Physics of Cars - Teacher Background Information" instead.
3. Give each student the "A Few Words About Force and Motion Fill-in-the-Blank" activity to help them become more familiar with some of the words.
4. Use the answer key below to check student work.
5. Ask students to brainstorm more examples for each physics term.

Answer Key

1. ___**Gravity**_____ is a force that pulls things towards the earth.
2. A ___**push**_____ or a ___**pull**_____ can set a still object in motion.
3. A push or pull against an object in motion can __**stop**____ it.
4. The tendency of something to keep moving or stay at rest unless a greater force stops or moves it is called ____**inertia**_____.
5. Force must be applied to put something into ___**motion**_____ or to stop it from moving.
6. The rubbing of car tires against the road is an example of ___**friction**____.
7. A ___**force**_____ is a push or a pull.

Learning Objective:

Students will watch a video about the athleticism and coordination of a pit crew and discuss how the pit crew helps keep the driver safe.

Materials:

- Overhead projector and computer
- Acess to Youtube internet video titled "Sport Science explore the science of a NASCAR pit crew, Part 1" (6:20 minutes)
- Whiteboard and markers
- Lined paper and pencils
- Optional - copies of "*Science of Pit Crew* Video Questions" (one per student)

ACM Pre-Visit Lesson Plan #3

Pit Crew Introduction

Activity:

1. Ask students to discuss why NASCAR would be considered a sport. How is it physically different from normal driving? Keep track of student responses on a whiteboard.

2. Introduce the Sports Science television show on ESPN. According to their website, http://espn.go.com/espn/sportscience/, this "Emmy Award-winning TV series, hosted by John Brenkus, uncovers sports' biggest myths and mysteries by using cutting-edge technology to measure momentum, friction, and the laws of gravity."

3. Display the video questions or hand out a copy for each student. As you play the video (found at http://www.youtube.com/watch?v=nQQbEfr9irE), be prepared to stop frequently to summarize and allow time for students to write answers.

4. Discuss the answers to the video questions. Make the connection between the video and their upcoming field trip. Explain how the teamwork of the pit crew is essential to ensuring the safety of the driver.

Answer Key to "*Science of Pit Crew* Video Questions"

1. How does the Pit Crew help the driver?
The speed and efficiency of pit stops affects the driver's spot in a race.

2. How does the pit crew prepare for a race?
They work out like other athletes and practice the timing and choreography of a pit stop.

3. Name one job of a pit crew member.
Possible answers may include jackman, gas man, catch can man, tire carriers, and tire changers.

4. How fast can the pit crew in the video complete a tire change and gas refill?
12.12 seconds

5. In what ways did the group work well as a team?
They were assigned a job based on skill and dedication and they trusted one another to do their own task quickly and efficiently. They anticipated each other's needs such as the jackman knowing when to lower the jack and let the car drive off with the wheels properly attached. They practiced in order to become proficient. They knew exactly what to do during a pit stop because of successful communication prior.

ACM Post-Visit Lesson Plan

Museum Reflection

Learning Objective:

In this lesson, students will reflect on their museum visit and review the key concepts from the workshop.

Materials:

- Lined paper and pencils
- Construction or drawing paper
- Crayons, colored pencils, or markers
- Optional- computer and overhead projector
- Optional- large boxes

Activity:

1. Ask students to discuss the following questions or respond as writing prompts:
    - What was your favorite thing about your museum visit?
    - What was your least favorite thing about your museum visit?
    - What did you learn about inertia? Why are seat belts important?
    - How are race cars designed to be safe?

2. Fold a piece of paper in half. On one side, write the word "unsafe" and draw what it would look like to ride in a car unsafely. On the other half, write the word "safe" and draw a picture of them riding safely in a car. Older students can add captions using complete sentences.

Optional:

1. Have students compete to see who can create the safest "vehicle" for their passenger, a raw egg. Simulate a crash by dropping "vehicles" from a ladder or launching from a bungee cord at a cinder block.

2. Construct a class car using boxes that students can pretend to drive.

ACM Extension Activity #1

Getting to Know Road Signs

Learning Objective:

Students will become familiar with the colors, symbols, shapes and meaning of common road signs. Recognizing signs and understanding what they mean can help us all be safer whether we are driving or walking along roads.

Materials:

- Red, blue, green, orange and yellow pens, pencils, markers and/or crayons
- White board/ dry erase markers
- Pictures of road signs
- "Getting to Know Road Signs" worksheet
- "Sign Scavenger Hunt" worksheet
- Optional- strips of green construction paper and white crayons/oil pastels

Activity:

1. Ask the children to describe signs they've seen in their community. To start the discussion, mention familiar places, such as grocery stores, gas stations, or restaurants.
2. Have each child develop a definition of a sign. (Example: A sign helps you find your way.) Write their definitions on the board.
3. Show the children pictures of a variety of road signs.
4. Discuss the shape and color of each sign, the words, numbers, pictures or symbols that are found on each one and what they mean.
5. Hand the students the "Getting to Know Signs" worksheet. Have each student color the shapes correctly.

