Note to Counselor
Artificial Intelligence (AI) Merit Badge

The Artificial Intelligence merit badge introduces Scouts to the world of AI. As they work on the requirements for the AI merit badge, Scouts will explore the fundamental concepts of AI, different types of AI, and how it is used in everyday life.

A critical part of the badge will be a discussion of the ethical implications of AI. Topics include data privacy, the potential for bias in AI systems, and the impact of AI on jobs and society. The idea is to encourage Scouts to think critically about the technology's role in the world and their responsibilities as digital citizens.

Scouts will also be asked to investigate career opportunities in AI and related fields. This will involve researching the education, training, and skills required for such professions.

There is no pamphlet for this merit badge, by design. The badge works with the Scoutly AI chatbot, giving Scouts real experience with AI tools. More information on Scoutly here.

The digital resources do not replace the need for a real-life, human merit badge counselor. Encourage Scouts to interact with the Scoutly chatbot as a part of their learning journey, but remind them that Scoutly does not replace your role in evaluating understanding and completion. Reinforce the importance of discussing what they've learned–not just completing tasks. Ask open-ended questions to assess comprehension and reflection. Be flexible with examples. Scouts may draw from personal experiences, school, hobbies, or community observations to fulfill requirements.

How does Scoutly work?

Scoutly is an AI tool or digital helper trained only on official Scouting America documents. Anyone who's ever searched the internet for information knows there's a risk of getting outdated or even outright false information. Scoutly has access to all of the organization's data on merit badges, meaning it can provide detailed guidance on the requirements and other information in the merit badge pamphlets. As an AI tool, it is always learning. More official Scouting America publications are added to its knowledge base each week. Scoutly does best when it is asked clear questions. As currently configured, each question is new; it does not remember the previous questions or learn a skill. It cannot provide images.

How to ask Scoutly questions

To ask Scoutly a question about a requirement, it's important to be specific. If you ask the same question a couple times in a row, don't be surprised that the answer will change. The chatbot is a computer program that generates responses probabilistically, meaning it does not pick *the* single "correct" next word, but one of several likely options. There can be random variations with the same prompt which can lead to different phrasing, structure, or even examples. Some questions may have more than one good answer, so it picks one of several options. Check all answers for correctness.

A Scout can try various questions to see how specific the question needs to be. It may be helpful to include the name of the merit badge in the question. Sometimes using a fresh web browser helps.

Try these questions, all about knots:

- What is a knot?
- How are knots used in Scouting?
- How do I tie a knot?
- How do I tie a square knot?
- What is a good knot to lash two poles together?
- How do I teach someone a square knot?
- Tell me an interesting fact about knots.
- What merit badge uses knots?

AI Basics: The *AI or Not?* Game

In the AI or Not? Game in requirement 2, Scouts are asked to determine if the presented scenario uses AI. Some example scenarios are listed below, with possible discussion points.

Scenario 1: Basic Calculator. A basic calculator performing mathematical operations.

Answer: Not AI
Explanation: This is simple automation following pre-programmed rules.
Discuss: The difference between automation and AI, understanding fixed rules versus learning and recognizing basic computation.
Follow-up discussion questions:

1. What makes this different from AI?
2. Could this become AI? How?
3. What would need to change?

Scenario 2: Smart Chess Program. A chess program that improves its strategy by analyzing past games.

Answer: AI
Explanation: The program learns and adapts from experience.
Discuss: Understanding machine learning, recognition of pattern analysis, and the concept of improvement through experience.
Scout connection: Chess merit badge.
Follow-up discussion questions:

1. How does the program learn?
2. What data does it use?
3. How is this different from a basic calculator?

Scenario 3: Weather Prediction App. A smartphone app that predicts weather patterns and adjusts forecasts based on actual outcomes.

