

ATV Safety

background information & activity book



ATV Safety Educational Packet

Farm Safety for Just Kids is a non-profit organization working to promote youth safety within the rural environment. This is done through the production and distribution of educational materials and the initiation of programs about farm and rural safety and health. Outreach coordinators and a chapter network of grassroots volunteers conduct educational programs to prevent health hazards, injuries, and deaths to children and youth. ATV safety is one topic addressed by Farm Safety for Just Kids. A multitude of resources are available to teach a variety of topics such as machinery safety, livestock safety, chemical safety, and rural roadway issues.

Thank you for your interest in making the rural environment safer by teaching others about staying safe on the farm while around ATVs. Please use the following guide to assist you in your ATV safety program. Feel free to contact Farm Safety for Just Kids at (800) 423-5437 or visit www.FarmSafetyForJustKids.org with questions or concerns.



Author Shari Burgus

Layout Design Matters

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Farm Industry News, Case, Kawasaki

Advisory Group
Richard Connell, Colorado Farm Bureau
Mary Hoffmann, RedBrownVille FS4JK Chapter
Rhonda Fowler, Iowa DNR
Nancy Faber, former FS4JK Outreach Coordinator

Refer to the Farm Safety for Just Kids website at www.FarmSafetyForJustKids.org for additional information.

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Program Objectives:

- ▶ Conduct youth led ATV safety programs
- ▶ Identify dangers associated with operating ATVs and behaviors that prevent injuries
- ▶ Increase educational programs that encourage:
 - » Personal protective equipment (PPE) use
 - » ATV training by certified instructors
 - » No passengers on ATVs
 - » Operating appropriately sized ATVs
 - » Using good judgment when operating an ATV

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Background

Whether used to check cattle in the pasture, spray chemicals, or to simply get to a favorite fishing hole, riding an ATV is a great way to accomplish the task. ATVs are used on many farms and ranches for a variety of reasons. In 2009, approximately 10.5 million ATVs were used in the United States. This number is triple what it was in 1998. Since the number of ATVs is high and there is potential for danger, the number of accidents involving ATVs is high.

- ▶ Between 2001 and 2009, approximately 1,186,800 people were treated in emergency departments and 5,864 people were reported as dying as a result of ATV-related injuries in the United States.
- ▶ There was a statistically significant decrease in the estimated number of ATV-related emergency department treated injuries from 2009 to 2010.

ATVs are operated by all ages, but youth are at high risk of injury when operating an ATV.

- ▶ In 2010, 25% of the 115,000 ATV-related emergency department treated injuries were age 16 or younger.
- ▶ In 2004, there were 180 deaths to youth under 16 due to ATV-related incidents. This number dropped to 94 in 2008.
- ▶ Of the 2,775 ATV-related fatalities of children younger than 19 years of age, 43% were younger than 12 years of age. This represents 12% of the total number of estimated ATV injuries.

Behaviors while operating ATVs influence the type and number of ATV incidents.

- ▶ More than 92% of ATV-related fatalities involve one or more unsafe behaviors (no PPE use, riding on paved surfaces, using alcohol/drugs, allowing passengers, riding ATV larger than recommended, and/or speeding).
- ▶ Approximately 90% of ATV-related injuries to youth under 16 occur on adult-sized machines.

References:

- ▶ Levenson, MS. 2003. All-terrain vehicle 2001 injury and exposure studies. US Consumer Safety Commission.
- ▶ US Consumer Product Safety Commission. 2009 Annual Report of ATV Deaths and Injuries. Bethesda, MD, USA: 2010.
- ▶ US Consumer Product Safety Commission. 2010 Annual Report of ATV Deaths and Injuries. Bethesda, MD, USA: 2011.

Injury Prevention

Riding an ATV safely is controlled by the operator. Listed below are factors that determine the ATV operator's safety. Actions can be taken to prevent ATV riding from becoming a disaster.

SIZE

Even youth sized ATVs can weigh more than the operator. Adult sized ATVs can weigh 600 pounds, so it can be difficult for even an adult to control this much weight. Size is only one consideration when determining when someone is ready to safely ride an ATV.

ATV dealerships have age recommendations that help determine what size is appropriate for you to ride, but we all know people that don't fit nicely into the standard.

These recommendations include:

- ▶ ATVs with an engine size less than 70cc are recommended for youth 6 years or older.
- ▶ ATVs with an engine size 70-90cc are recommended for youth 12 years or older.
- ▶ ATVs with an engine size greater than 90cc are recommended for people at least 16 years of age.

Another way to tell if you're big enough to operate an ATV is to follow some easy-to-use guidelines. Having someone else measure and observe these items will help facilitate a more accurate assessment.

- ▶ Seat clearance – The ATV requires lots of room to maneuver the machine. While standing on the footpegs, measure the distance between the ATV seat and your inseam. There should be 3 to 6 inch clearance. This space will allow you to move easily and prevent the seat from hitting you during a ride which could throw you over the handlebars.
- ▶ When sitting on the ATV seat the upper leg position should be approximately horizontal to the ground. If your knees are significantly lower than your hips, you're too short for the machine. If your knees are significantly higher than your hips, you're too big for the machine.

- ▶ Foot length will influence your ability to operate the foot brake smoothly. With the heel of your right foot touching the footpeg, your toes should be able to depress the brake with a smooth downward motion. The same is true of your left foot operating the gearshift.
- ▶ Your hand reach will determine your ability to control the ATV when turning. While sitting on the ATV seat without leaning forward, place your hands on the handlebars. Both elbows should be bent. If they are straight, you're too small and won't be able to turn properly when riding. If your elbows are less than a right angle, you're too big for the machine.
- ▶ Throttle reach - This will determine your ability to turn the handlebars without interference. Place your right hand on the handlebar in a normal operating position. Without moving your fingers, check to make sure your thumb can easily operate the throttle.
- ▶ Brake control – Place your hands on the handlebars in normal operating position. Your middle finger should extend beyond the brake lever by the distance of your first joint. If not, you're not big enough to effectively and safely grip the handlebar in an emergency. Be sure you are able to reach the stop switch with your thumb.

NO PASSENGERS

Most ATVs are built for one operator. ATV seats are large, but that's to allow the driver room to move when turning corners or maneuvering terrain. It's not designed for additional people to ride. An additional person's weight alters the ATV's center of gravity. The center of gravity is the point where the machine is most stable. The lower and more centered the center of gravity the more stable the machine and less likely to tip over. When a person rides on the machine with the operator the center of gravity moves in the direction of the extra weight. This means the vehicle is more likely to tip over. This can also be true if you are hauling heavy items. Chemicals, hay, or feed being hauled alter the center of gravity similar to the weight of an extra rider.

When another person is riding on an ATV they distract the operator away from his/her main responsibility – driving safely. Operating an ATV

takes lots of body movement. When there's another person in close proximity, it's more difficult for the operator to move appropriately.

Some ATVs are built for additional riders. If this is the case, the user's manual will say so. The manufacturer took the extra weight into consideration when designing the ATV.

PERSONAL PROTECTIVE EQUIPMENT

Since the possibility of injury exists if an ATV operator is thrown from the vehicle, it is important to protect the body as much as possible. This is why what you wear when riding an ATV is important.

PPE includes:

- ▶ **Helmet** – This is vital when riding an ATV to protect your brain. A helmet won't prevent an accident, but it could reduce the severity of injury if an accident does take place. Finding the right size helmet helps to protect your head. Go to an ATV dealership and ask to try on several helmets. The helmet should fit snugly on the head and not move when the chinstrap is fastened and you move your head. If it does move, it's too big. A face guard gives additional protection to the mouth and nose. The helmet should have a seal on it saying either D.O.T. (Department of Transportation) or Snell approved. Both of these seals means the helmet meets minimum crash standards.

Other vital PPE include:

- ▶ Long pants
- ▶ Long sleeved shirt
- ▶ Gloves
- ▶ Over-the-ankle leather boots
- ▶ Goggles

These items don't need to be expensive and exclusive to ATV riding.

