Montana Teen Driver Education and Training

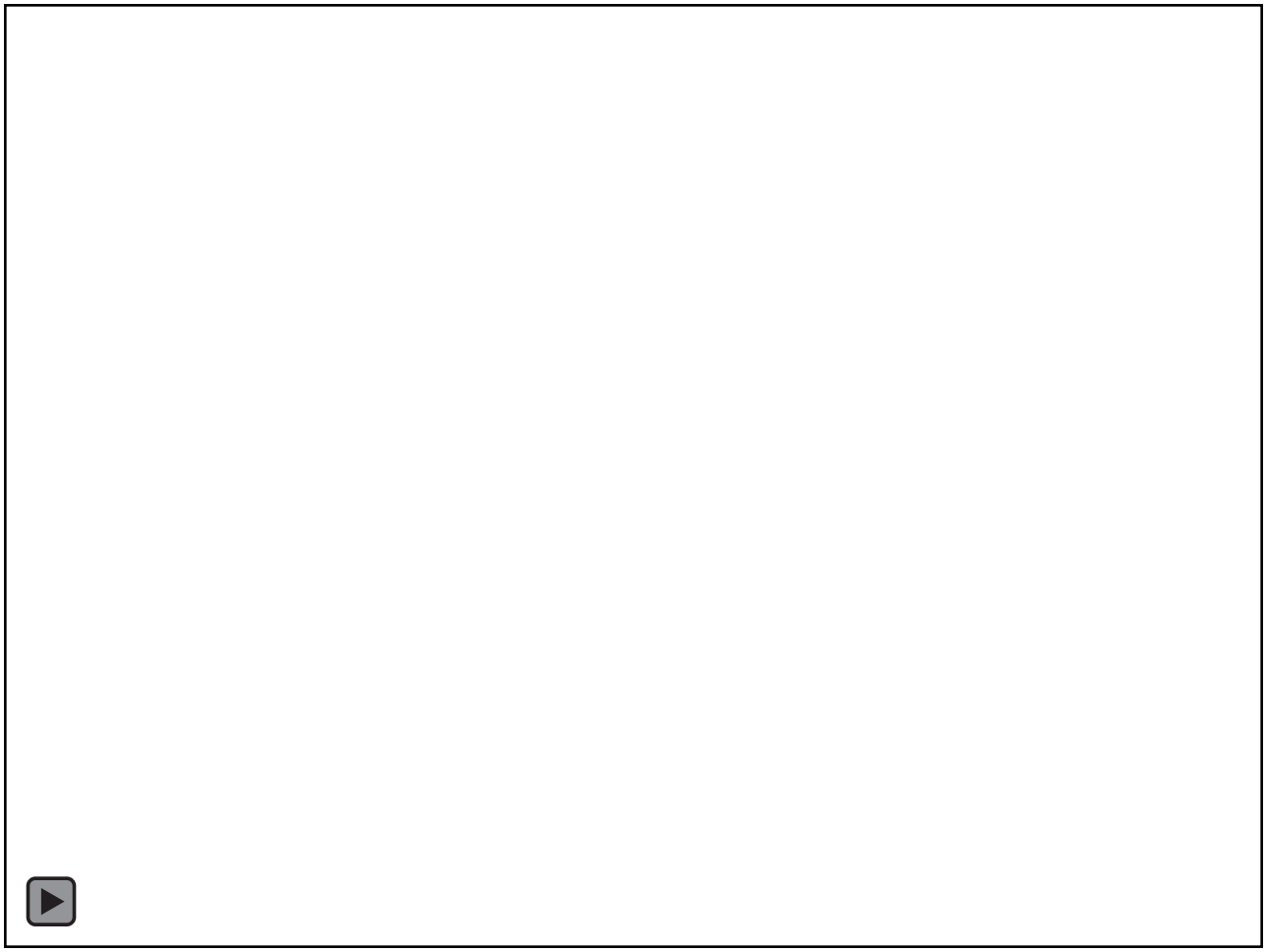
Module 4.2

Curves and Hills

Curves and Hills Objectives

- Know what a curve is.
- Know how to recognize an approaching curve.
- Be able to recognize different types of curves.
- Understand that hills are curves of a different sort.
- Identify factors that contribute to risk in curves.
- Understand how altitude affects vehicles and drivers.

Momentum, Balance and Traction



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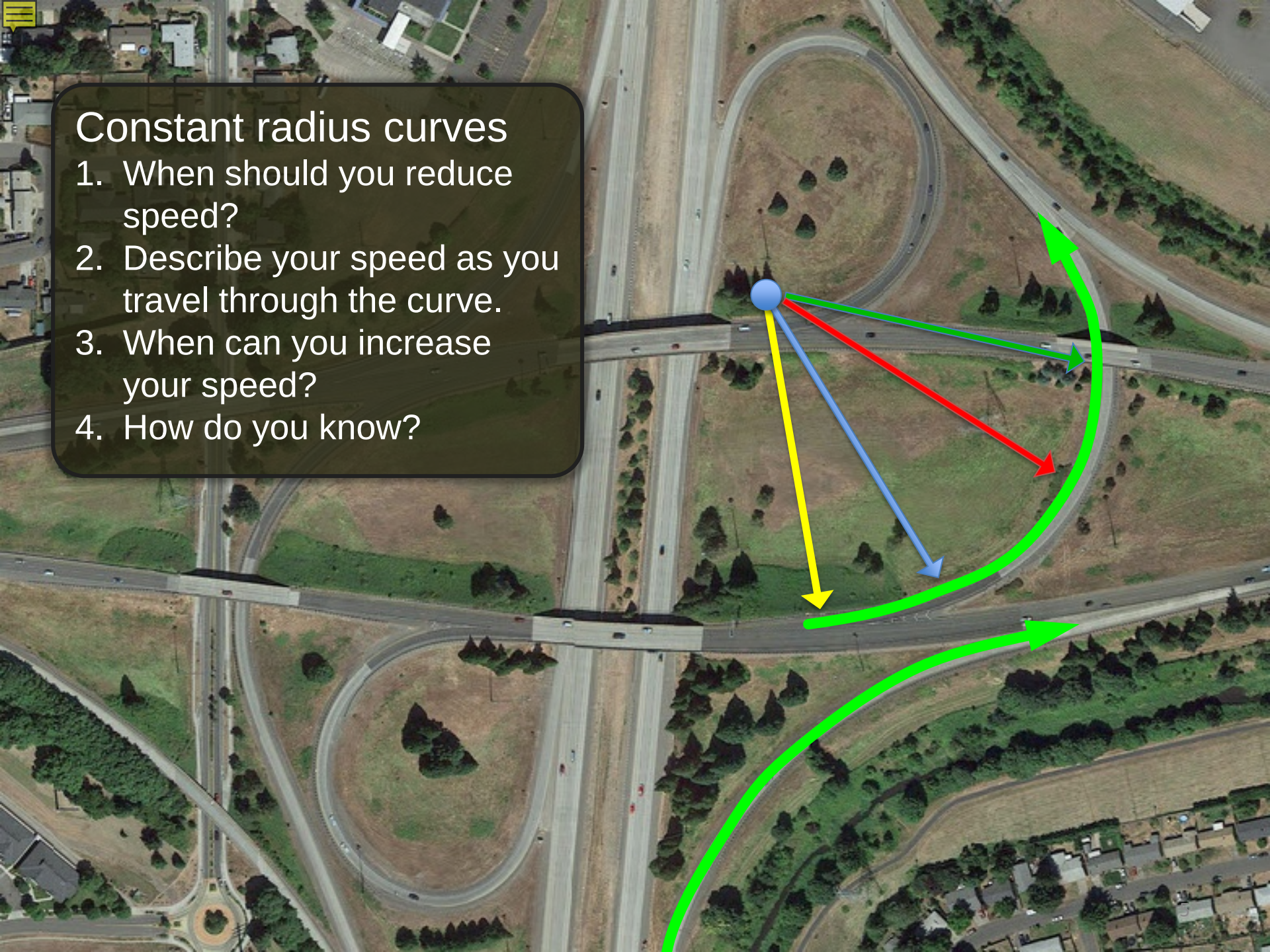
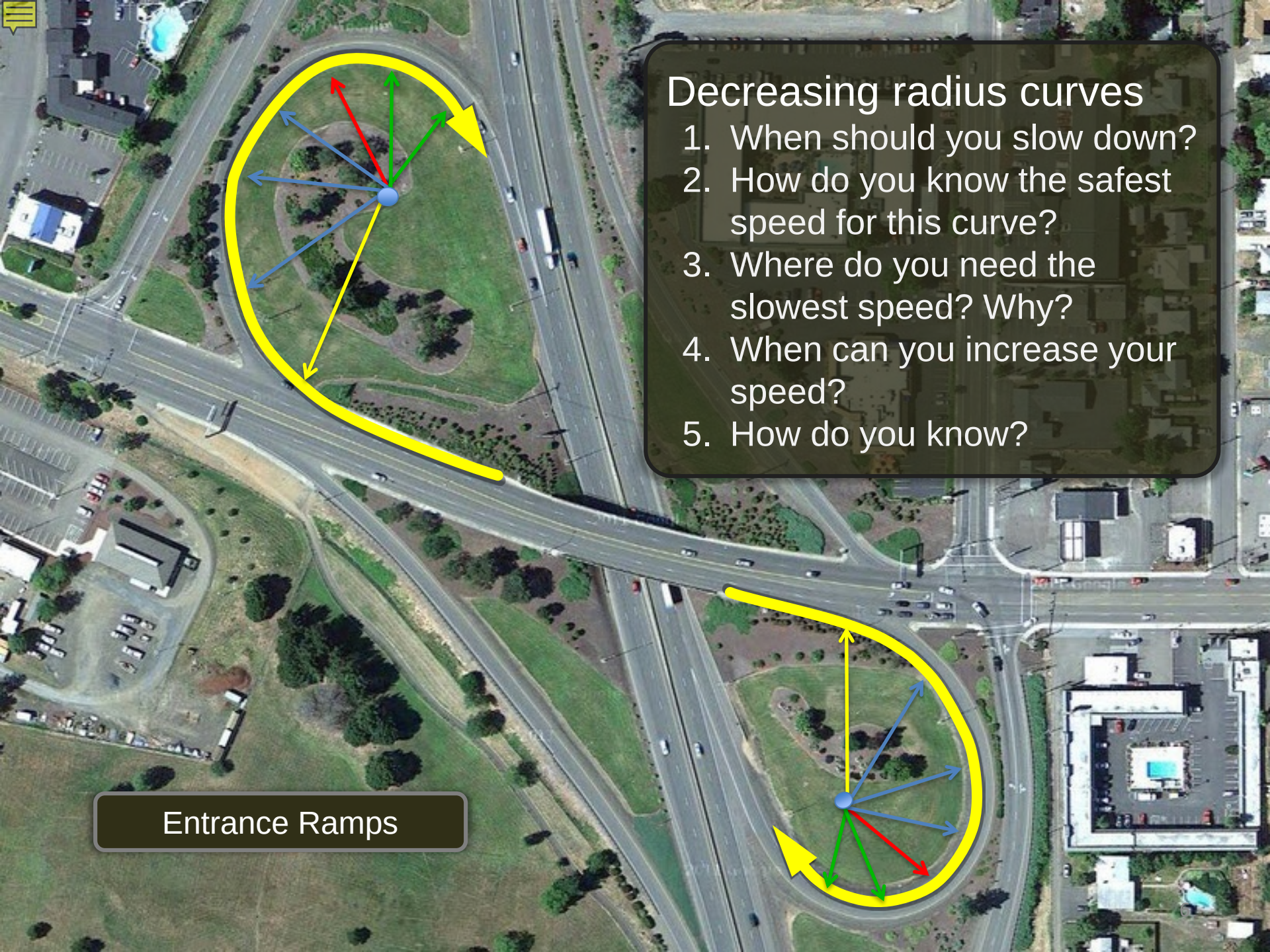
Types of Curves