Answer: AI
Explanation: The system learns from past predictions and actual weather patterns to improve future forecasts.
Discuss: Predictive analytics, data pattern recognition, and continuous learning systems.
Scout connection: Weather prediction for outdoor activities and camping.
Follow-up discussion questions:

1. How does weather prediction help in Scout activities?
2. What data does the system use?
3. How does it improve over time?

Scenario 4: Digital Alarm Clock. A basic digital alarm clock that goes off at set times.

Answer: Not AI
Explanation: Simple time-based trigger without learning or adaptation.
Discuss: The difference between programming and AI, understanding automated systems, recognition of simple triggers.
Scout connection: Camp schedule management.
Follow-up discussion questions:

1. What would make this alarm clock "smart"?
2. How is this different from a smart home system?
3. What features would add AI capabilities?

Scenario 5: Music Recommendation System. A streaming service that suggests songs based on listening history.

Answer: AI

Explanation: Uses machine learning to understand preferences and make personal recommendations.

Discuss: Pattern recognition in user behavior, personalization algorithms, content recommendation systems.

Scout connection: Music merit badge.

Follow-up discussion questions:

1. How does the system learn your preferences?
2. What patterns might it identify?
3. How could this technology help in other areas?

Scenario 6: Traffic Light Timer. A traffic light that changes at fixed intervals.

Answer: Not AI

Explanation: Operates on predetermined timing without adaptation.

Discuss: Fixed automation vs. adaptive systems, understanding basic programming, recognition of scheduled tasks.

Scout connection: Traffic Safety merit badge.

Follow-up discussion questions:

1. What would make this traffic light "smart"?
2. How could AI improve traffic flow?
3. What sensors would be needed?

Scenario 7: Smart Traffic Management. Traffic lights that adjust timing based on current traffic patterns

Answer: AI

Explanation: System learns and adapts to traffic patterns in real-time.

Discuss: Real-time data analysis, adaptive systems, pattern recognition.

Scout connection: Traffic Safety merit badge.

Follow-up discussion questions:

1. How does this improve traffic flow?
2. What data does it collect?
3. How does it handle special events?

Scenario 8: Automatic Door. A store door that opens when someone approaches

Answer: Not AI

Explanation: Simple motion sensor trigger without learning capability.

Discuss: Basic automation, sensor technology, trigger-response systems.

Scout connection: Engineering merit badge.

Follow-up discussion questions:

1. What sensors does it use?
2. How is this different from AI?
3. What would make it "smart"?

Scenario 9: Smart Home Security. A security system that learns household patterns and alerts for unusual activity

Answer: AI
Explanation: System learns normal patterns and identifies anomalies.
Discuss: Pattern recognition, anomaly detection, adaptive learning.
Scout connection: Crime Prevention merit badge.
Follow-up discussion questions:

1. What patterns might it learn?
2. How does it identify "unusual" activity?
3. What privacy concerns exist?

Scenario 10: Automated Sprinkler System. Lawn sprinklers that turn on at scheduled times.

Answer: Not AI
Explanation: Simple timer-based automation without adaptation
Discuss: Scheduled automation, basic programming, time-based triggers.
Scout connection: Gardening merit badge.
Follow-up discussion questions:

1. How could this system be improved?
2. What would make it "smart"?
3. How could it be more efficient?

Scenario 11: Smart Irrigation System. Sprinklers that adjust watering based on soil moisture, weather forecasts, and plant needs.

Answer: AI
Explanation: System learns optimal watering patterns using multiple data sources.
Discuss: Multi-factor decision making, environmental adaptation, resource optimization.
Scout connection: Environmental Science merit badge.
Follow-up discussion questions:

1. What factors influence its decisions?
2. How does it save water?
3. What sensors does it use?

Scenario 12: Vending Machine. A basic vending machine that dispenses items when money is inserted.