TRAINING

Riding an ATV requires different skills than those needed to drive a bicycle, car, truck, or tractor. Training is available to help you learn the safest way

to ride an ATV. Training usually includes classroom and hands-on exercises. Usually you will use your own size appropriate ATV for training purposes.

If you've just purchased a new ATV ask the dealership if they offer training. This may be free or at a minimal cost. ASI (All-Terrain Vehicle Safety Institute) also offers classes for new ATV operators. Check out their website at www.atvsafety.org to see if a class is offered in your area. You can also learn to ride safely from your parents.

WHERE TO RIDE

ATVs are designed with low pressure wide tires that grip the road surface. They are intended to be used where the ground surface is rough, slanted, and often steep. The low pressure tires allow the vehicle to operate in areas that regular vehicles cannot go. If an ATV is driven on hard surfaces like pavement or blacktop, the ATV may not perform well and could be unsafe.

Some states have laws that permit riding on hard surface roads for short distances to get from one area to another. Check out <http://www.atvsafety.gov/legislation/legislation.html> and click on your state to find out what rules apply to where you live.

PRE-RIDE INSPECTIONS

ATVs are often used in remote areas that may be a long way from help if something unexpected happens. Inspecting the mechanical condition of the vehicle before setting out will help make the ride safer for you. Off-road riding can cause wear and tear on the machine so regular maintenance is essential. Since all machines are different, read the owner's guide for specifics for your particular machine. Checklist items will include: tire condition and air pressure, brakes, electrical system, fluid levels, chain or drive shaft, lights/switches, and nuts/bolts.

Program Implementation

SUGGESTED TIMELINE

2 months prior to program

- ▶ Determine program leaders (see right)
- ▶ Research national and local ATV safety statistics (see page 11)
- ▶ Determine audience age, gender, past experience, etc. (see right)
- ▶ Identify location

1 month prior to program

- ▶ Develop program content and activities
- ▶ Obtain supplemental supplies based on planned activities
- ▶ Write press releases and record PSAs (found on website)

1 week prior to program

- ▶ Deliver PSAs and press releases to media
- ▶ Distribute and collect written pre-surveys or conduct observation (see pages 12 & 13)

Program Day

- ▶ Conduct educational program

Next day

- ▶ Write news story about program and submit to media with photos

1 month after program

- ▶ Distribute and collect post-surveys or conduct observation (see pages 12 & 13)
- ▶ Tabulate survey results (see page 12)
- ▶ Compare pre and post survey results to identify changes in knowledge, behavior, and attitude (see page 12)

PROGRAM LEADER SELECTION

Choose people that have experience with ATVs to present the information. Select people that follow the rules for safe ATV use (wear helmets, have taken training, don't allow passengers, and ride the correct size ATV). Presenters can be high school students or adults. Youth usually respect the opinion of older youth. Junior high or middle school students look up to and respect high school age speakers. High school students also listen to their peers.

Victims of ATV incidents or near-misses can give impressionable messages if they turn the incident into a learning moment. Suggest that they tell the audience how the incident has changed their attitude and behavior such as no longer taking passengers, wearing a helmet, etc. When talking to an incident survivor about being a potential speaker and the person indicates he or she has NOT changed, you may want to reconsider asking them to speak.

By including several speakers the audience will gain different perspectives. For instance, an ATV instructor may talk about what is included in training, a student may talk about the hazards that arise when there are two people on an ATV, and an ATV crash survivor may talk about his or her own survival and the changes that resulted from being involved.

PROGRAM AUDIENCE

Select audiences that are old enough to operate ATVs and those old enough to understand the messages and conduct the activities.

The All-Terrain Vehicle Safety Institute recommends:

- ▶ Over 90 cc (adult sized machine) – 16 years old and older
- ▶ 70 cc to 90 cc – ages 12 to 16
- ▶ 70 cc and below – ages 6 to 11

If addressing younger youth make sure to emphasize the importance of riding ATVs that are recommended for their age. Proper supervision is always recommended.

PROGRAM SAFETY TIPS

Safety is vitally important when conducting any educational program. This suggested ATV program can be conducted with or without an actual ATV present. Students can often relate to the topic better if they can actually visualize the ATV.

In the case where ATVs are on the premises, care should be taken that no one is exposed to the hazards that are being discussed.

- ▶ Do not allow ATVs to be started or operated by students.
- ▶ Do not allow older students to give rides to other students.
- ▶ Care should be taken when the ATVs are unloaded if they are brought to the location on a trailer.
- ▶ Remove keys from all ATVs.

With all sessions:

- ▶ Inform participants to be cautious when conducting activities that require interaction and physical movement.
- ▶ Mark and enforce boundaries between machines and people.
- ▶ Use good sense when showing how ATVs maneuver properly with weight distribution demonstrations. Showing off or riding recklessly will undermine the messages.

ADDITIONAL RESOURCES

Handout Distribution

Many puzzles included at the end of the leader's guide can be reproduced and sent home as a reminder of the program content.

Power Point Presentation

A presentation is available at our website, farmsafetyforjustkids.org. It gives statistics and rationale behind the importance of following safe practices when operating an ATV. It could be used as an opening activity or a summary for your program. Be aware that a script is also included on the power point. Print the slides in NOTE version so the script can be read before the program.

Suggested Program Agenda

Agenda	Suggested Lesson Ideas
Ice breaker or opening Benefits of ATV use Statistics (National and Local)	ATV Mixer, PPT, ATV Trivia (see pages 15 & 25)
Dangers associated with ATV use Protection against injury due to ATV use	ATV Tires, Funny or Dangerous? (see pages 16 & 17)
Personal Protective Equipment <ul style="list-style-type: none"> ▶ Helmets ▶ Boots ▶ Gloves ▶ Clothing ▶ Training 	ATV Helmets (see page 19 & 20)
Safe behavior while using an ATV Riding the correct sized ATV	Center of Gravity (see pages 21 & 23)

Promotion

Let the public know about your ATV safety program. By doing this, you will reinforce the concepts given during the program, possibly inform new audiences of ATV hazards, and increase community awareness about your organization. If a program is being funded by an outside agency, publicity offers the opportunity to recognize their contribution. You may also want to write them thank you notes.

Press releases are written communications directed at members of the news media for the purpose of announcing your event and the importance of ATV safety. They aim to attract favorable attention to the program and inform the public about important issues. Sample press releases are given on the CD within this packet. They can be adapted to speak about your specific program.

PSAs (public service announcements) inform the public about the hazards that ATVs hold if not used safely. Your local radio station may allow you to read your selected PSA on the air or record them at the studio. Find PSA examples on farmsafetyforjustkids.org that can be adapted and rewritten to tell your story. This lets the community know about your program and encourage them to use the information to protect family members.



Websites

Organization	Description
All-Terrain Vehicle Safety Institute www.atvsafety.org	The ATV Safety Institute (ASI) offers three age specific e-learning courses to address basic ATV safety principles. Adults, teens, and children will learn how to apply the “golden rules” of ATV riding in an interactive setting. The course includes videos, pictures, and interactive games to make it a fun and effective learning experience for all age groups. After taking the course, users can take an ATV safety exam and receive a certificate of completion.
Department of Natural Resources (NM, UT, IA, MT, MA) www.iowadnr.gov	This online certification offering features interactive exercises for students. Students must pass a chapter quiz in order to progress to the next chapter and must pass a final exam with 80% accuracy to earn their certificate. Topics covered by the course include parts of the machine and how they work, riding positions and when to use them, safety gear, personal responsibility, and conservation principles. Students must be 12 or older to earn their ATV education certificate.
4-H www.atv-youth.org	This online interactive video appeals to young ATV users. In a forgotten land the minions of evil have returned once again. One by one, towns, and farms have all fallen victim to creatures. Only one stronghold remains: Tread-Sylvania. Safely ride your ATV through mysterious locations and defeat the horrible monsters to free the town from their evil grasp!
Penn State www.agsafety.psu.edu	Five short video clips of ATVs rolling over in farm settings help students understand the principles of safe ATV operation on the farm.
U.S. Consumer Product Safety Commission www.atvsafety.gov	This site is dedicated to making sure parents, teenagers, children, trainers, state officials, and others have the most up-to-date safety information about ATVs.
Wisconsin Department of Natural Resources http://www.dnr.state.wi.us	Lesson plans for teachers of ATV safety (braking, parking, turning, ATV parts, pre-inspection, start-up procedure, and reducing risks) help translate safety principles into action.
Yamaha Australia Video Clips www.yamaha-motor.com.au	Short (2 to 10 minute) video clips about specific safety topics (instruments, turning, braking, riding, inspection, transportation, hauling loads, etc.) provide information about safe ATV use.