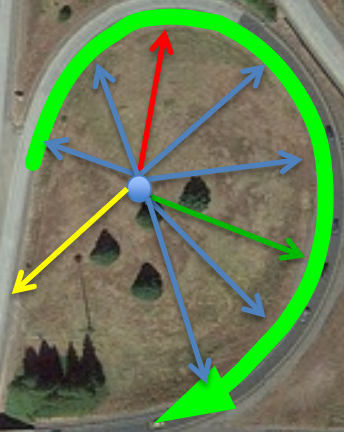
- Constant Radius
- Decreasing Radius
- Increasing Radius

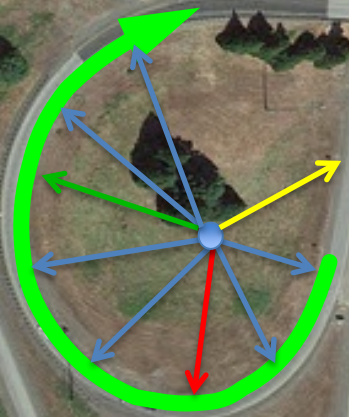

Constant radius curves
1. When should you reduce speed?
2. Describe your speed as you travel through the curve.
3. When can you increase your speed?
4. How do you know?


Decreasing radius curves
1. When should you slow down?
2. How do you know the safest speed for this curve?
3. Where do you need the slowest speed? Why?
4. When can you increase your speed?
5. How do you know?
Entrance Ramps

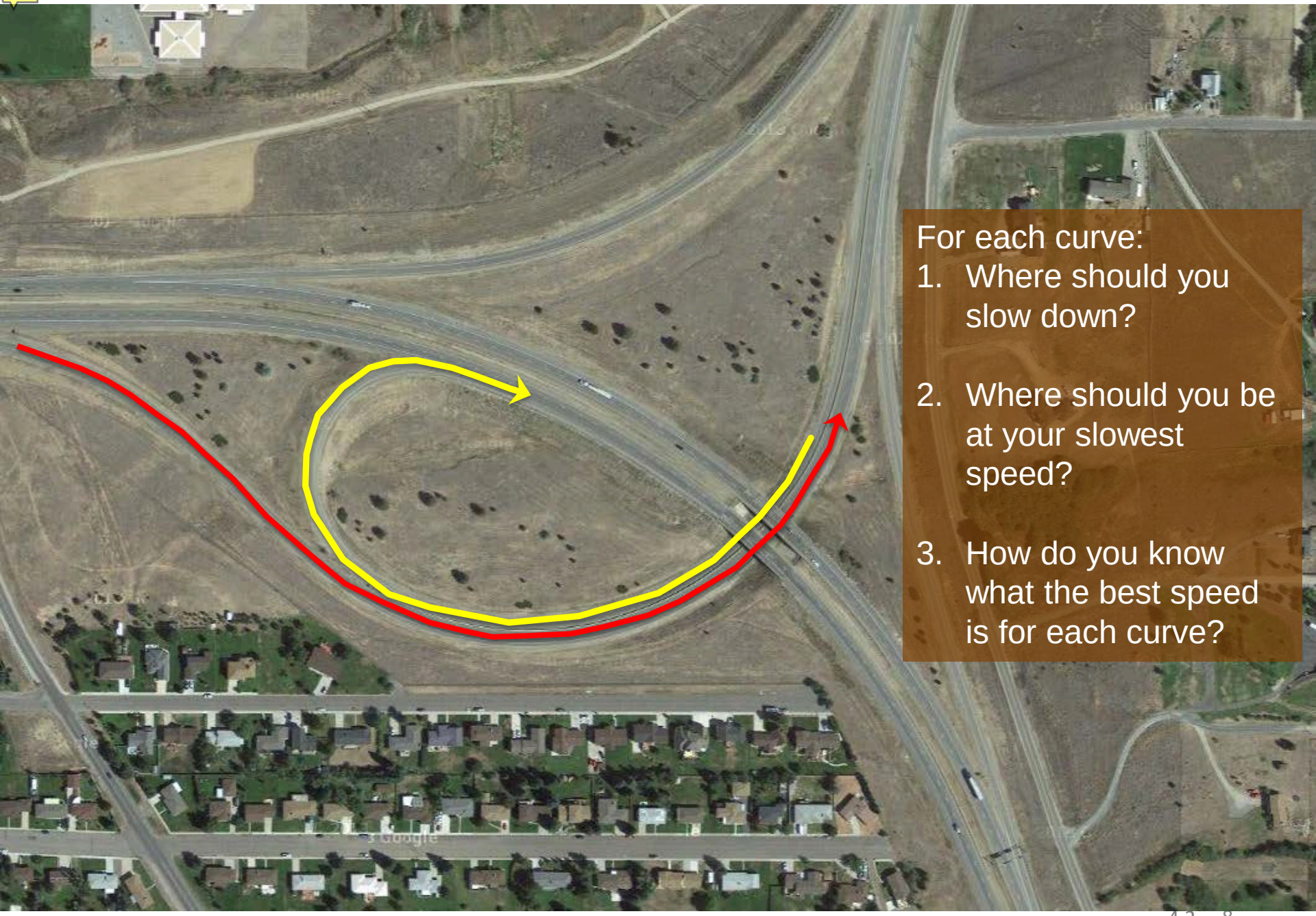
Increasing radius curves

1. Where should you begin to slow down?
2. Where is your slowest speed for this curve?
3. How do you know what the best speed is for this curve?