Optional**:**

1. Have students draw pictures illustrating the appropriate behavior for each road sign and older students can write sentences indicating the appropriate action.
2. Assign the "Sign Scavenger Hunt" worksheet as homework. As students ride home, have them draw an X through signs they see on their way.
3. As students work on the "Sign Scavenger Hunt," have them write down their own definition for each sign.
4. Allow students to make their own personalized road sign using strips green construction paper and white crayons/oil pastels.

Learning Objective:

In this lesson, students will learn about cardinal directions. They will describe to their classmates the relative location of themselves to an object in the room. In addition, they will locate various countries on a map and explain their location in relation to one another.

Materials:

- World map
- "North," "South," "West," and "East" labels posted in their correct location in the room
- Pencils and copy paper.
- Copies of blank world map (one per student)

ACM Extension Activity #2

Maps and Directions

Activity:

1. Explain relative directions (left, right, in front of, behind, etc.) .
2. Review by asking students to explain their location in relation to another student.
6. Introduce the four cardinal directions (north, south, west, and east). Locate a compass rose on a map.
7. Explain each direction as students stand up and face each way.
8. Draw a map of the room including a compass rose.
9. Repeat activity #2, but now using cardinal directions.
10. Hand out images of classroom objects, if available. Allow students to work in small groups to identify the relative location of one object to another, using cardinal directions. (Example: The teacher's desk is in front of or north of the students' desks.)
11. Have students draw a compass rose and label the cardinal directions on their own blank map of the world.
12. Locate and label the United States on the map.
13. Ask students if they can identify any other countries. Label those countries and ask students to explain the location of one country to another, using cardinal directions.

Optional:

1. Look at a map of Tacoma and research directions to LeMay – America's Car Museum.
2. Increase the challenge by using the following directions: Northwest, Northeast, Southwest, and Southeast.

ACM Extension Activity #3

Traffic Light Tag Game

Learning Objective:

Students will understand the changes in motion associated with the colors of a traffic light and demonstrate their ability to react quickly to change their own motion and speed. Review with students that in most countries, the traffic light sequence is green (go), yellow/amber (prepare to stop), and red (stop).

Materials:

- Traffic Light Signs
- Optional- hole punch and lanyard for wearing signs
- Optional- red, green, and yellow scarves or ribbons in lieu of traffic light signs

Activity**:**

1. Ask the students if they have ever seen a traffic light? Show them a picture of a traffic light. What does a traffic light do? What are the colors on a traffic light? What do they mean?

2. Today they will be role-playing cars traveling down a road. They must remember that red means stop, green means move ahead quickly (but safely), and yellow means to slow down and prepare to stop.

3. Pick five students to wear the traffic light signs. These can be hole punched and attached to a lanyard and worn like a nametag. Color-coded scarves or ribbons are also appropriate.

4. When the whistle is blown, the students with the traffic light signs will try to gently touch their classmates.

5. When touched, the student must move at the speed associated with the sign that touched them.

    - If they are tagged by a green light, they must walk quickly.
    - If they are tagged by a yellow light, then they must move slowly.
    - If they are tagged by a red light, then they must stop and sit down. Later, if they are tagged by a green light, then they can walk quickly again.

6. When the whistle is blown again, the "traffic lights" hand their signs to one of the "cars" and play the game again.

ACM Extension Activity #4

"GPS Says" Game

Learning Objective:

Students will review relative and cardinal directions with a variation of the game "Simon Says."

Materials:

- Optional- PA system

Activity**:**

1. Move students to an open space such as an outdoor field or gym.

2. Explain the rules: As with regular Simon Says, players are eliminated for either not following instructions that are not immediately preceded by the phrase "GPS Says" or by failing to follow an instruction which does not include the phrase "GPS Says". In this game, players can also be eliminated for incorrectly following the directions. For example, someone could be eliminated for turning left if the command is "GPS says turn right."

3. Model how to move for the following directions before playing:
   - Open the door (make hand motion to grasp door handle and pull forward)
   - put on your seatbelt (make motion with arm across chest)
   - lock the doors (make snapping sound)
   - put up your "bumpers" (palms up and out front)
   - drive straight for x blocks (take one step per block)
   - turn left
   - turn right
   - make a U-turn
   - stop
   - head north
   - head south
   - head east
   - head west
   - head southeast
   - head southwest
   - head northeast
   - head northwest
   - put your car in reverse and carefully back up for x blocks (take one step per block while making beeping sound)
   - get gas (put hand out and make glug noise)
   - go to the hospital (make siren sounds), etc.