Evaluation

Determining the effectiveness of your program is important. This could be done by observing those operating ATVs, through surveys of program participants, or both.

Conducting surveys of your intended program audience can identify their knowledge about ATV safety. If the surveys are done before an educational program takes place, it will give the presenter a basis for where his/her audience is in relation to ATV safety. The educational program can then target issues lacking by the audience.

The surveys can be conducted again after the program has taken place in a pre and posttest format. This will identify change in knowledge and behavior. The resulting information could make a great newspaper article when reporting the changes made by your audience.

Listed on page 13 are ten knowledge based questions related to the information in this packet. Take into consideration what topics you plan to cover in your presentation and program. If you will not be covering road surfaces, don't use the questions related to this topic. The questions can be combined or rewritten to be specific to your program.

Surveys can be completed and tabulated several ways. They can be copied, distributed, completed, collected, and tabulated by hand if there are only a few surveys. If many surveys will be completed, an easier way to complete the process is using an electronic software package; some of them are free if you want only basic analysis results. Use their suggestions to ensure a good response rate.

ATV Knowledge Survey ANSWER KEY: 1:d, 2:d, 3:b, 5:b, 4:d, 6:a, 7:d, 8:d, 9:a, 10:b

SELF ASSESSMENT

The self-assessment tool below and the behavior survey on page 15 can be used to identify behaviors used by your audience. If used before your presentation, it can be used to identify areas that need special attention. If used after the program, it can be used to see if your audience has changed their behavior when compared to the assessment done prior to the program. This information is self-reported so there is a chance the information may be slanted.

ATV OBSERVATION

Student Self-Assessment of Safe Behavior When Around ATVs

	Always	Sometimes	Never
I wear an approved helmet when riding an ATV			
I wear long pants and shirts when riding an ATV			
I wear gloves when riding an ATV			
I ride the appropriate sized ATV for my age			
I never allow passenger when operating an ATV			
I am never an passenger when someone else is operating an ATV			
I have participated in ATV training classes			
I never operate my ATV on hard road surfaces			

ATV Knowledge Survey

1. Which of the following statements is true about the use of ATVs in the U.S.?
 - a. ATVs are decreasing in number
 - b. ATVs are increasing in number
 - c. ATVs are increasing in size and power
 - d. Both b and c are true
2. Most ATV injury incidents involve?
 - a. Riding ATVs smaller than recommended
 - b. Riding on non-paved surface roads
 - c. Operator using personal protective equipment
 - d. Speeding
3. Which of the following ATV recommendations is correct?
 - a. ATVs with an engine size of less than 50cc are recommended for youth 6 years old
 - b. ATVs with an engine size of 70-90cc are recommended for youth 12 years old
 - c. ATVs with an engine size greater than 90cc are recommended for people 14 and above
4. ATVs have large seats to allow...
 - a. Passengers and special friends to ride along
 - b. Driver room to move when turning corners or maneuvering terrain
 - c. Visual attractiveness of the machine
 - d. Space used to store gear underneath
5. Why is the practice of allowing passengers on ATVs not recommended?
 - a. Alters the center of gravity of the machine
 - b. The passenger can distract the operator attention away from safe driving
 - c. The ATV is more likely to tip over with the extra weight
 - d. All of the above are true
6. Which of the following statements is true about an ATV helmet?
 - a. A face guard will give additional protection to the mouth and nose
 - b. It's okay to use a helmet if it's been in an accident before
 - c. The helmet should fit loosely allowing your head to move when the chinstrap is fastened
 - d. A Department of Agriculture approval means the helmet meets minimum crash standards
7. Which of the following personal protective equipment should be used when operating an ATV?
 - a. Long pants
 - b. Helmet
 - c. Over the ankle boots
 - d. All of the above should be worn when operating an ATV
8. ATVs are intended to operate on what type of surfaces?
 - a. Rough terrain
 - b. Slanted surfaces
 - c. Paved surfaces
 - d. Both a and b
9. How are UTVs (Utility vehicles) different than ATVs?
 - a. UTVs usually have a bench seat for passengers
 - b. ATVs usually have a (ROPS) rollover protective structure
 - c. It's more important to use a seat belt when operating an ATV
 - d. ATVs are more likely to be used as a work vehicle than UTVs
10. Which of the following statements is true about determining the correct size ATV?
 - a. There should be 1 inch of clearance between the seat and your inseam when standing on the foot pegs
 - b. Your upper leg should be approximately horizontal to the ground
 - c. Both elbows should be straight when leaning forward with hands on the handlebars
 - d. Your toes should be just short of the brakes

You can observe the behavior of students riding ATVs and notice their behavior and apparel. This is an option for areas where ATVs are used on a continual basis such as an ATV recreational park or in rural areas where ATVs frequent. A chart such as the one below will help categorize the information. Use these categories or determine your own. Conduct an observation before the lesson and again after the program. Compare the differences.

PROGRAM SUCCESS

The information from the tabulated pre and post surveys can be used to document success of the program.

Examples that might be used in press releases:

- ▶ Before the program _____% of the audience stated they wear a helmet when riding an ATV as compared to _____% after they participated in the program.
- ▶ Before the program _____% of the audience stated they allow passengers when riding an ATV as compared to _____% after they participated in the program.
- ▶ Before the program _____% of the audience

stated they ride their ATVs on paved roads as compared to _____% after they participated in the program.

- ▶ _____% of the participants indicated they would like to participate in ATV safety training.

How is this information useful?

- ▶ Use the information in local newspaper stories.
- ▶ Encourage additional educational programs on the topic by giving the feedback to school, youth group, or civic leaders.
- ▶ Seek out funding opportunities to expand the program.
- ▶ Release the information to local planning groups showing there is a need for training.
- ▶ Increase awareness to community residents that were not a part of the program.

	Helmet	Boots	Gloves	Long Pants	No Passengers	Safe Operation	Appears to be 16+	Big enough to operate
ATV 1								
ATV 2								
ATV 3								
ATV 4								
ATV 5								

ATV Behavior Survey

State _____ Gender Male Female

1. I live on a farm Yes No
2. I own an ATV Yes No (if yes, what size cc is it) _____
3. I ride an ATV Yes No (if yes, what size cc is it) _____
(if you answered no to question 3, stop here)
4. My use of an ATV is for
 Work Recreation Both work-related and recreation
5. I wear a proper ATV helmet when riding an ATV
 Always Most of the time Sometimes Never
 (if you marked an answer other than always on question 5, what was your reason for that answer)
 I don't think a helmet is necessary I don't have a helmet
 It's not cool to wear a helmet I didn't know I was supposed to wear a helmet
 Sometimes I forget I only wear a helmet if my parents are around
6. I allow passengers while operating an ATV
 Always Most of the time Sometimes Never
7. I ride as a passenger on an ATV
 Always Most of the time Sometimes Never
 (if you marked an answer other than never on question 6 or 7, what was your reason for that answer)
 I didn't know it was unsafe I don't want to appear to be unfriendly
 I think it is cool to ride double So none of us have to walk
8. I use an ATV that is the recommended size for me
 Always Most of the time Sometimes Never I don't know
9. I ride an ATV on paved surfaces.
 Always Most of the time Sometimes Never
10. I have participated in ATV safety training Yes No
 (if yes, was the training conducted by a certified ATV instructor)
 Yes No I don't know
 (if no, why have you not participated)
 I didn't know I was supposed to
 I don't think training is needed
 I didn't know where to attend
 I think it would be uncool to participate
11. Have you been injured in an ATV incident Yes No
 (if yes, where were you treated)
 I was treated at the doctor's office
 I was treated at the hospital
 I was treated at home

Lesson Plans

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ATV Trivia

Targeted Age: Middle school and above

Trivia questions and answers can be used many ways in an ATV safety program.