Exit Ramps



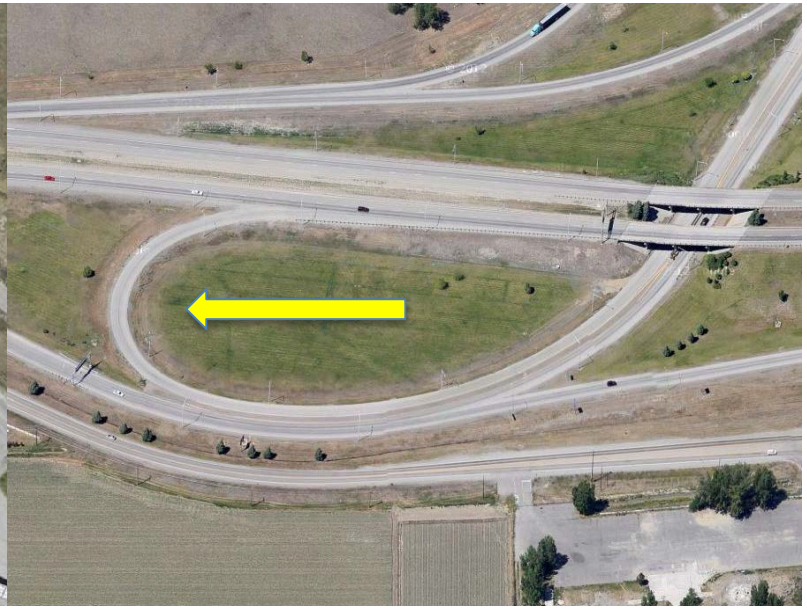
For each curve:

1. Where should you slow down?

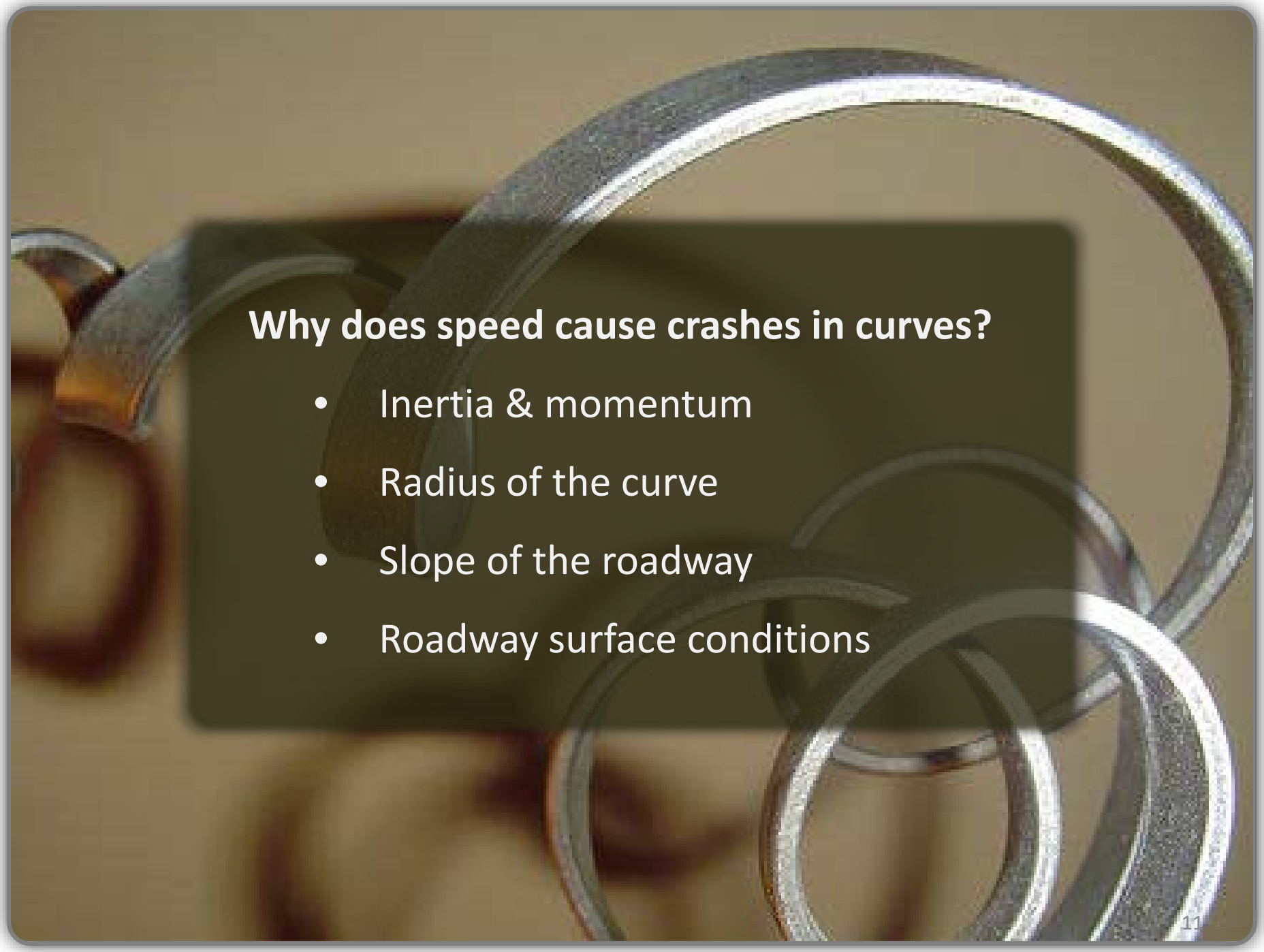
2. Where should you be at your slowest speed?

3. How do you know what the best speed is for each curve?

What Type of Curve?