4. Ask students to take turn being the GPS and let them practice giving directions.

Standards Addressed

The following standards are addressed through the museum visit, pre-visit lesson plans, post-visit lesson plans, and extension activities:

Common Core State Standards (CCSS):	**Essential Academic Learning Requirements:**
English Language Arts and Literacy in History/Social Studies and Technical Subjects: Reading: • 1. Read closely to determine what the text is saying to make logical inferences from it; cite textual evidence when writing or speaking to support conclusions drawn from the text. • 10. Read and comprehend complex literary and informational texts independently and proficiently. Writing: • 2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, and analysis of content. Speaking and Listening: • 1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. **Mathematics:** Grade K: • Geometry: Identify and describe shapes. Analyze, compare, create, and compose shapes. Grade 1: • Geometry: Reason with shapes and their attributes. Grade 2: • Geometry: Reason with shapes and their attributes.	**Math:** K. (K.2, K.3, K.5): Patterns and Operations; Objects and their Locations; Reasoning, Problem Solving, and Communication. 1. (1.3, 1.6): Geometric Attributes; Reasoning, Problem Solving, and Communication. 2. (2.2, 2.5): Addition and Subtraction; Reasoning, Problem Solving, and Communication. **Writing:** 1.(1.5) The student understands and uses a writing process. 2. (2.1, 2.2, 2.3) The student writes in a variety of forms for different audiences and purposes. 3. (3.1, 3.2, 3.3) The student writes clearly and effectively. **Communication**: 1. (1.1, 1.2) Student uses listening and observation skills and strategies to gain understanding. 2. (2.1, 2.2, 2.3) The student uses communication skills and strategies to interact/work effectively with others. 3. (3.1, 3.2, 3.3) The student uses communication skills and strategies to effectively present ideas and one's self in a variety of situations. **Social Studies:** 3. (3.1, 3.2) Geography- Understands the physical characteristics, cultural characteristics, and location of places, regions, and spatial patterns on the Earth's surface. Understand human interaction with the environment.

Common Core State Standards (CCSS), continued:	**Essential Academic Learning Requirements, continued:**
Language: • 1. Demonstrate command of the conventions of Standard English grammar and usage when writing or speaking. • 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate. • Acquire and use accurately a range of general academic and domain-specific words or phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level, demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression. **Next Generation Science Standards:** K-PS2-1: Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. K-PS2-2: Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. 2-PS1-1: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. 3-PS2-1: Plan and conduct an experiment to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. 3-PS2-2: Make observations/measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	**The Arts**: 1. (1.1, 1.2) The student understands and applies arts knowledge and skills in visual arts. 2. (2.1, 2.2, 2.3) The student uses the artistic process of creating, performing/presenting, and responding to demonstrate thinking skills in dance, music, theatre, and visual arts 3. (3.1, 3.2) The students communicates through the arts 4. (4.2, 4.3, 4.4, 4.5) The student makes connections within and across the arts to other disciplines, life, cultures, and work. **Science**: K-1 SYS: Part-Whole Relationships: Identify parts of living and non-living systems. K-1 INQ: Making Observations: Answer questions by explaining observations of the natural world. K-1 APP: Tools and Materials: Use simple tools and materials to solve problems in creative ways. K-1 PS1: Push-Pull and Position: Forces are pushes and pulls. Motion is a change in position. 2-3 SYS: Role of Each Part in a System: See how parts of objects, plants, and animals are connected and work together. 2-3 INQ: Conducting Investigations: Carry out investigations by using instruments, observing, recording, and drawing evidence-based conclusions. 2-3 APP: Solving Problems: Develop a solution to a problem by using a simplified technological design process. Investigate the use of tools. 2-3 PS1: Force Makes Things Move: Forces on objects make them move. Changes in force will cause changes in the motion.

Glossary

The following terminology is addressed through the museum visit, pre-visit lesson plans, and post-visit lesson plans:

2-D or two-dimensional: an object that is flat—having height and width.

3-D or three-dimensional: an object that has height, width, and depth and can be viewed from multiple points of view.

Automobile: a passenger vehicle designed for use on ordinary roads and typically having four wheels and a gasoline or diesel internal-combustion engine. "Auto" means "self", "mobile" means "moving."

Car: a motor vehicle with four wheels; usually propelled by an internal combustion engine.

Cardinal directions: also known as cardinal points; include the directions of north (N), south (S), west (W), and east (E).

Caution: care taken to avoid danger or mistakes.

Color: what the eye sees when a wavelength of light is reflected from a surface.

Compass rose: a circle on a map to show cardinal directions (north, south, west, and east).

Construction: the building of something.

Distance: the amount of space between two points.

Energy: a source of usable power, such as petroleum or coal; usable heat or power; the capacity of a physical system to do work. Living systems (plants and animals) also need energy to function; ability of a system to do work.

Engine: a machine that turns energy into mechanical force or motion.

Force: push or pull that gives energy to an object, causing it to start moving, stop moving, or change its motion; a force is that can cause an object with mass to accelerate.

Freeway: an express highway with no intersections, usually having traffic routed on and off by means of a cloverleaf.

Gravity: the force of attraction between all masses in the universe; especially the attraction of the earth's mass for bodies near its surface; the natural force of attraction exerted by a celestial body, such as Earth, upon objects at or near its surface, tending to draw them toward the center of the body.

Highway: a main road, especially one between towns and cities.

Hospital: a place where sick or injured people are given care or treatment.

Inertia: tendency of objects to remain in motion or stay at rest unless acted upon by an unbalanced force; how hard it is to get something to speed up or slow down.

Mass: the property of matter that causes it to have inertia; amount of matter an object contains.

Matter: anything that takes up space and has mass (weight).

Momentum: the strength of a moving object.

Motion: change in the relative position of the parts of anything; action of a machine with respect to the relative movement of its parts; the act or process of moving from one place to another.