Here are a few ideas:

- ▶ Have each participant write down his or her responses and see who gets the most answers correct. This could be done as an opening activity or as a final assessment.
- ▶ Divide the group into teams and compete like a quiz bowl. Encourage group discussion or have each person take a turn at answering.
- ▶ Ask the questions sporadically during the program giving rewards such as candy for correct answers.
- ▶ Many of the answers are numerical. With these questions use a higher-lower response until the answer is correct.
- ▶ Using a tic-tac-toe format, compete with two participants, placing an X and O when each gives a correct answer. Like Hollywood Squares, nine people sitting in a square agreeing or disagreeing with responses will add excitement.

Answers to the questions may be updated as new information, technology, and statistics change. Add additional questions used within your specific program.

1. Q: What country first developed ATVs?
A: Japan
2. Q: What size ATV is recommended by for an age 13 youth?
A: Between 70cc and 90cc.
3. Q: At what age is a person considered an adult capable of riding an adult sized ATV?
A: 16
4. Q: What engine size is considered an adult sized ATV?
A: 90cc and more
5. Q: What percent of youth under the age of 16 injured on an ATV were operating a machine larger than recommended for them?
A: 97%
6. Q: What percent of ATV drivers have taken an organized training program from a certified instructor, dealer, or salesperson?
A: 7%
7. Q: ATV tires use (low or high) air pressure tires?
A: Low
8. Q: How many inches clearance should be between an ATV seat and your inseam while standing up on the footpegs?
A: 3 to 6 inches
9. Q: How much does a 500cc ATV weigh?
A: As much as 600 pounds
10. Q: What year were 3-wheelers taken out of production?
A: 1988
11. Add your own questions related to your specific program.

Funny or Dangerous?

Targeted Age: High school

Find videos of ATV crashes on the internet. This can be done by typing in "ATV crashes" in the search box. Choose 3 to 5 videos that show different situations, genders, age, and protective equipment used. Compare and contrast each video for the following factors by using one table for each video.

Video: _____

	Answer	How did this influence the safety of the operator?	What could have been done differently to improve safety?
Gender			
Age			
Passengers			
Personal Protective Equipment (PPE)			
Riding Surface			
Weather Conditions			
Other			
Other			

ATV Tires

Objective: Comprehend the unique characteristics of ATV tires and their capability to travel on rough terrains.

Targeted Age: Middle school and above

Materials:

- ▶ Round medium sized balloons
- ▶ Rigid driving surfaces (plywood, heavy cardboard, or corrugated plastic) that can be inclined to various degrees

The tires on ATVs are wide, bumpy, and designed to use low air pressure. This allows the tires to grip ground surfaces so the ATV can drive on areas where regular vehicles like cars and trucks cannot. This same surface gripping capability can cause problems if used on smooth surfaces like pavement. This activity involves water that may cause a mess if the balloons break. It might be wise to do the activity outside where water will not create a problem. If done inside, protect the floor with plastic.

Before the demonstration prepare two or more “road surfaces”. One should be rigid and smooth to represent pavement. The other surface(s) should be rough and uneven. This can be done by taping or gluing items (cut out cardboard, sand, rocks, crumpled paper, etc.) on cardboard. The cardboard itself could be bent to create “ravines” or “hills”.

Fill the balloons with various amounts of water from very little (half cup) to a lot (several cups until the balloon is taut). Tie each balloon securely. The least filled should be squishy and represents low pressure. The most filled will be very round and represent high pressure. Those in-between represent various degrees of pressure. Place each filled balloon on a flat surface. Ask students to observe the amount of surface of each balloon touching the surface. When the pressure is low there is more surface touching the “road surface”. Have the students estimate the percentage of touching surface of each balloon. As the balloon expands with more water the total surface area increases, but the surface area touching the “road” decreases.

Using the same amount of force with each balloon, gently roll each across the different road surfaces. Compare the road surfaces and the different balloons. The balloons with the most water should roll faster. Those with little water may not roll at all without pushing. Put each board on a slight incline by putting books under the end. Gently roll the filled balloons again. Repeat the demonstration again after increasing the incline by adding another book. Observe what happens.

(this activity is continued on the next page)

ATV Tires (continued)

Q: What do the balloons represent in this demonstration?

A: The balloons represent inflated ATV tires. The greater the amount of water added to the balloon represents increasing the pressure in the tire. Air, not water, is used in tires.

Q: How does pressure influence the direction and speed of “the tire”?

A: When more surface area touches where the object is rolling, it slows down the object. The less the object touches the road surface the faster it will go. It will also be more likely to go in a straight line. There is less surface to grab onto.

Q: Why are ATV and bicycle tires different and why?

A: Bicycle tires have very little surface area touching the road surface because the tires are built thin using high air pressure. This allows the bike to travel easily and fast. Mountain bikes have wider tires with deeper tread than racing bikes to be able to ride on more uneven surfaces. ATV tires are wider yet with lots of surface area touching with lower tire pressure. The ATV has power to travel up steep inclines and needs the surface area of wide, bumpy tires to grab onto surfaces.

Q: How did the objects on the “road surface” influence the balloons when they rolled?

A: The greater the amount of pressure (more water in the balloon) the more they bounce off objects. The lower pressure (less water in the balloon) the slower it goes and the more likely the balloon will go over objects. The low pressure balloons grab the “road” and objects instead of deflecting them. ATVs have a power source other than simply pushing the balloons with your hand which means an ATV can drive over raised surfaces.

Q: How does tire pressure influence the use of ATVs on smooth surfaces?

A: The low pressure rubber tires have a lot of surface touching the road surface. If the vehicle stops suddenly, the low pressure tires grab the road surface and can throw the operator off the vehicle. In addition, hard surface areas can cause more damage to the body than less rigid surfaces when it hits.

ATV Helmets

Objectives:

- ▶ Determine the consequences of not wearing an ATV helmet when operating an ATV.
- ▶ Recognize the characteristics of a helmet that protects the ATV operator's brain.

Targeted Age: Upper elementary and above

ATVs are used to ride over rough terrain and bumpy surfaces. The operator can be thrown off the vehicle quickly when it hits an uneven surface. Personal protective equipment (PPE) is important to prevent injuries if the ATV operator is thrown off or the ATV rolls over. The most important PPE is a properly fitted ATV helmet. Head injuries can be devastating and the brain needs protection.

ACTIVITY 1

Materials:

- ▶ Plastic brain mold – find this at a novelty store or online
(a 1/2 gallon ice cream container will also work)
- ▶ 8 ounces elbow macaroni
- ▶ 6 ounce package of gelatin
(your choice of color, but peach works great)
- ▶ Plastic sheet if conducting the activity inside

Cook macaroni in 6 cups of boiling water for 15 minutes or until soft. Drain, but do not rinse cooked macaroni. Spray the inside of the mold with cooking spray. Place cooked macaroni in brain mold. Prepare gelatin with 3 cups boiling water until gelatin dissolves. Pour over macaroni and place in refrigerator for several hours to set up. Unmold the "brain" by placing the bottom of the mold in hot water for a few seconds.