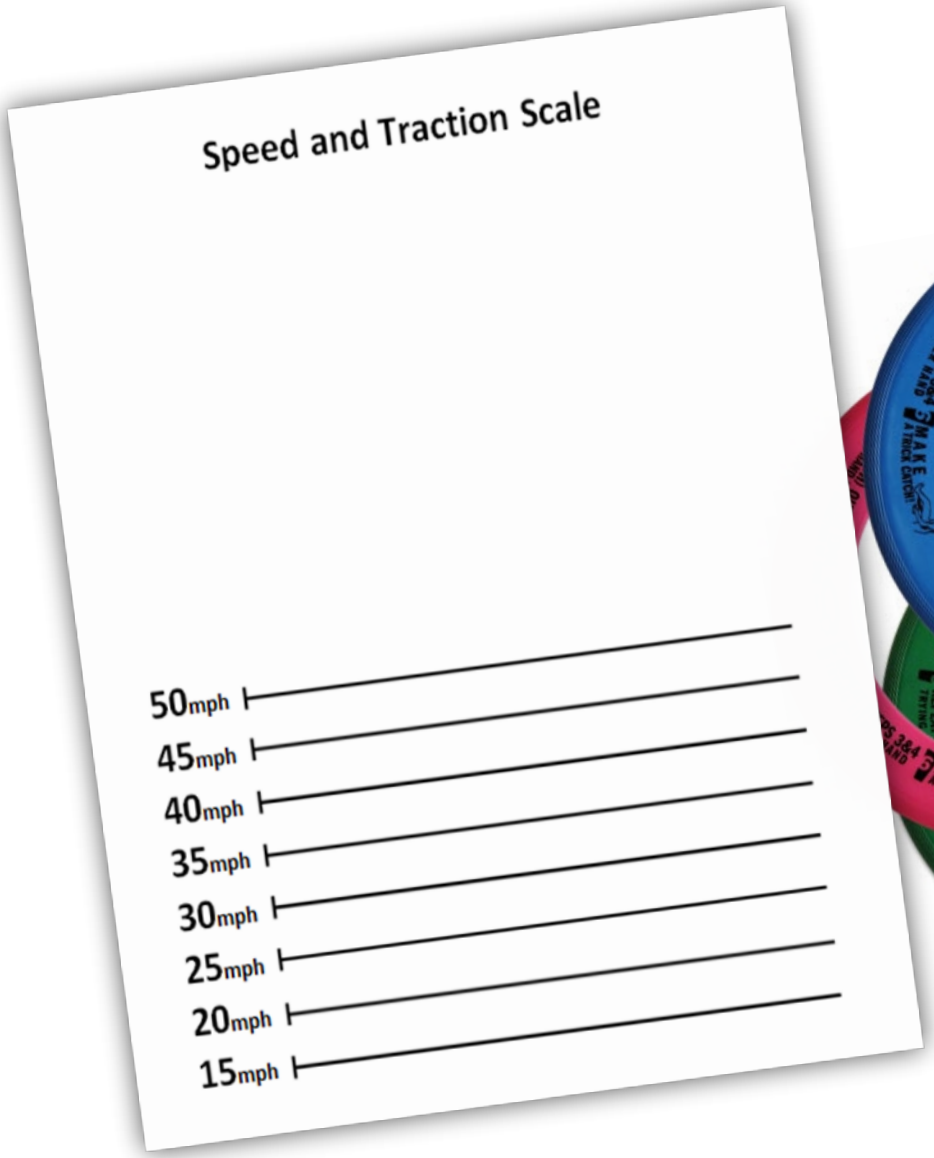


SPEED IN A CURVE

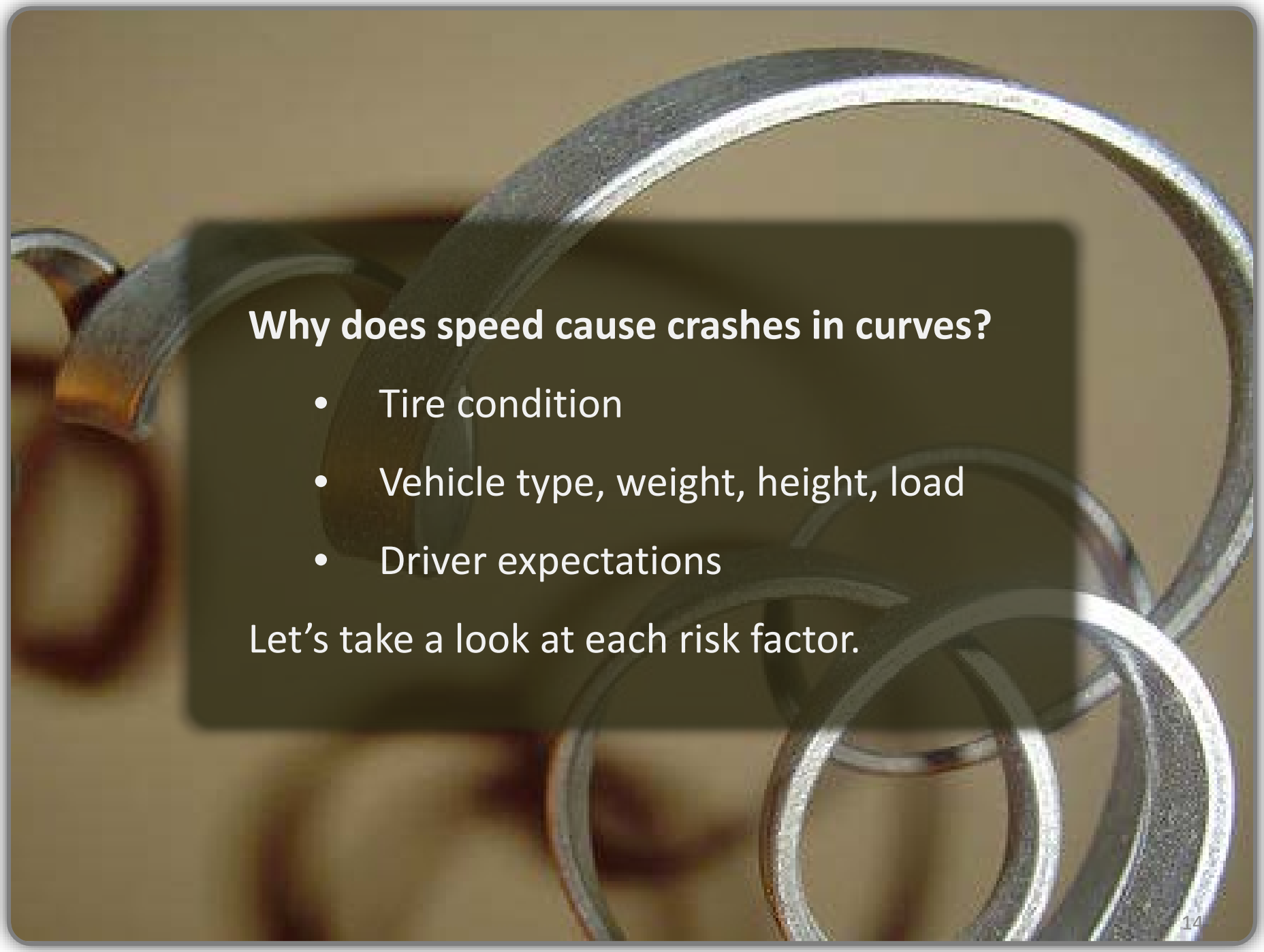

Why does speed cause crashes in curves?
• Inertia & momentum
• Radius of the curve
• Slope of the roadway
• Roadway surface conditions

PLAY VIDEO (3:11)

Curves: Speed, Camber, & Vehicle Load



Let us experiment with speed limitations.



Why does speed cause crashes in curves?

- Tire condition
- Vehicle type, weight, height, load
- Driver expectations

Let’s take a look at each risk factor.

WHAT CONTRIBUTES TO RISK IN A CURVE?

Vehicle Contributes to Risk

Width

Length

Height

Velocity

Weight

Type of Tires

Condition of Tread

Center of Gravity

Tire Inflation

Load Distribution

And More!