Pattern: repeating sequence of lines, shapes, or colors.

Push: to press upon or against (something) with force in order to move it.

Relative directions: the directions of left, right, forward, backward, up, and down; not absolute.

Restraint: the act of holding back from action; keep in check or under control.

Road sign: an object that is used to explain instructions or information to people using a road.

Safety: the condition of being protected from or unlikely to cause danger, risk, or injury.

Shape: a 2-dimensional, enclosed space.

Speed: the rate or a measure of the rate of motion; distance traveled divided by the time of travel; how fast an object moves.

Speed limit: the maximum speed at which a vehicle may legally travel on a particular stretch of road.

Through street/road: a street along which the traffic has the right of way over vehicles entering or crossing at intersections.

Transportation: the act of moving something from one location to another; an object that moves something from one place to another.

Vehicle: something that transports people or objects from one place to another.

Whole numbers: The numbers 0, 1, 2, 3….

1899 Baldwin Steamer

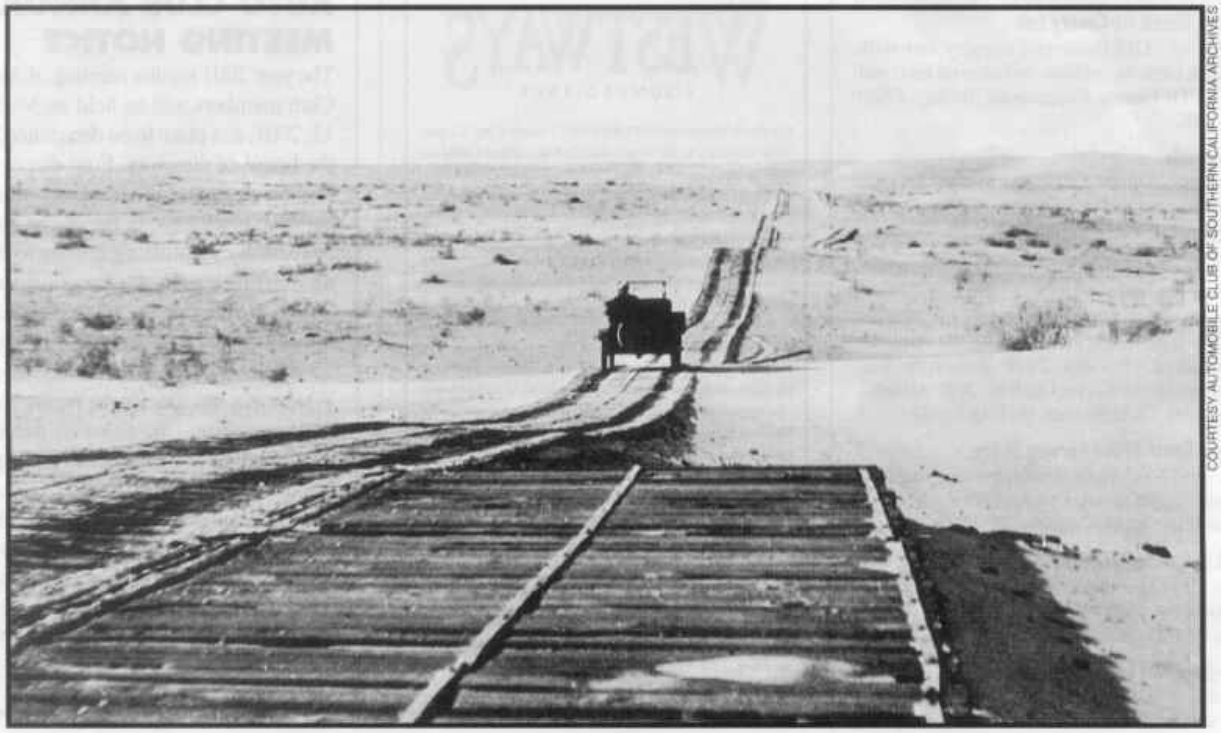
1906 Cadillac Model M

1909 Regal 30

1930 Duesenberg Model J

Early unpaved roads:

Plank Road:



A motorist negotiates the Plank Road through the Algodones Dunes, circa 1919. The platform in the foreground is a turnout, which allowed drivers to pull over so cars coming from the opposite direction could pass.

Name: _____ **Date:** _____

Car Safety Comparison

Directions: Look closely at the two images below. Then, make a list of things that look safe or unsafe about each vehicle.

1906 Cadillac Model M		**2012 No. 5 Farmers Insurance Chevrolet**	
			
What looks unsafe?	**What looks safe?**	**What looks unsafe?**	**What looks safe?**

5. Between the two cars, which one do you think is more safe and why?

_____

_____

_____

_____

Force and Motion

What is a force?

A **force** is a push or a pull on an object. A push or a pull can set a still object in motion and likewise, a push or pull against an object in motion can **stop** it. If you push a toy car to make it move, the push is the force that made the car roll. If you pull the car to you, the pull is the force that made the car roll back to you.

What is motion?