Discuss the size, shape, and fragile condition of the brain without the mold, making a correlation between the skull and the plastic gelatin mold. The average human brain weighs about three pounds which is close to what the molded "brain" weighs. Place a plastic sheet on the floor if working inside. If you can be outside, it's less messy to clean up afterwards. Standing on a ladder, drop the "brain" on the floor or from a balcony if outside. Estimate the distance of the fall comparing that to being thrown from an ATV. Observe the results of the falling "brain". Talk about the skull's importance to the brain and the importance of a helmet to protect the skull and brain.

Q: How fast might you be moving when riding an ATV? How does speed influence the impact of being thrown from a vehicle?

A: Depending on the size of an ATV, it can travel at road speeds (40 to 80 miles per hour). Most of the time ATVs travel at much slower speeds because they are moving up or down hills, over bumps, and around curves. Due to momentum, the faster a vehicle is moving the further an obstacle or person is thrown from the vehicle. The force of hitting a stationary object (road surface, tree, another vehicle, etc.) is directly proportional to speed.

Q: What other personal protective equipment (PPE) is needed when operating an ATV?

A: Although a helmet is the most important PPE, ATV operators should also wear long sleeved shirts, long pants, over-the-ankle boots, gloves, and goggles. Each PPE protects a different part of the body, with the brain being the most fragile.

(this activity is continued on the next page)

ATV Helmets (continued)

ACTIVITY 2

Materials:

- ▶ Raw eggs
- ▶ Resealable plastic bags
- ▶ Cushioning material such as bubble wrap
- ▶ Polystyrene foam container
- ▶ Packing tape
- ▶ ATV helmet with DOT or Snell seal

Place an uncooked egg in a plastic bag and close securely. Throw the egg in the air several times and eventually allow it to hit the ground. Compare the egg to a rider that is thrown from an ATV. It may not break when it's caught or tossed for a short distance and carefully caught. This represents humans riding an ATV and moving in the seat while riding over rough terrain. When the egg hits a hard surface it will break.

Place another uncooked egg in another bag. Wrap this bag with several layers of bubble wrap and securely tape inside a foam box. Seal the box with tape. Throw the box around in the same manner as before with the egg in the bag, becoming more boisterous with each throw, eventually allowing the box to hit the floor. Open up the box and check the egg. If wrapped correctly, the egg should be intact. You may want to practice ahead of time so you are using the correct amount of wrapping material required to protect the egg.

Show an actual ATV helmet and point out the padding within the outside shell. Point out the DOT (Department of Transportation) or Snell seal indicating the helmet meets standards for protection. Snell standards are more stringent than DOT. Point out other features of the helmet (face guard, chin strap, etc.).

Q: Are all helmets made the same?

A: There are different types of helmets for different forms of transportation. Examples include: equestrian, bicycle, and motorcycle helmets. Each one has its own requirements based on speed and size of the transportation mode.

Q: What's the purpose of the face shield on an ATV helmet?

A: Like the brain, your face contains very important items such as eyes, nose, and mouth. If thrown from an ATV, your head and face are often the first items to impact. The face guard provides additional protection to these crucial areas of the head.

Q: How do you determine the right sized ATV helmet?

A: ATV helmets should fit snugly and be stable when you shake your head from side-to-side or front-to-back. Try on several at the store. There is much padding within the helmet for protection purposes and there should be some resistance when pulling it over your head. Bigger is not necessarily better. A loose fitting helmet can be dangerous, fly off the head, and be noisy due to increased wind resistance.

Center of Gravity

Objective: Determine the relationship among center of gravity, weight distribution, and tendency of an ATV overturn.

Targeted Age: Middle school and above

Materials:

- ▶ Corrugated cardboard
- ▶ Scissors
- ▶ String (3 to 6 feet)
- ▶ Tacks
- ▶ Ruler
- ▶ Bulletin board or rigid foam core
- ▶ Pencils with erasers
- ▶ Tape

ATVs are often used on the farm to transport heavy and bulky items from one location to another. ATVs are great work horses and make many farm chores easier. The problem with hauling items on an ATV is the extra weight alters the center of gravity (COG) of the machine. When the COG is altered the ATV is less stable and more likely to tip over if the operator does not take this shift into account when driving. Gravity is the pulling force between two objects due to their masses. COG is the balance point of the object.

Copy and glue the ATV picture, buckets, hay bales, and riders onto cardboard. Cut them out. Tie each end of the string to a tack. Tack the top of the string into a bulletin board. Attach the second tack into anywhere on the ATV cutout. Allow the ATV to pivot freely. When the cutout stops moving, line the ruler up with the string and draw a line across the entire ATV cutout. Remove the tack from the cardboard and place it in a different location on the ATV cutout. Repeat the line drawing. Where the two lines intersect is the Center of Gravity. Mark this point COG 1. Check out the accuracy of the COG by finding the place on the cutout where you can balance the object on the eraser end of the pencil. The intersecting point and the pencil eraser point should be the same place.

Tape the driver to the ATV. Repeat the COG identification as before. Add objects (buckets, hay bales, and extra riders) one at a time and repeat the COG identification. Mark each COG with appropriate labels such as COG rider, COG hay, etc.

Compare the COGs. Notice the COG changes as the weight distribution changes. Discuss the extra weight of each object and how this weight changes the COG. Discuss how this change influences the stability of the ATV. Allow students to try various weights and positions to determine the changes in COG.

Q: How does a rider on an ATV put both the rider and operator at risk?

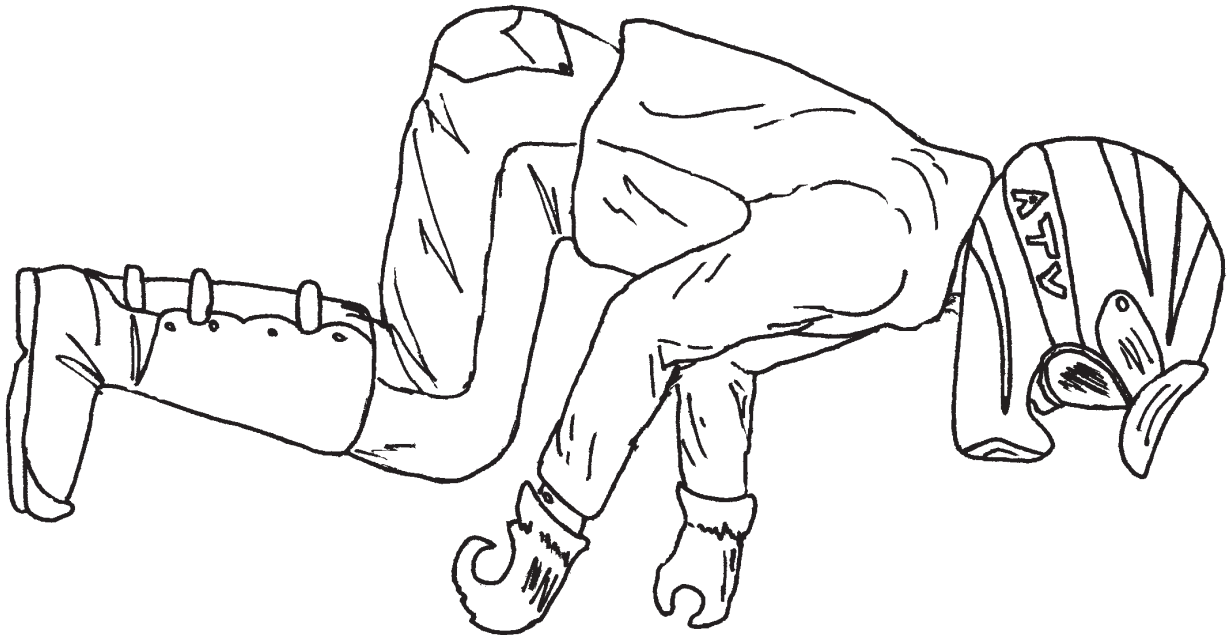
A: A person on the back of an ATV shifts the center of gravity up and backwards while the COG of a single operator is low and in the middle of the machine. When this happens the ATV is more likely to overturn, putting both the operator and passenger at risk of turning over. ATVs weigh more than the operator and injuries can take place when it overturns. The operator and passenger could be thrown off the vehicle or caught underneath.