Roadway Design

Positive Slope

Roadway Design

Positive Slope

Roadway Design

Negative Slope

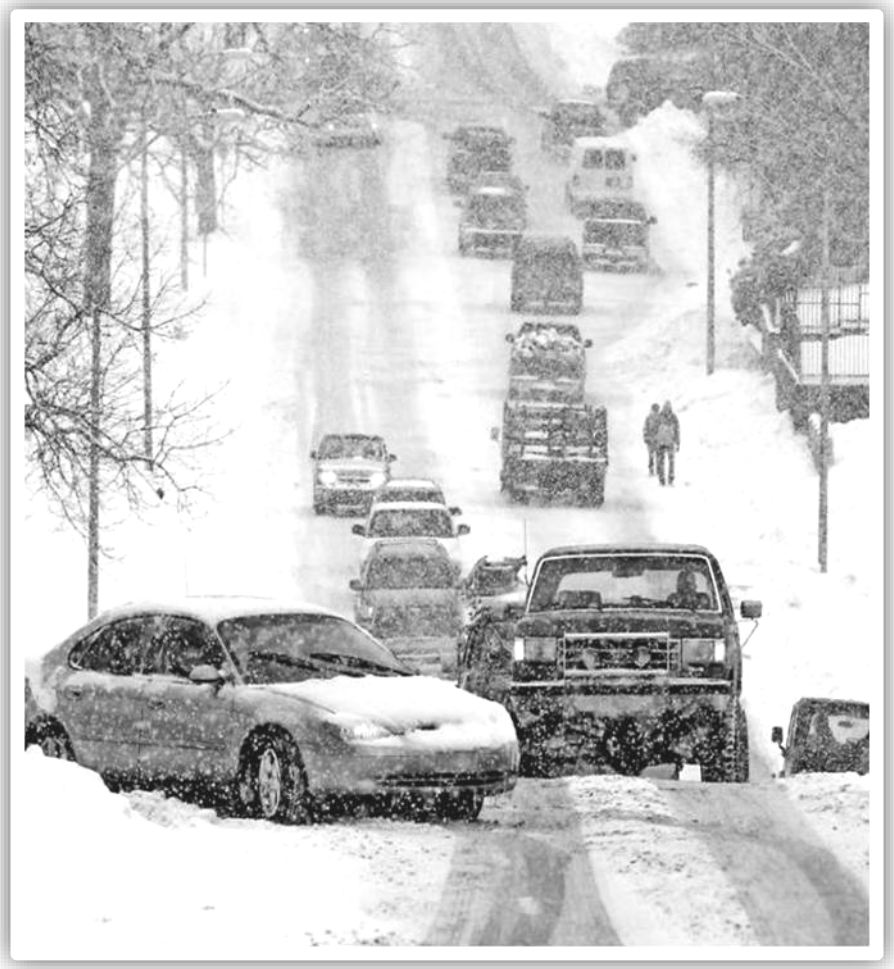
Roadway Design

Negative Slope

Roadway Design and Vehicle Load

Roadway Surface Contributes Risk

Each surface demands a different level of traction and contributes to a unique and dangerous layer of risk!



Describe the following:

- Surface condition
- Roadway design
- Curve radius (sharpness)
- Speed control
- Lane position

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ZONE CONTROL FOR CURVES

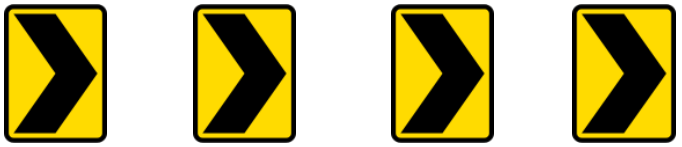
FIND

Find the curve in your target area.

There are many tools to help the driver find a curve.

What do you think they might be?

Clues for Curves



What clues do you see that a curve is ahead?

SOLVE

After the driver sees that they are approaching a curve, he or she must decide what speed control and lane position options they will employ.

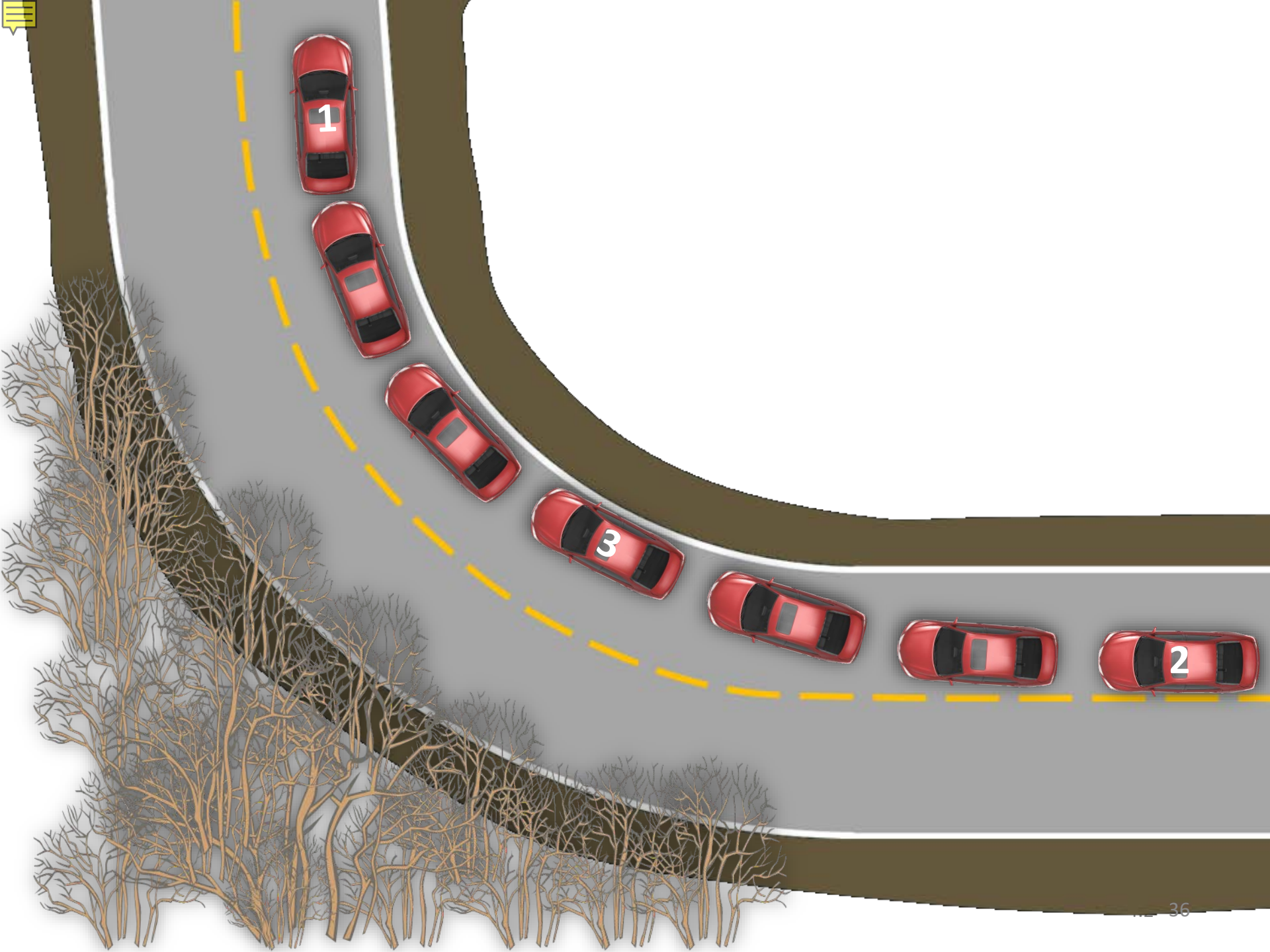
Solve – Speed Control

- What is my best speed for this curve?
- How do I know what my best speed is for this curve?
- How do manage my speed for this curve?

Solve – Steering Control

- What is my best lane position to enter this curve?
- What is my best lane position for driving through the curve?
- How do I manage my speed for this curve?

