



CMC Avalanche Science

Program Standards v 6.0

Welcome to the Leadville Campus of Colorado Mountain College (CMC) and congratulations on your decision to pursue a Certificate in Occupational Proficiency as a 'Snow, Weather, and Avalanche Field Technician'. You have enrolled in the Avalanche Science Program (ASP or Program) which is a part of the Ski Area Operations Program.

The following document provides Program expectations for enrolled students. Students should review the components of this document carefully because of the impact these standards may have on their academic success, their personal safety, and the safety of their fellow students. This document is meant to promote the best and safest educational experience for our students. It is also intended to articulate the philosophy of professional behavior, technical competence, and safe practice expected of our students.

Essential Eligibility Requirements

Age

Students must be 18 years of age to participate in Program coursework unless specifically authorized by the Program Director.

Physical ability

We want to ensure students are able to participate safely in the Avalanche Science Program. The following physical requirements are essential for success in the Program (Note: additional minimum health, fitness, and ability requirements are detailed later in this document under the sections titled *Winter Backcountry Travel, Ability, and Health and Fitness*).

Students must possess the physical ability to:

- Lift a minimum of 30% of your body weight from the ground to above your waist.
- Stand for long periods of time (1 or more hours).
- Reach objects overhead and to either side.
- Crouch or stoop for a period of time not to exceed 15 minutes.
- Remain seated for at least 60 minutes.
- Walk/hike/ski/split-board/snowshoe/snowmobile on flat, uneven terrain for up to six hours while carrying a backpack weighing up to 20% of your body weight.
- Walk/hike/ski/split-board/snowshoe/snowmobile up and down slopes of varying angles up to 40° carrying a backpack weighing up to 20% of your body weight.
- Withstand temperature extremes ranging from 105°F to -40°F with proper equipment.
- Perform all of the above physical tasks at elevations ranging from 10,000 to 14,400 feet.
- Perform all of the above physical tasks throughout repeated long and challenging days in the field in adverse weather conditions.



- Possess manual dexterity sufficient enough to manipulate objects in a variety of shapes and sizes with gloved hands in temperatures below freezing.
- Possess speech, vision, and hearing sufficient for personal communication in a variety of indoor and outdoor environments.
- Possess speech, vision, hearing, and manual dexterity sufficient for using electronic devices such as a smartphone, desktop computer, tablet computer, avalanche transceiver, GPS device, rescue beacon, or radio in a variety of indoor and outdoor environments.

Previous academic preparation and required certifications:

To be admitted into the Avalanche Science Program, students must substantiate appropriate academic preparation through one of the following methods: College transcripts (official or unofficial), College placement exam (ACT, SAT, Accuplacer), final high school transcript, course challenge exam, equivalent coursework, work experience, or other experience/learning as reviewed and approved by the program application review committee:

Academics-

- English Composition and Reading at the “college-ready level”.
- Math at the “college-ready level”.

Certifications-

- Level 1 Recreational Avalanche Safety course (preferably completed within the past 5 years)- course must have been at least 24 hours in duration with 60% fieldwork, meeting the American Avalanche Association Level I Recreational Avalanche Safety curriculum guidelines
<https://www.americanavalancheassociation.org/s/Rec-Guidelines-Level-1-1.pdf>
- Avalanche Rescue course- Must be of at least 8 hours in duration, completed within the past 5 years, and covering the American Avalanche Association Avalanche Rescue curriculum guidelines
<https://www.americanavalancheassociation.org/s/Avalanche-Rescue-Guidelines-20170706-1.pdf>
- Current Wilderness First Responder (WFR) certification course (*Must be at least 70 hours in duration and covering the Wilderness Medical Society recommended WFR curriculum*)(*recommended minimum curriculum* <http://wfr-sop.org/sites/wfr-sop.org/files/minimumguidelineswfr2015v1.pdf>)
- Note: Applicants may possess a higher level of medical credential (e.g. EMT certification) but the application review committee will only consider this equivalent when it includes training or experience in emergency medical care performed in a wilderness context (e.g. EMT certification combined with Ski Patrol experience).
- Current Adult CPR with AED certification (*Must be training that required hands-on skills practice with an instructor*).

Students are strongly encouraged to discuss prerequisite academic work and required certifications with the Program Director as they investigate applying to the Program. These minimum entry requirements are intended to promote the best possible educational experience for our students; the Program acknowledges that there may be alternative pathways to meeting these expectations but students must be prepared to substantiate equivalent studies and/or experience.



Some of these entry requirements may be waived for students enrolling in individual courses for the purposes of continuing professional development and who are not seeking the full Certificate of Occupational Proficiency in Snow, Weather, and Avalanche Field Technician.

Additionally, students may be allowed to enter the Program while concurrently enrolled in prerequisite coursework as dictated by necessary skills/knowledge required for the course progression (i.e. a student may be permitted to start Program but must complete required prerequisite studies/certification prior to the first fieldwork session).

Winter Backcountry Travel and Ability

The Avalanche Science program is designed to develop skills, knowledge, and behaviors essential to professional avalanche safety work. We acknowledge that avalanche professionals often perform their work using a variety of winter travel modalities. However, due to the Program's permitted terrain use limitations and practical considerations, all students must be able to ski or snowboard per the standards listed below. We have established these standards to ensure that students are able to focus on the educational experience while in the field and not be limited by personal skiing/riding ability or fitness. The list below establishes the minimum expectations for movement-over-the-snow expected of an entry-level snow safety professional:

- I. Over-the-Snow-Travel Ability, minimum expectations- In order to accomplish safe and efficient fieldwork, the following requirements beyond the previously listed "physical abilities" are expected of students:
 - a. Must be able to ski (AT or telemark) or split-board at a "Strong Intermediate Level", in variable terrain and snow conditions, and while wearing a ski pack. This includes ascent and descent of slopes up to 40 degrees on non-groomed snow.
 - b. Must have a minimum of one winter season of backcountry skiing/riding and have completed at least 15 backcountry ski/ride tours, 5 of which include at least a total of $\geq 2,000$ feet of ascent and 6 miles of travel in a day.
 - c. Be able to make efficient and timely transitions from climbing to skiing/riding and back and be able to manage ski equipment and self-care without extended delays.
 - d. Students must be able to operate a snowmobile in variable snow conditions in simple backcountry terrain in a safe manner (Note: the course *SAO162 Introduction to snow, weather, and avalanche field technician* includes basic instruction in snowmobile operation intended to satisfy this expectation).