Q: What is the correlation between weight and center of gravity?

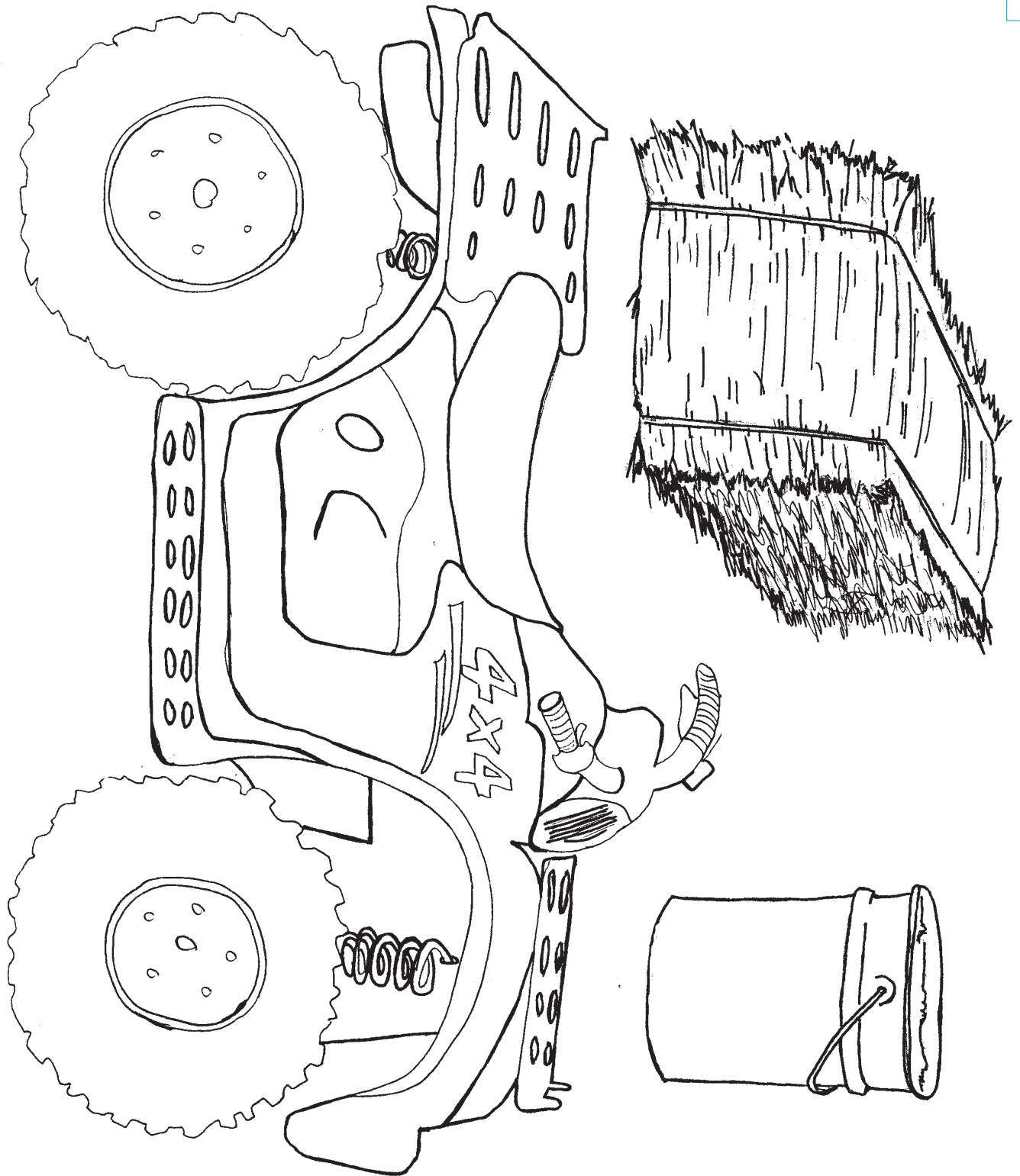
A: An ATV is most stable when the COG is low and most centered. When people or other objects are added to the ATV the center of gravity moves toward the extra weight. This makes the machine less stable.

(resources on next 2 pages)

Center of Gravity (resources)



Center of Gravity (resources)



Puzzles

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ATV Mixer

Find someone else in the room that fits the statement. Each person can only sign your sheet once. The winner is the first person to fill their sheet either up and down, across, or diagonal like BINGO.

Has refused to allow a passenger to ride an ATV	Only rides an ATV on off road surfaces	Uses an ATV to do farm chores	Has more than one ATV at home	Has never driven an ATV
Knows what ATV stands for	Has a younger brother or sister that drives an ATV	Has a grandparent that drives an ATV	Has raced using an ATV	Rode an ATV before the age of 16
Subscribes to an ATV magazine	Lives on a farm	FREE SPACE	Checks tire pressure before riding an ATV	Owner of an ATV helmet
Family owns a red ATV	Has participated in an ATV safety class	Has taught a session on ATV safety	Has read a magazine or newspaper article about an ATV fatality	Always wears gloves when riding an ATV
Has ridden a 3-wheeler	Has a dog that likes to ride the ATV	Has never done a wheelie while riding an ATV	Knows someone who has been hurt on an ATV	Owner of an ATV

Safety Secret Code 1

Decode the secret messages to find out how to stay safe while around ATVs.

☺	A
▲	B
▼	C
Ω	D
Π	E
&	F

■	G
e	H
○	I
☀	J
◼	K
□	L

🎵	M
—	N
@	O
♣	P
∂	Q
◆	R

◇	S
♥	T
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♠	V
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Safety Secret Code 2

Decode the secret messages to find out how to stay safe while around ATVs.

😊	A
▲	B
▼	C
Ω	D
Π	E
&	F

■	G
e	H
○	I
☀	J
◼	K
□	L

🎵	M
—	N
@	O
♣	P
∂	Q
◆	R

◇	S
♥	T
¥	U
♠	V
△	W
⊙	X

+	Y
#	Z

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😊— 😊♥♠ ▲@Ω+ ΔΠ○■e♥

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ATV Match Up

While driving an ATV situations arise where you often need to make quick decisions. The right decision can make the difference between safety and a deadly incident. Match up the encountered problem with the best solution to rectify the situation.

Additional Activity:

Within each problem set, identify which solution has the potential to be the most dangerous.

Problem Set 1	Solution
___ 1. Shifting is not smooth or consistent	A. Lean your upper body further into the turn.
___ 2. ATV leans to one side	B. Move foot clear of the shift pedal after each shift. Release the throttle before each shift.
___ 3. Front wheels plow straight ahead when you turn the handlebars	C. Put weight on outside footrest as you turn the bars. Put more body weight up front and use more effort to turn the handlebars.
___ 4. ATV turns wide	D. Slow down. Look around the turn.

Problem Set 2	Solution
___ 1. Not stopping where intended	A. Swing wider as you go around the marker, and shift your weight more. Use a short burst of throttle, but don't reduce weight on the front end.
___ 2. Run over markers as you try to go around them	B. Begin to slow down earlier.
___ 3. Inside wheel lifts	C. Release brakes and then immediately reapply brakes gradually.
___ 4. Wheels lock, creating a slide	D. Lean upper body into the turn more.