CONTROL - DRIVELINE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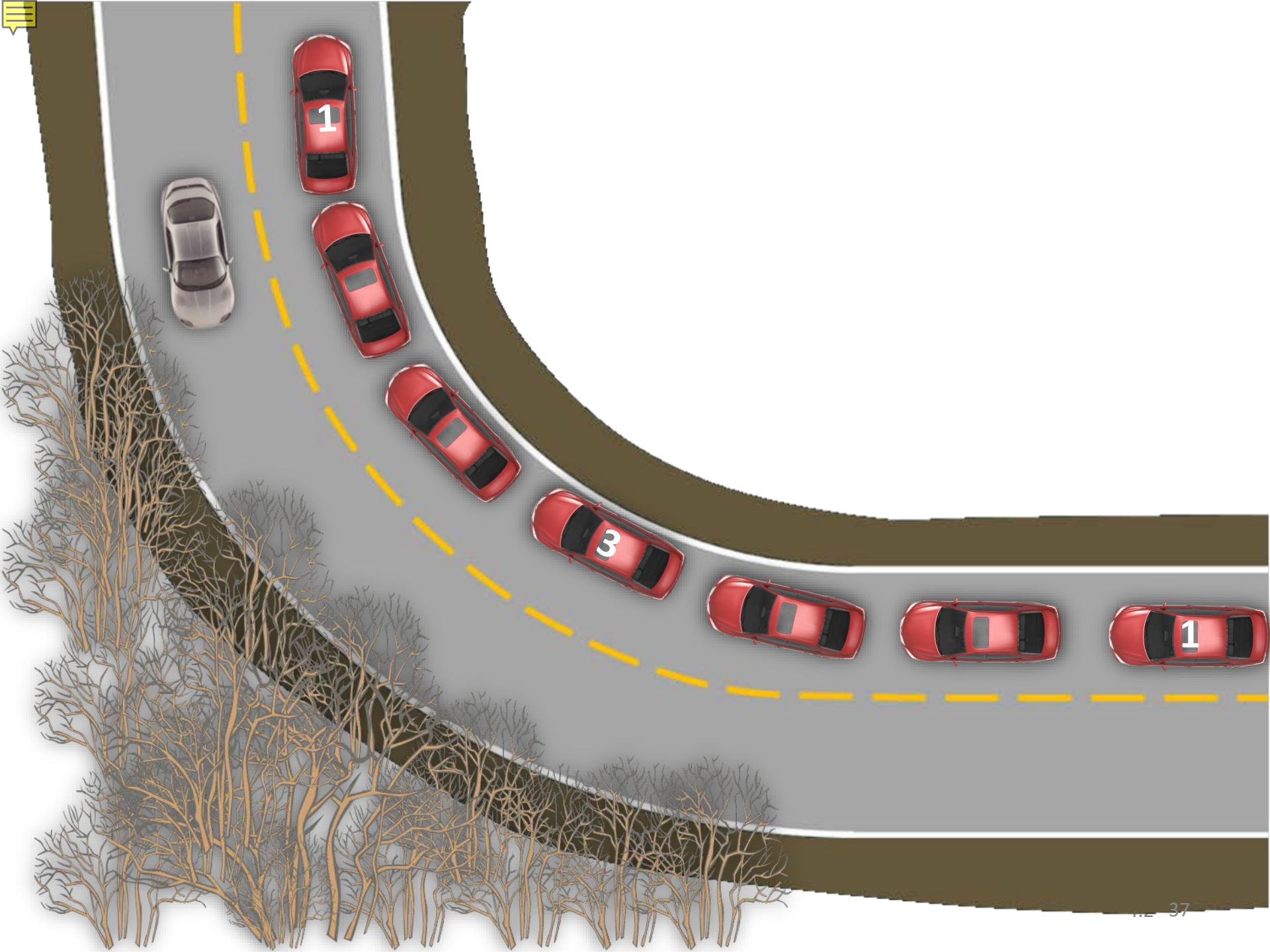
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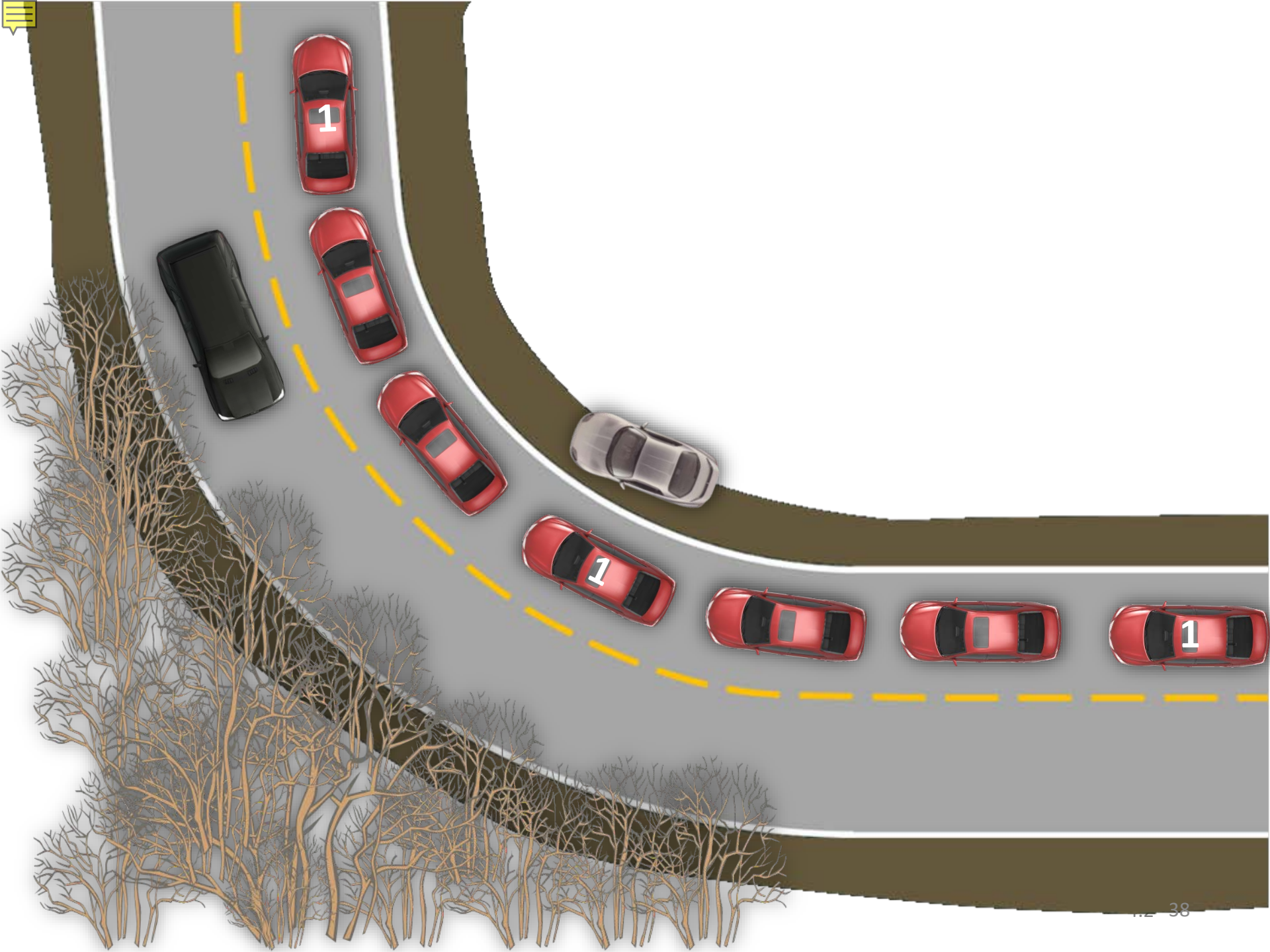
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