Answer: Not AI
Explanation: Simple input-output machine without learning capability.
Discuss: Basic automation, input-output systems, mechanical responses.
Scout connection: American Business merit badge.
Follow-up discussion questions:

1. How does it verify payment?
2. What would make it "smart"?
3. How could AI improve it?

Scenario 13: Language Translation App. An app that translates between languages and improves with user corrections.

Answer: AI
Explanation: System learns from user feedback and context to improve translations.
Discuss: Language processing, learning from feedback, context understanding.
Scout connection: American Cultures merit badge.
Follow-up discussion questions:

1. How does it handle new phrases?
2. What makes translations accurate?
3. How does it learn from corrections?

Scenario 14: Digital Thermostat. A thermostat that maintains a set temperature.

Answer: Not AI
Explanation: Simple temperature control without learning or adaptation.
Discuss: Temperature sensors, basic control systems, fixed responses.
Scout connection: Home energy management.
Follow-up discussion questions:

1. How does it maintain temperature?
2. What would make it "smart"?
3. How could AI improve efficiency?

Scenario 15: Homework Helper. An app that solves math problems by following fixed formulas.

Answer: Not AI
Explanation: Uses programmed rules without understanding or adaptation
Discuss: Algorithm vs. AI, rule-based systems, fixed problem-solving.
Scout connection: Scholarship merit badge.
Follow-up discussion questions:

1. How does it solve problems?
2. What are its limitations?
3. How could AI improve it?

Scenario 16: Smart Study Tutor. An educational app that adapts to student learning patterns and adjusts teaching methods.

Answer: AI
Explanation: System learns from student responses and adjusts teaching approach.
Discuss: Adaptive learning, personalization, educational assessment.
Scout connection: Scholarship merit badge.
Follow-up discussion questions:

1. How does it identify learning styles?
2. What patterns does it recognize?
3. How does it adjust methods?

Scenario 17: Automatic Hand Dryer. A bathroom hand dryer that activates when hands are present

Answer: Not AI
Explanation: Simple sensor-triggered response without learning.
Discuss: Sensor technology, basic automation, trigger-response systems.
Scout connection: Engineering merit badge.
Follow-up discussion questions:

1. What type of sensor does it use?
2. How is this different from AI?
3. What would make it "smart"?

Scenario 18: Smart Energy Monitor. A home system that learns energy usage patterns and suggests optimizations.

Answer: AI
Explanation: System analyzes patterns and provides adaptive recommendations.
Discuss: Pattern analysis, predictive modeling, resource optimization.
Scout connection: Energy merit badge
Follow-up discussion questions:

1. What patterns does it analyze?
2. How does it make recommendations?
3. How does this save energy?

Scenario 19: Automated Manufacturing Line. A factory line that assembles products in a fixed sequence.

Answer: Not AI
Explanation: Programmed sequence of actions without adaptation
Discuss: Industrial automation, sequential operations, fixed programming.
Scout connection: Engineering merit badge.
Follow-up discussion questions:

1. How is the sequence programmed?
2. What would make it "smart"?
3. How could AI improve it?

Scenario 20: Quality Control System. A manufacturing system that learns to identify defects from examples.

Answer: AI
Explanation: System learns to recognize and classify defects through training.
Discuss: Visual recognition, quality assessment, learning from examples.
Scout connection: Engineering merit badge.
Follow-up discussion questions:

1. How does it learn to identify defects?
2. What makes it more reliable than humans?
3. How does it handle new types of defects?

Ethics in AI: The *What Would You Do?* Game

In requirement 5, Scouts research ethical concerns and responsible uses of AI, including bias, privacy, and AI decision making. The *What Would You Do?* game explores ethical decision-making scenarios. Below are example scenarios:

Scenario 1: School Admissions. An AI system is making decisions about which students get into a school program by using AI to review student applications.

Key considerations:

1. Data inputs:
    a. Grades
    b. Test scores
    c. Extracurricular activities
2. Demographics
    a. Potential biases:
    b. Historical data bias
    c. Demographic bias
    d. Geographic bias
3. Human oversight:
    a. Review processes
    b. Appeal mechanisms
    c. Regular audits.