(this activity is continued on the next page)

ATV Match Up (continued)

Problem Set 3	Solution
___ 1. Front wheels lift as you climb a hill	A. Pull up on the handlebars and apply a small amount of throttle as the front wheels meet the obstacle. Release the throttle as soon as the front wheel has gone over the obstacle.
___ 2. Front wheels push an obstacle rather than crossing over it	B. Lean into the hill more. Move off the seat towards the uphill side. Place your weight on the uphill footrest.
___ 3. Rear wheels hit the obstacle with excessive impact	C. Lean forward slightly once the front wheels have gone over the obstacle in order to reduce weight on the rear wheels. The throttle must be released before the rear wheels hit the obstacle.
___ 4. ATV tips as you traverse the hill or turn	D. Lean forward more: move way up on the seat or stand and position your torso over the front wheels. Don't accelerate as quickly up the slope.

Problem Set 4	Solution
___ 1. ATV loses momentum while going up a hill	A. Apply less front brake pressure.
___ 2. ATV swerves to one side	B. Center your body on the ATV.
___ 3. Front end slides or skids	C. Apply less rear brake pressure. Shift to a lower gear more smoothly.
___ 4. Rear end slides or skids	D. Approach at a higher speed. Don't let the ATV roll backwards.

Problem Set 5	Solution
___ 1. Excessive jarring as front wheels encounter bumps on the descent	A. Place weight on the downhill footrest. While encountering bumps on the descent keeping your body leaning to the uphill side.
___ 2. ATV descends too quickly	B. Maintain smooth braking. Be sure you are in gear and the transmission is engaged. Do not apply the throttle.
___ 3. Rear end slides downhill	C. Shift more weight to the rear. Descend more slowly.
___ 4. ATV rolls backwards while you are on it	D. Use the front brake only. Move your body weight forward. If front brake does not slow the ATV, dismount to the side immediately.

Chore Puzzle

John and two of his friends have to meet the team bus in 45 minutes for a football game. John's Dad told him earlier to get 3 chores done before he can leave for the game. His friends pitch in to help so they can make the bus. They all wanted to use the ATV, but there was only one. They drew straws to determine which chore they will use and what mode of transportation will be their assignment.

Use the clues listed below to find out who did what and how they traveled.

Clue 1: The person who fed the cattle walked

Clue 2: The person who sprayed the weeds did not use the bike

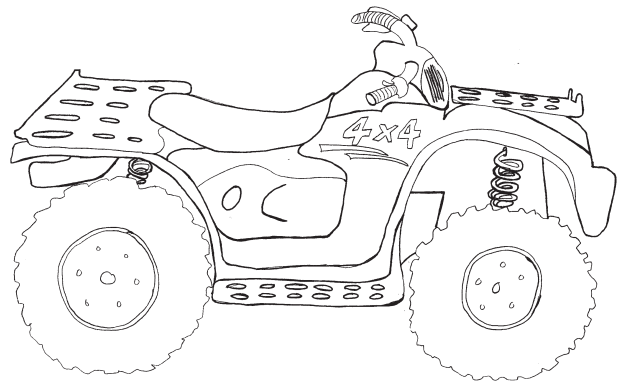
Clue 3: Sam used the bike

Clue 4: John did not feed the cattle

	Check the fence	Spray weeds	Feed cattle	4-wheeler	Walk	Bike
John						
Bill						
Sam						

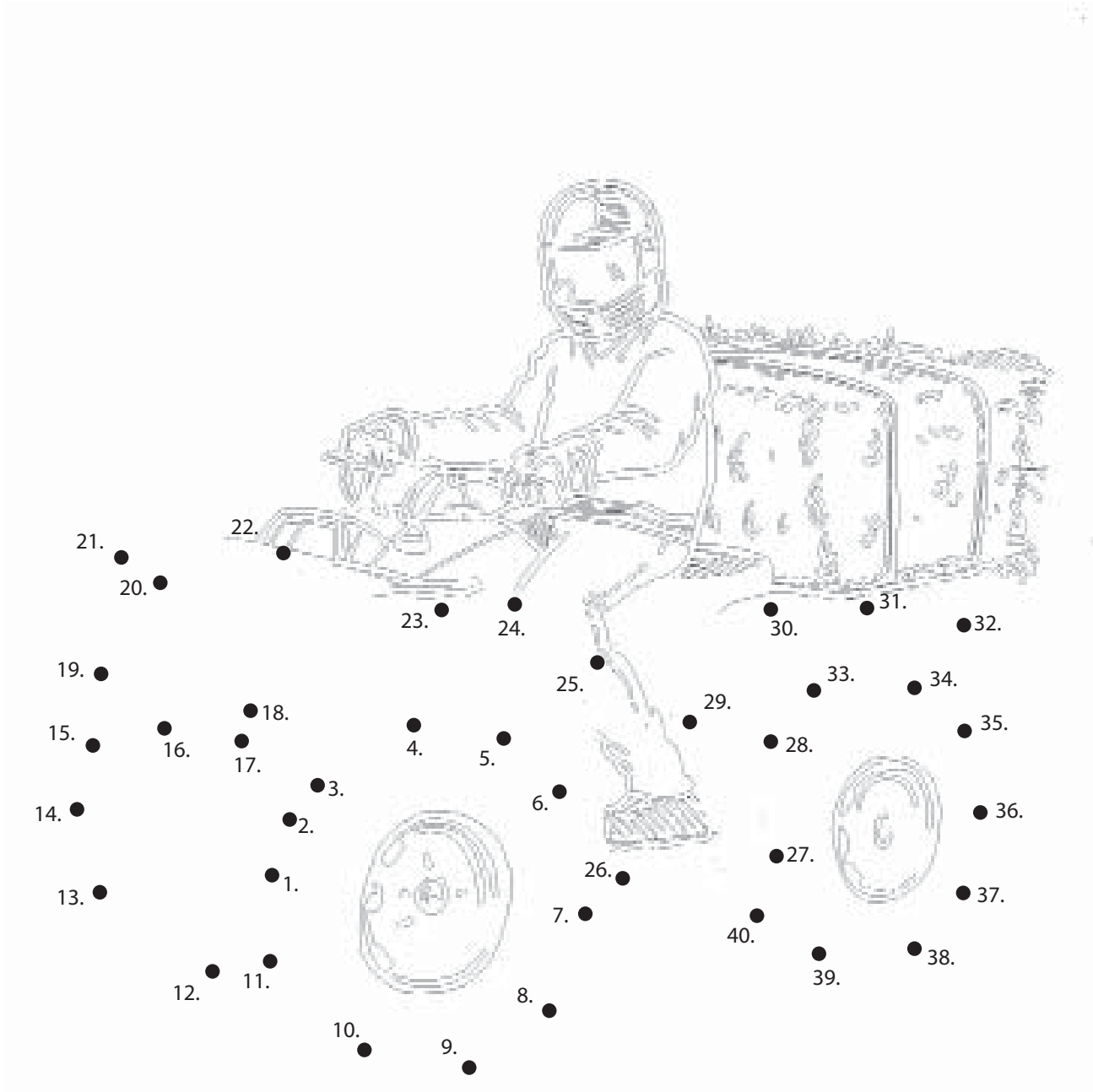
Who got to use the ATV?

What chore did that person have to do?