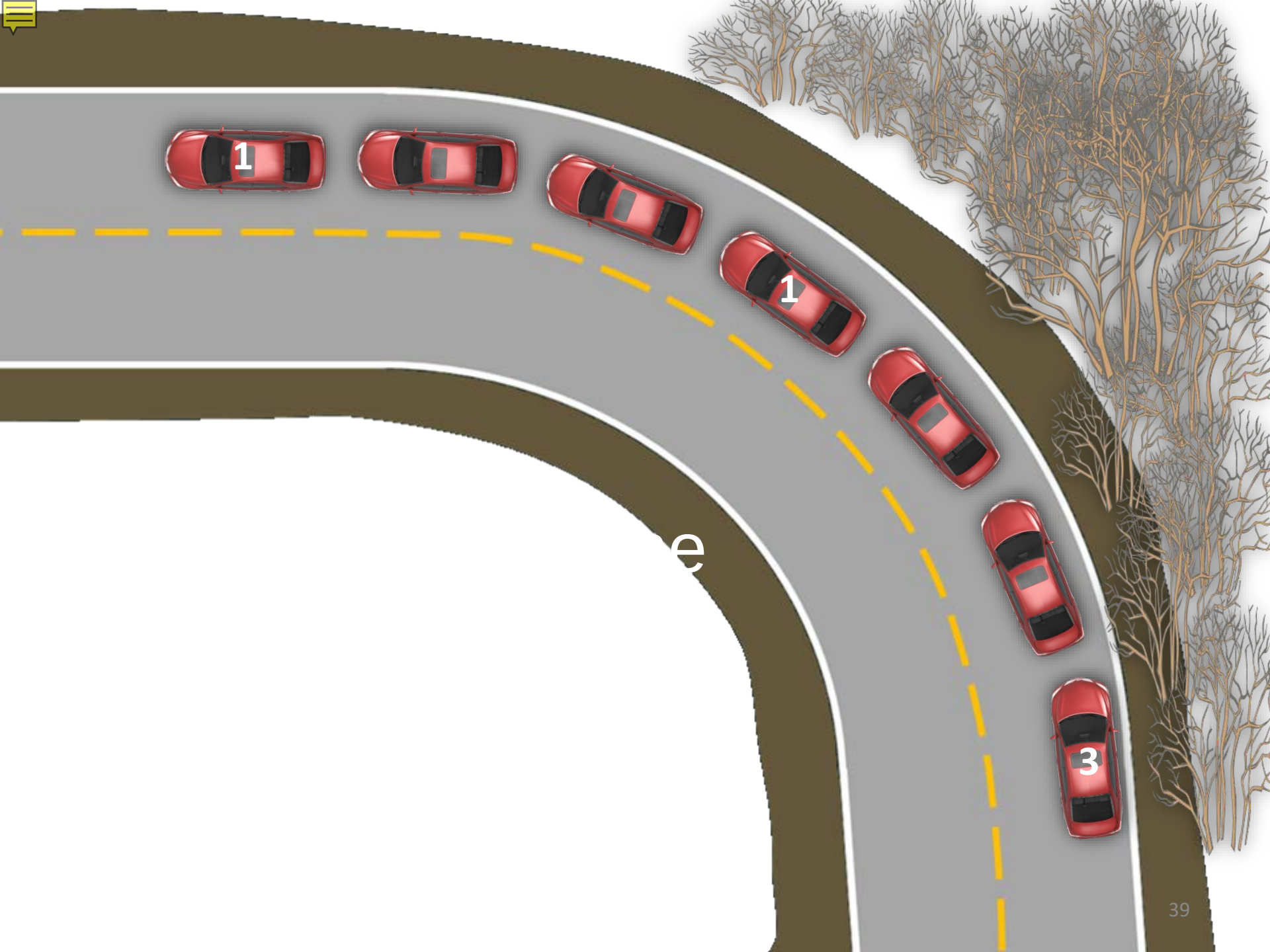
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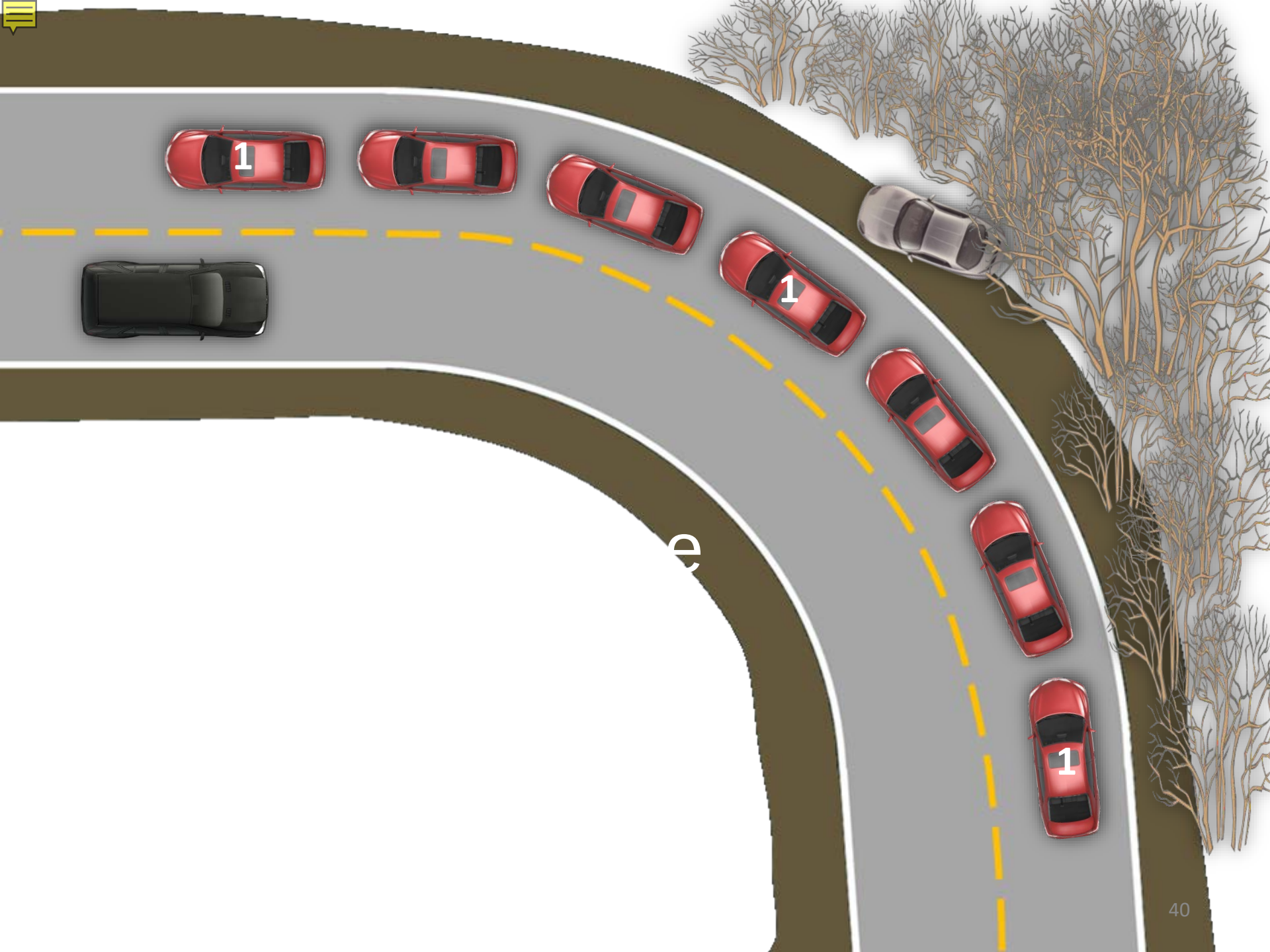
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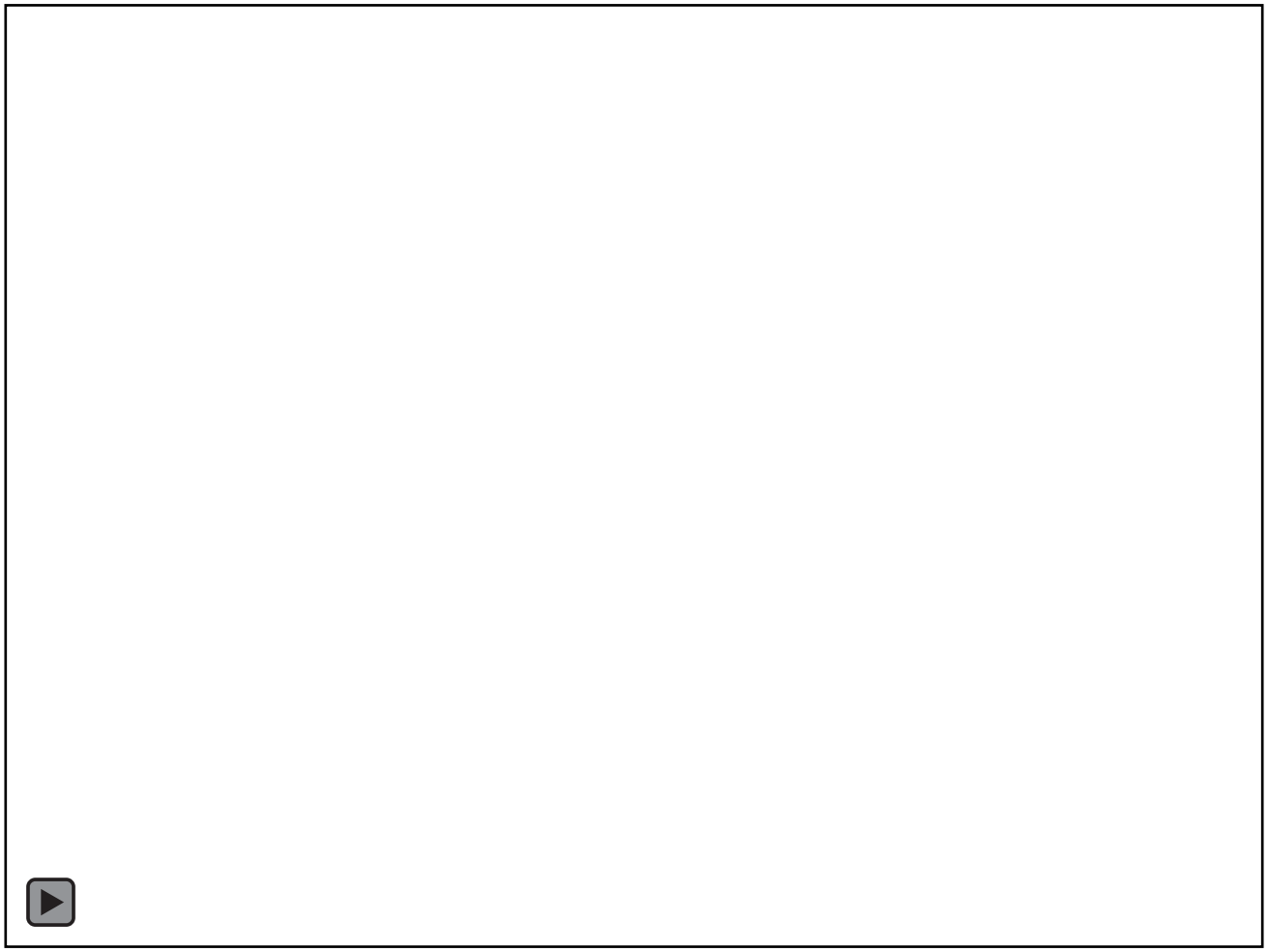
Vision Control and Driveline