When something is not sitting still, it is in **motion.** In order to put the car in motion, you must apply a force. If you push the car it begins to **move** and is in motion. Once in motion, a force must be applied to make it stop. For example, if the car hits a wall, the wall applies a force that stops the car from moving.

What is inertia?

The tendency of something to keep moving or stay at rest, unless a greater force stops or moves it, is called **inertia**. Imagine riding a skateboard down a hill. If you pushed off and coasted down the hill you would keep going until you hit something that would make you slow down or stop.

What is friction?

Friction is a force that slows things down. An example of friction is the rubbing of car tires against the road as it moves forward. When a road is covered in ice, there isn't as much friction between the tires and the ice. This is why cars can slide out of control when driving on ice. By adding rough sand on top of the ice, a car's tires can hold on to the road better because there is more friction between the tires and sand than there is between the tires and ice.

What is gravity?

Gravity is a force that pulls all things towards the earth**.** It keeps your feet on the ground unless another force pushes or pulls you off of the ground. Gravity is what helps pull your bike down a hill and it is why you pick up speed as you continue down the hill. It is also what makes it harder for you to ride uphill.

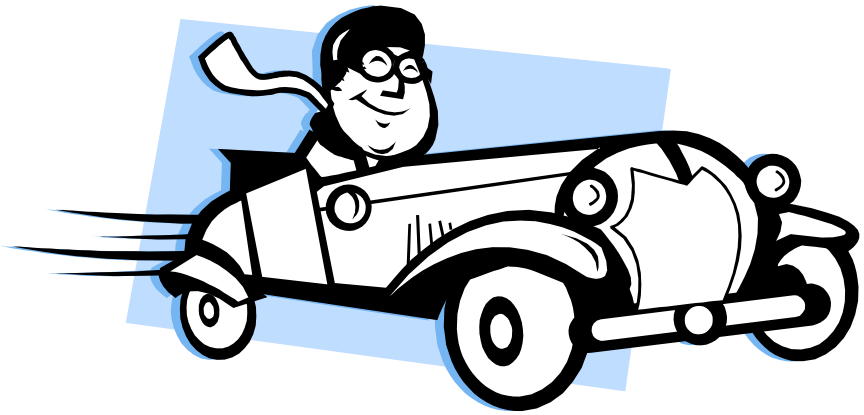
Name: _____ Date: _____

A Few Words about Force and Motion

Fill-in-the-Blank

Fill in the blanks in the sentences below using the bolded words in the reading assignment "Force and Motion":

1. _____ is a force that pulls things towards the earth.
2. A _____ or a _____ can set a still object in motion.
3. A push or pull against an object in motion can _____ it.
4. The tendency of something to keep moving or stay at rest unless a greater force stops or moves it is called _____.
5. Force must be applied to put something into _____ or to _____ it from moving.
6. The rubbing of car tires against the road is an example of _____.
7. A _____ is a push or a pull.



Name: _____ Date: _____

Science of Pit Crew Video Questions

1. How does the Pit Crew help the driver?

2. How does the pit crew prepare for a race?

3. Name one job of a pit crew member.

4. How fast can the pit crew in the video complete a tire change and gas refill?

_____ seconds

5. In what ways did the group work well as a team?

Name: _____ Date: _____

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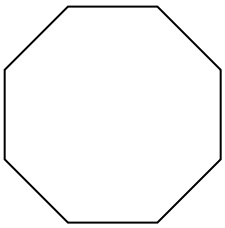
Getting to Know Road Signs

Red signs mean stop or use caution (be careful/watch for cars).

Color the stop sign shape red.

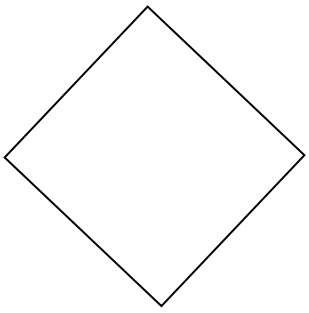


Yellow signs with black lettering are used to warn about something.

Color the square yellow.

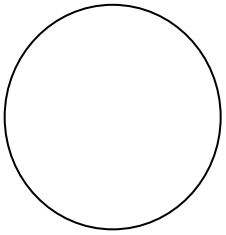
Orange signs with black lettering mean road construction (people are working on or fixing the road).

Color the diamond orange.



Green signals mean go with caution (go slowly while watching for cars).

Color the circle green.



Green signs with white lettering show directions and distances to different places. This sign has the name of the streets that meet at a corner.

Color the rectangle green.

What is the name of the street on which you live?

Blue signs show information, like how to get to a hospital. The H on this sign stands for Hospital.

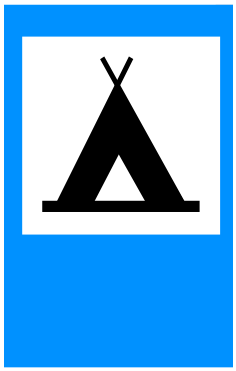
Color the square blue.

White signs with black lettering tell you something important. This sign tells someone driving that they shouldn't go faster than the number on the sign.

Use a black pen or crayon to write the number 25 on this rectangle.

Sign Scavenger Hunt

1. Circle the signs you see as you walk around your school.
2. Put an X through the signs you see on your way home from school.