Scout Law connections:

1. Trustworthy: Ensuring transparent processes
2. Kind: Considering individual circumstances

Discussion questions:

1. How can we ensure the system is fair?
2. What role should humans play?
3. How does this relate to Scout values?

Scenario 2: AI Healthcare Assistant. A hospital is implementing an AI system to prioritize emergency room patients using vital signs and symptoms to recommend treatment order.

Key Considerations:

1. Data Inputs:
    a. Patient vital signs
    b. Reported symptoms
    c. Medical history
    d. Age and risk factors
2. Potential Issues:
    a. Life-or-death decisions
    b. System errors or biases
    c. Override procedures
    d. Responsibility allocation
3. Stakeholder Impact:
    a. Patients
    b. Medical staff
    c. Hospital administration
    d. Emergency responder

Scout Law Connections:

1. Helpful: Ensuring proper care for all
2. Courteous: Respecting patient needs
3. Kind: Considering individual circumstances
4. Brave: Making difficult decisions

Discussion Questions:

1. Who is responsible if the system makes a mistake?
2. How should human judgment be incorporated?
3. What backup systems should be in place?

Scenario 3: AI in Law Enforcement. Police department is using AI to predict high-crime areas by analyzing historical crime data to allocate patrol resources.

Key Considerations:

1. Data Analysis:
    a. Historical crime statistics
    b. Demographic information
    c. Socioeconomic factors
    d. Time and location patterns
2. Ethical Concerns:
    a. Racial bias
    b. Community impact
    c. Privacy rights
    d. Resource allocation
3. Implementation Challenges:
    a. Officer training
    b. Community trust
    c. System transparency
    d. Accountability measures

Scout Law Connections:

1. Trustworthy: Maintaining public trust
2. Loyal: Serving all communities fairly
3. Helpful: Protecting public safety
4. Brave: Addressing difficult issues

Discussion Questions:

1. How can we ensure fair treatment of all communities?
2. What oversight should be in place?
3. How should this data be used responsibly?
4. What role does human judgment play?

Scenario 4: Educational Assessment AI. School system implementing AI to grade essays and assignment by using AI to evaluate writing quality, content, and creativity.

Key Considerations:

1. Assessment Criteria:
    a. Writing mechanics
    b. Content understanding
    c. Creativity measures
    d. Learning objectives

2. Potential Challenges:
    a. Subjective evaluation
    b. Cultural sensitivity
    c. Language differences
    d. Creative expression
3. Student Impact:
    a. Learning motivation
    b. Fair assessment
    c. Feedback quality
    d. Educational growth

Scout Law Connections:

1. Trustworthy: Ensuring fair evaluation
2. Helpful: Supporting learning
3. Kind: Considering individual needs

Discussion Questions:

1. How can creativity be fairly assessed?
2. What appeals process should exist?
3. How should cultural differences be handled?
4. What role should human teachers play?

Scenario 5: Environmental Monitoring. AI system making decisions about resource usage and environmental protection by controlling water usage, energy consumption, and waste management

Key Considerations:

1. Resource Management:
    a. Water allocation
    b. Energy distribution
    c. Waste handling
    d. Conservation goals
2. Competing Needs:
    a. Environmental protection
    b. Community needs
    c. Economic interests
    d. Long-term sustainability
3. Impact Assessment:
    a. Environmental effects
    b. Community access
    c. Economic consequences
    d. Future generations

Scout Law Connections:

a. Thrifty: Conserving resources
b. Clean: Protecting environment
c. Helpful: Supporting community needs

Discussion Questions:

a. How should different needs be balanced?
b. What priorities should guide decisions?
c. How can fairness be ensured?
d. What role does conservation play?

Scenario 6: Social Media Content Moderation. AI system moderates online content for youth platforms by filtering inappropriate content and monitoring interactions.