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Driving on Hills

- Line-of-sight restrictions—can't see through or over a hill.
- Change from uphill to downhill or downhill to uphill will cause the car to speed up or slow down.
- Traction issues when it's snowy or icy.
- Slow moving vehicles blocking your path or line of sight.

Hills and Mountains

- A hill can rise and descend gently, or can be part of a mountain range.
- Gravity is every driver's passenger when traveling up and down hills.

Adjusting Your Speed for Uphill

Slow Moving Vehicles

HILLS— GOING DOWNHILL

Speed Control—Where?

PLAY VIDEO (:16)

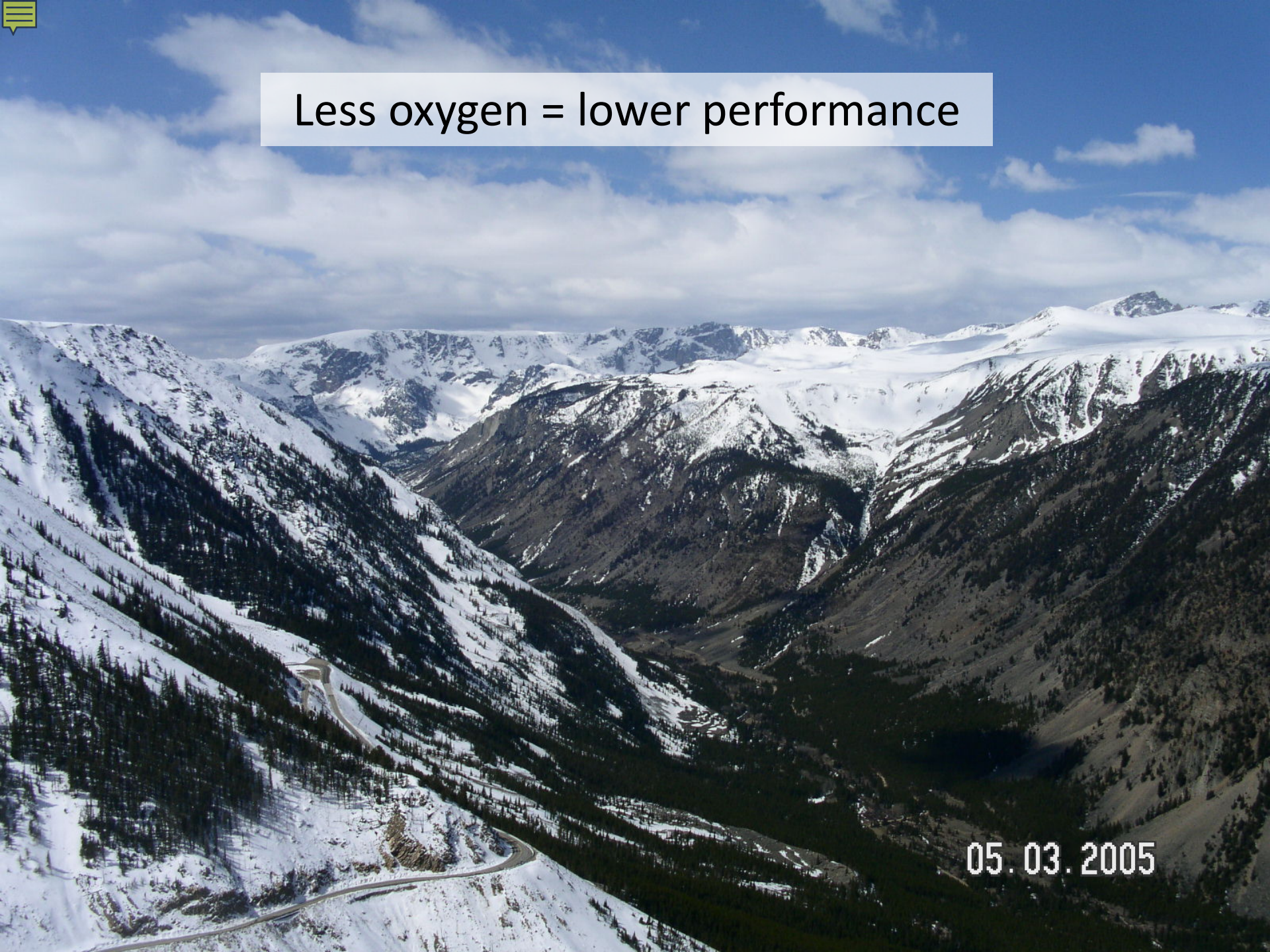
Speed Control—What?

- Off Accelerator
- Trail brake on and off
- Controlled Braking
- Downshift to a lower gear both automatic and standard transmission

Runaway Truck Escape Ramps

What's at the top of this hill?

ALTITUDE


Less oxygen = lower performance
05.03.2005

Montana Driver Education and Training

Standards and Benchmarks

1. **Laws and Highway System**
   - 1.1. know the laws outlined in the Montana Driver's manual;
   - 1.2. understand the laws outlined in the Montana Driver's Manual; and
   - 1.3. consistently demonstrate knowledge and understanding by responsible adherence to highway transportation system traffic laws and control devices.
2. **Responsibility**
   - 2.1. recognize the importance of making safe and responsible decisions for owning and operating a motor vehicle;
   - 2.2 demonstrate the ability to make appropriate decisions while operating a motor vehicle;
   - 2.3. consistently display respect for other users of the highway transportation system; and
   - 2.4. develop positive habits and attitudes for responsible driving.
3. **Visual Skills**
   - 3.1. know proper visual skills for operating a motor vehicle;
   - 3.2. communicate and explain proper visual skills for operating a motor vehicle;
   - 3.3. demonstrate the use of proper visual skills for operating a motor vehicle; and
   - 3.4. develop habits and attitudes with regard to proper visual skills.
4. **Vehicle Control**
   - 4.1. demonstrate smooth, safe and efficient operation of a motor vehicle; and
   - 4.2. develop positive habits and attitudes relative to safe, efficient and smooth vehicle operation.
5. **Communication**
   - 5.1. consistently communicate driving intentions (i.e., use of lights, vehicle position, and personal signals);
   - 5.2. adjust driver behavior based on observation of the highway transportation system and other roadway users;
   - 5.3. adjust communication (i.e., use of lights, vehicle position, and personal signals) based on observation of the highway transportation system and other users; and
   - 5.4. develop positive habits and attitudes for effective communication.
6. **Risk Management**
   - 6.1. understand driver risk-management principles;
   - 6.2. demonstrate driver risk-management strategies; and
   - 6.3. develop positive habits and attitudes for effective driver risk-management.
7. **Lifelong Learning**
   - 7.1. identify and use a range of learning strategies required to acquire or retain knowledge, positive driving habits, and driving skills for lifelong learning;
   - 7.2. establish learning goals that are based on an understanding of one's own current and future learning needs; and
   - 7.3. demonstrate knowledge and ability to make informed decisions required for positive driving habits, effective performance, and adaptation to change.
8. **Driving Experience**
   - 8.1. acquire at least the minimum number of BTW hours over at least the minimum number of days, as required by law, with a Montana-approved driver education teacher; and
   - 8.2. acquire additional behind-the-wheel driving experience with a parent or guardian's assistance in a variety of driving situations (i.e., night, adverse weather, gravel road, etc.).