NO
PARKING
FIRE
LANE


STOP


PARKING
ONLY


DO NOT
ENTER


INTERSTATE
66


END OF
FREEWAY


PARK
E 53 ST

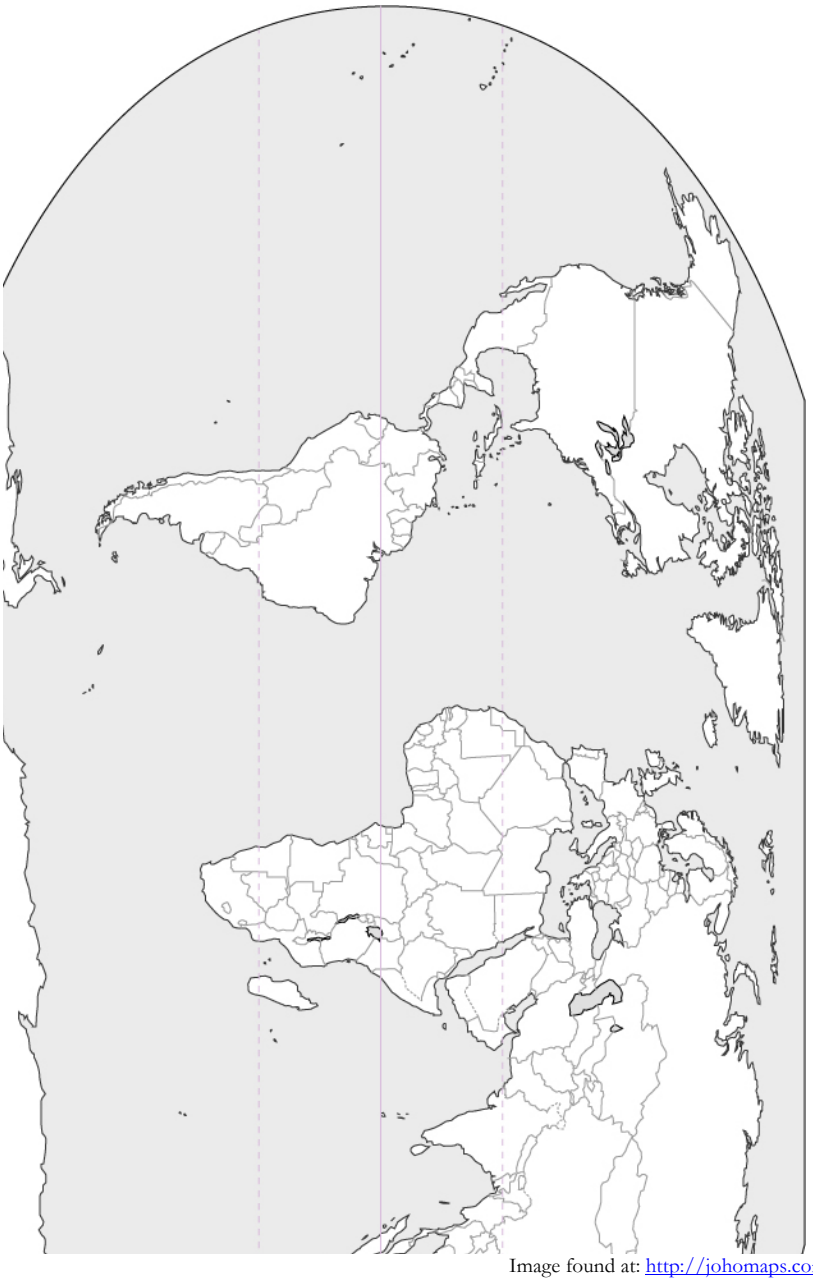
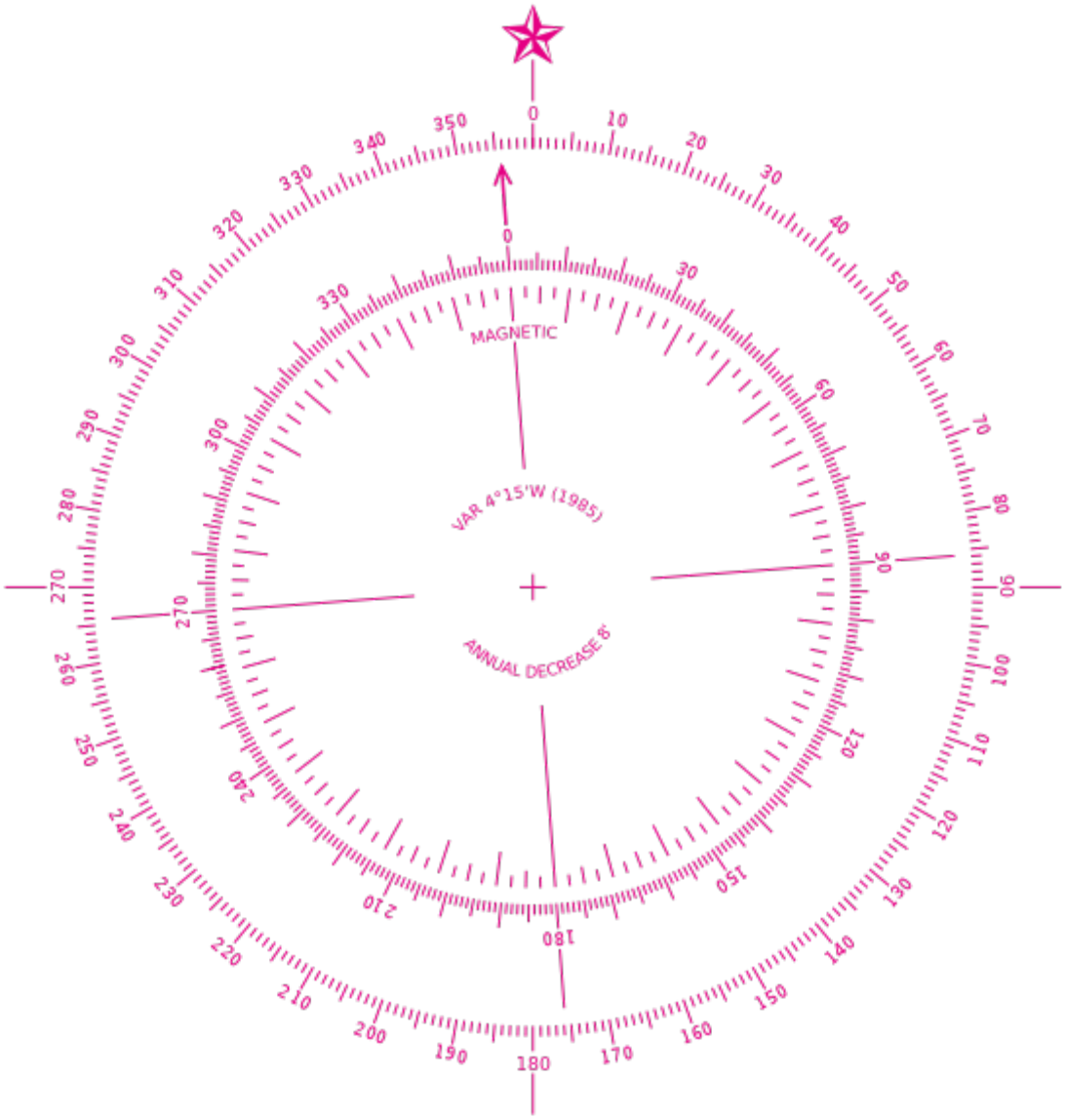
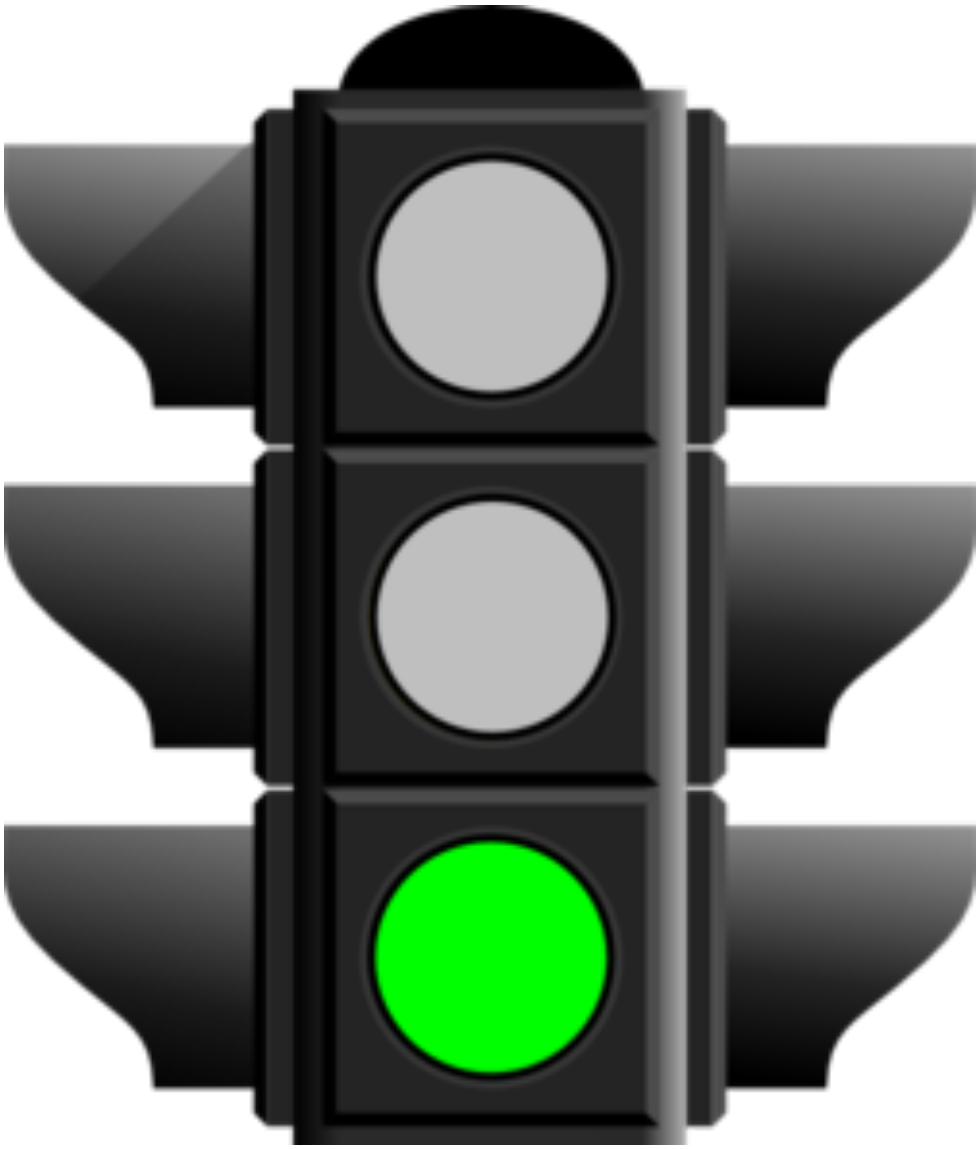