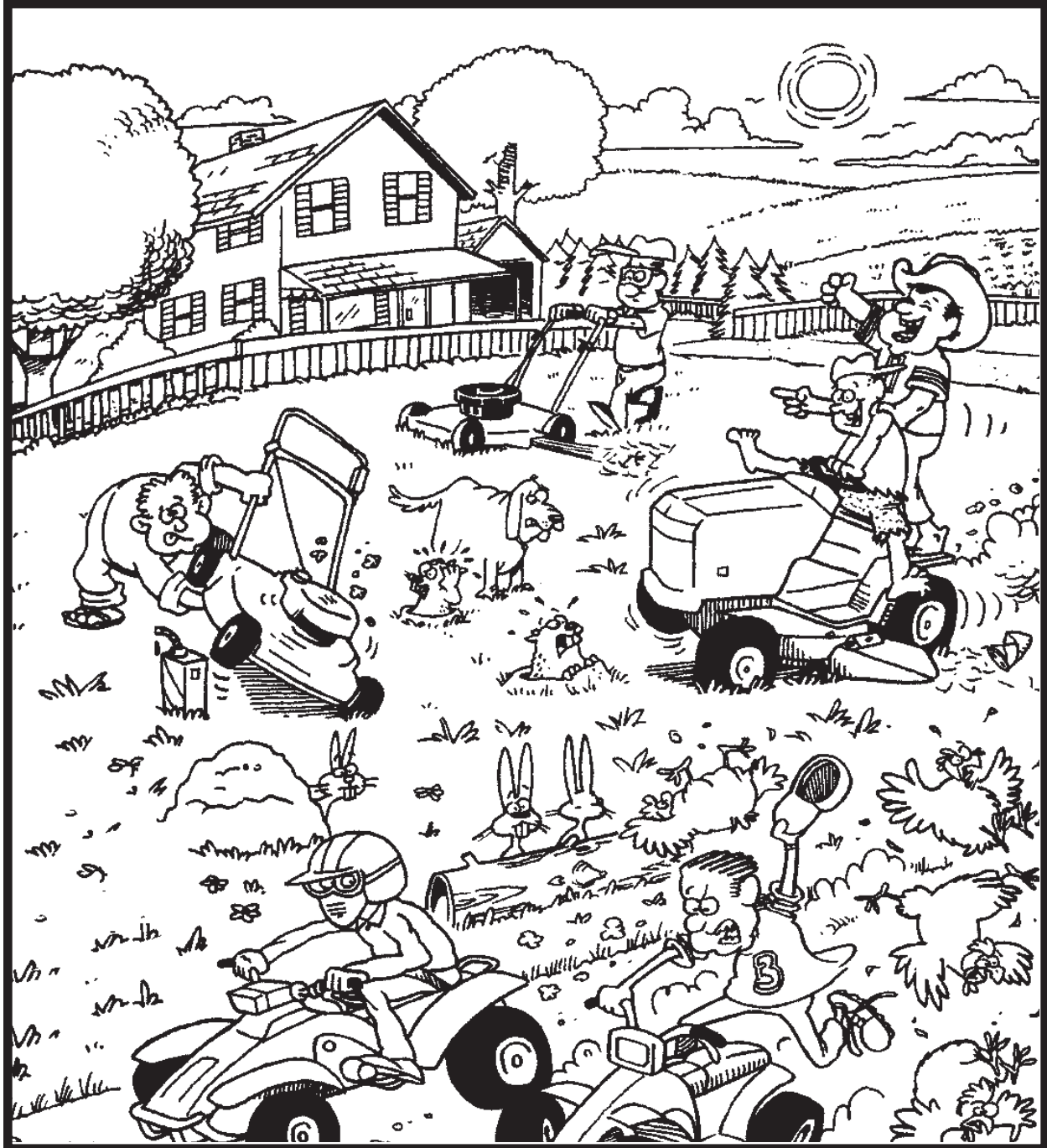
Dots to Dots

Most ATVs are too big and powerful for children to ride. If you have an older brother or sister, you can help them stay safe by reminding them to wear proper protective gear. Draw a line between the numbers to finish the picture.



Find and Seek

An ATV can be a great way to get from one place to another on the farm if ridden safely. There are some hazards you might run into while riding your ATV on the farm. See how many you can find within this farm scene.



Line 'Em Up

An ATV can carry more than just a person. It can be used to move objects from one place to another. That's one of the main reasons ATVs are used on the farm.

Unscramble the following farm items that are hauled on ATVs.

EEDF _____

AYH _____

RWATS _____

CALSICHEM _____

NIGRA _____

RNOCEDES (2 words) _____

TWARE _____

NUMAER _____

CENFNGI _____

REIW _____

LESPO _____

NHCLU _____

In the News

Using the news clippings on the next page, or those that you find, answer these questions. If the article does not answer a specific question, answer with Not Applicable (N/A).

Article: _____

	Answer	Consequence What happened due to this factor?	Prevention Strategy How could it have been prevented?
Age			
ATV Size			
Extra Riders			
Personal Protective Equipment (PPE)			
Proper Training or Supervision			
Riding Surface			
Weather Conditions			
Other Factors			

(resources on next page)

In the News (resources)

LHS girl killed in ATV accident

Madison Young, 15, of Monroe, was traveling with a second girl, Katie Kennedy, also 15, on an ATV along Mt. Ena Church Road Sunday afternoon. According to the Georgia State Patrol, the ATV entered a curve and lost control, running off the road and hitting an embankment around 1:12 p.m. Young was reportedly thrown from the vehicle and collided with a tree and was seriously injured when emergency workers arrived. She was lifeflighted to Children's Healthcare of Atlanta, where she was pronounced dead later that afternoon.

Kennedy is reportedly still in the hospital due to injuries from the incident.

The incident is still under investigation, and it is not yet known which girl was driving the ATV.

Speed, inexperience cited in Newport ATV crash

NEWPORT, Maine — The Maine Warden Service has determined that speed and driver inexperience were the key factors in an all-terrain vehicle accident that seriously injured a 16-year-old Canaan boy over the weekend, a spokeswoman for the service said Tuesday. The youth, whose name is being withheld because he is a minor, remained in critical condition and in a drug-induced coma Tuesday at Eastern Maine Medical Center in Bangor, said Edie Smith of the Maine Department of Inland Fisheries and Wildlife.

The boy suffered "severe head trauma" when the ATV he was driving crashed on Murray Road in Newport on Sunday afternoon, according to a DIF&W press release.

Smith said Sgt. Chris Cloutier and Warden Troy Dauphinee of the Maine Warden Service reconstructed the accident and determined that the boy was going too fast around a curve.

A second driver in another ATV, a relative of the youth, attempted to warn him to slow down before entering the curve.

The boy, who was not wearing a helmet, was transported via Sebecook Ambulance to the Bangor hospital. His ATV crashed through the woods and landed on its side.

Six teens hurt in ATV crash

MALLORYTOWN LANDING — Six teens were injured Sunday night when the all-terrain vehicle they were riding crashed into a tree near here, provincial police said Monday. Two of the victims were taken to Brockville General Hospital with non-life-threatening injuries, while the other four suffered cuts and bruises, said Ontario Provincial Police Const. Sandra Barr.

Police were still investigating the incident Monday morning and few details were available.

The Gator-type ATV was carrying all six of the young people on Old River Road West, near Pools Resort Road, around 7 p.m. when the vehicle apparently hit a tree, said Barr.

She was not sure whether charges were pending, adding this depended in part on whether the vehicle was riding on private or public property.

Answer Key

Safety Secret Code 1

All controls should be within reach of the driver. Training is important before attempting to ride an ATV.

Safety Secret Code 2

There is no safe place for an extra rider on an ATV. Body weight impacts an ATV driver's capability to operate the machine safely.

ATV Match Up

- | | | | | |
|-----------------|-------|-------|-------|-------|
| ▶ Problem Set 1 | 1 - B | 2 - A | 3 - C | 4 - D |
| ▶ Problem Set 2 | 1 - B | 2 - A | 3 - D | 4 - C |
| ▶ Problem Set 3 | 1 - D | 2 - A | 3 - C | 4 - B |
| ▶ Problem Set 4 | 1 - D | 2 - B | 3 - A | 4 - C |
| ▶ Problem Set 5 | 1 - C | 2 - B | 3 - A | 4 - D |

Chore Puzzle

- ▶ John
- ▶ Spray Weeds

Find and Seek

- ▶ Lack of PPE
- ▶ ATV extra rider
- ▶ Crazy operation of ATV
- ▶ Reaching under the lawn mower
- ▶ Animals in front of ATV

Line 'Em Up

- ▶ Feed
- ▶ Hay
- ▶ Straw
- ▶ Chemicals
- ▶ Grain
- ▶ Seed corn
- ▶ Water
- ▶ Manure
- ▶ Fencing
- ▶ Wire
- ▶ Poles
- ▶ Lunch