Key Considerations:

1. Content Evaluation:
    a. Age appropriateness
    b. Cultural sensitivity
    c. Context understanding
    d. Safety concerns
2. Protection Measures:
    a. User safety
    b. Privacy protection
    c. Bullying prevention
    d. Information security
3. Implementation Challenges:
    a. False positives/negatives
    b. Context interpretation
    c. Freedom of expression
    d. Community standards

Scout Law Connections:

1. Clean: Maintaining appropriate content
2. Courteous: Preventing harassment
3. Friendly: Supporting positive interaction
4. Brave: Addressing harmful content

Discussion Questions:

1. How strict should filtering be?
2. What appeals process is needed?
3. How should context be considered?
4. What role do human moderators play?

Scenario 7: Transportation Safety. AI system controlling autonomous vehicles making split-second decisions in potential accident scenarios.

Key Considerations:

1. Safety Priorities:
    a. Passenger protection
    b. Pedestrian safety
    c. Property protection
    d. Emergency response
2. Decision Factors:
    a. Risk assessment
    b. Damage minimization
    c. Legal requirements
    d. Ethical guidelines
3. Responsibility Issues:
    a. Decision accountability
    b. Insurance implications
    c. Legal liability
    d. Moral responsibility

Scout Law Connections:

1. Trustworthy: Ensuring safety
2. Helpful: Protecting others
3. Brave: Making difficult choices
4. Loyal: Prioritizing human life

Discussion Questions:

1. How should priorities be programmed?
2. Who is responsible for decisions?
3. What safety measures are needed?
4. How should risks be balanced?

Scenario 8: Financial Services. AI system approving or denying loan applications by evaluating creditworthiness and financial risk.

Key Considerations:

1. Assessment Criteria:
    a. Credit history
    b. Income stability
    c. Debt ratios
    d. Financial patterns
2. Fairness Issues:
    a. Economic equality
    b. Access to credit
    c. Historical bias
    d. Demographic factors
3. Impact Analysis:
    a. Individual opportunity
    b. Community development
    c. Economic mobility
    d. Social equity

Scout Law Connections:

1. Trustworthy: Fair evaluation
2. Thrifty: Financial responsibility
3. Helpful: Supporting opportunity

Discussion Questions:

1. How can bias be prevented?
2. What appeals process is needed?
3. How should special circumstances be considered?
4. What role should human judgment play?

Scenario 9: Employment Screening. AI system screening job applications and resumes.

Key Considerations:

1. Evaluation Criteria:
    a. Skills assessment
    b. Experience matching
    c. Qualification verification
2. Fairness Concerns:
    a. Bias prevention
    b. Equal opportunity
    c. Diverse hiring
    d. Special circumstances

3. Implementation Issues:
    a. Transparency
    b. Appeals process
    c. Human oversight
    d. Communication methods

Scout Law Connections:

1. Friendly: Respectful treatment
2. Kind: Understanding circumstances
3. Helpful: Supporting careers

Discussion Questions:

1. How can fairness be ensured?
2. What oversight is needed?
3. How should unique situations be handled?
4. What role should human recruiters play?

Scenario 10: Personal Privacy. AI system collecting and analyzing personal data for service personalization and improvement.

Key Considerations:

1. Data Collection:
    a. Types of data
    b. Storage security
    c. Usage limitations
    d. User consent
2. Privacy Protection:
    a. Data rights
    b. Information control
    c. Security measures
    d. Transparency
3. Ethical Balance:
    a. Service quality
    b. Privacy rights
    c. Data necessity
    d. User control

Scout Law Connections:

1. Trustworthy: Protecting information
2. Loyal: Respecting privacy
3. Courteous: Respecting boundaries

Discussion Questions:

1. What data should be collected?
2. How should it be protected?
3. What control should users have?
4. How can transparency be maintained?