Image found at: http://johomaps.com/world/worldblank_bw.jpg

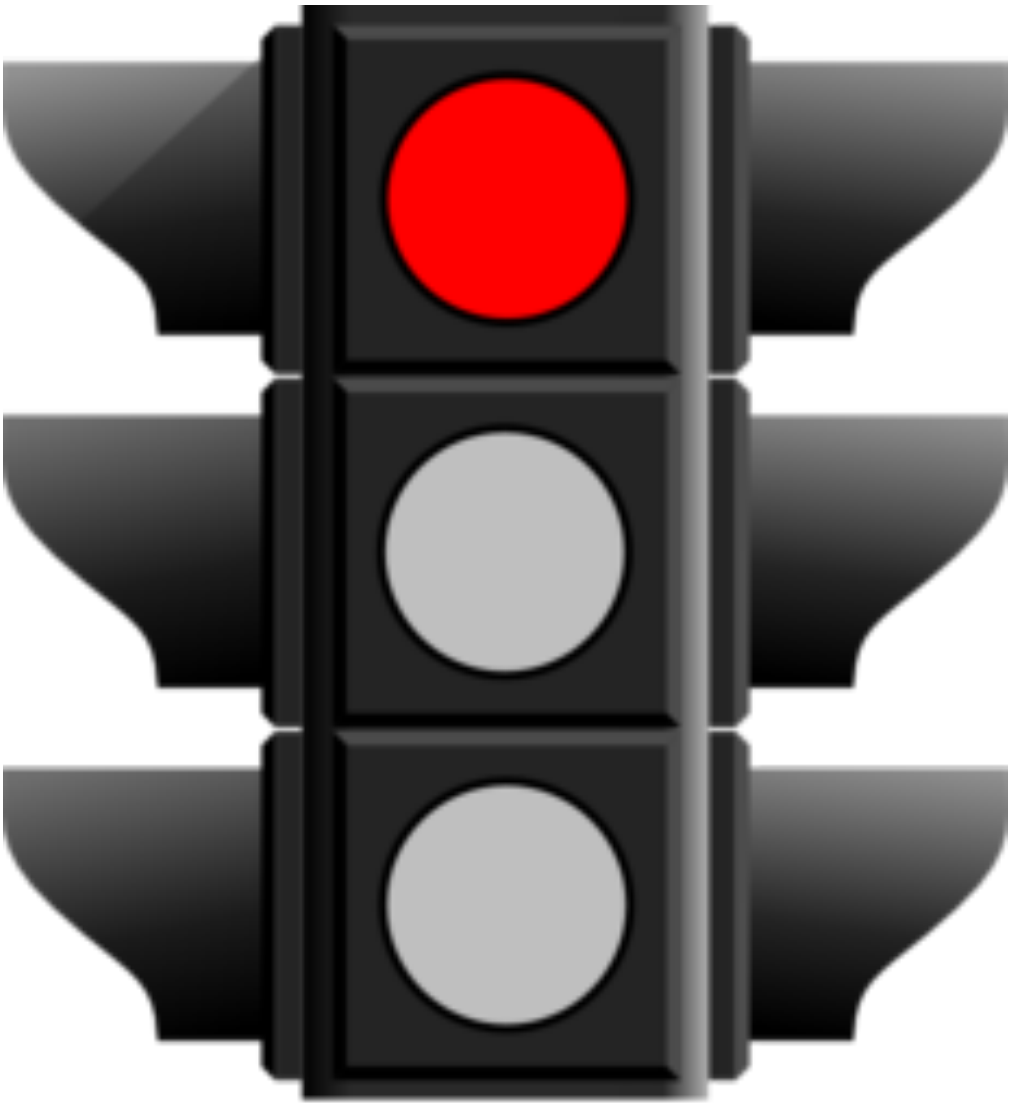
Compass Rose



http://en.wikipedia.org/wiki/File:Modern_nautical_compass_rose.svg



GO



STOP

Slow Down

1906 Ford Model N

1918 Cadillac Type 57

2009 Dodge Charger #9 Budweiser

2012 No. 5 Farmers Insurance Chevrolet

1989 Buick Regal Chattanooga Chew