Health and Fitness

- I. Health and Fitness minimum expectations- In order to accomplish safe and efficient fieldwork the following health and fitness considerations beyond the previously listed "physical abilities" are expected of participants during designated fieldwork:
 - a. Students must submit a CMC Physician Reported Medical History Form along with their program application prior to engaging in fieldwork. The Student's Medical History will be reviewed by the program faculty in consultation with the program medical advisor as needed. Note: Students with physical and/or mental health conditions deemed incompatible with Program activities

may not be permitted to participate in fieldwork. Program applicants are encouraged to contact the Program Director and the campus disabilities coordinator with questions. Per the CMC Risk Management Plan, the fieldwork activities of the Program meet Level IV risk/exposure.

- b. Students must be of appropriate physical fitness to engage in strenuous physical activity for prolonged periods (>4 hours), in cold weather, in harsh conditions, and at altitudes of >10,000’.

Computing- skills, software, and hardware

Snow safety professionals rely on computers and a variety of software applications in their work on a daily basis and the Avalanche Science Program coursework and learning outcomes do as well. This Program requires students to have strong, basic computing skills, consistent access to a computer with webcam and microphone running a modern operating system (laptop preferred, simple USB headset strongly encouraged), and a reliable high-speed internet connection. Note: the college has computer labs open daily and students can arrange for the use of a laptop computer during on-campus sessions if needed. It is also strongly recommended that students carry a modern GPS capable smart phone with capacity to run a variety of navigation and other snow science applications.

- I. The Program requires students to have:
 - a. Strong, basic computing skills.
 - b. Consistent access to a computer with webcam and microphone running a modern operating system (laptop computer preferred, simple USB headset strongly encouraged).
 - c. A reliable, high-speed internet connection capable of streaming voice and video for online class sessions, accessing cloud-based applications, and uploading/downloading files up to 100MB in size.
- II. The Program requires the use of a variety of applications for coursework, for example:
 - a. Microsoft Applications: PowerPoint, Excel, Word, or...
 - b. Google Applications: Google Docs, Google Sheets, Google Sites, Google Forms, and Google Drive.
 - c. Web Browser: it is recommended that students have available more than one modern web browser such as- Safari, Edge, Internet Explorer, Chrome, Firefox.
 - d. Other commonly used applications: Adobe reader, Google Earth, CalTopo, YouTube, WebEx, Zoom, Screencast-O-Matic, Snow Pilot. Instructors will provide detailed information to students about the required applications for specific coursework and will generally provide a “freeware” version of the application whenever possible.
 - e. Note: Mac OS specific applications (e.g. pages, numbers) are not used by the program.
- III. Students must be comfortable with the following basic computer skills:
 - a. Familiarity with the operating system used on your computer or the computer you will be using.
 - b. Composition and basic formatting using word processing software such as Word or Google Docs.
 - c. Creation of simple spreadsheets in either Excel or Google Sheets along with basic formatting and formula use.
 - d. Creation of simple presentations using PowerPoint or Google Slides.
 - e. Sending and receiving emails and sending/receiving attachments.
 - f. Understand terms such as mouse, drag, drop, open, select, file, choose, double-click, download, upload, send, etc.
 - g. Print documents and pictures.
 - h. Installation of new software.

- i. Web navigation.
- j. Pull down menus and directories in Windows or folders on a Mac.
- k. Save/Save As (files).
- l. File naming conventions (allowed characters, extensions, format, etc.)
- m. Finding and managing files in the cloud or on the hard drive or external memory devices.
- n. Basic cloud-based computing applications.
- o. Minimize and maximize windows.
- p. Copy and paste text or graphics across applications (using the clipboard).

Public Speaking, Communication, and Professional Writing

Snow safety professionals are called upon to provide information and idea exchange across a variety of platforms, in a variety of formats, to many different audiences. The Program requires students to engage in public speaking and to develop skills in delivering information effectively. Throughout the two-year program, students will make multiple presentations to their peers, faculty, the public, and even industry experts. Writing assignments are frequent and students will be evaluated on simple grammar, spelling, and composition while learning to build basic technical reports, literature reviews, quick communications, standard recordkeeping, and avalanche and teaching modules.

General Program Standards

Online learning expectations

- Students will be required to complete a significant amount of coursework online, either ‘synchronously’ or ‘asynchronously’. Some online coursework will be delivered live, in a ‘synchronous’ format where students will be required to attend class sessions on set days and times remotely via a web-conferencing platform such as Zoom. Other online work such as reading assignments, topic-focused assignments, quiz/exam taking, and discussion group participation will be completed ‘asynchronously’ (independently) outside of live class time.
- Our success during online classes will depend on the same commitment we all bring to the physical classroom- we will adopt the same rules and norms such as: taking notes, participating by asking and answering questions, wearing classroom-appropriate clothing, being free from distractions such as personal cell phones, and being prepared with assigned material prior to the class sessions.
- Participating in online coursework requires a full-function computer (laptop or desktop), running a modern operating system, with consistent access to reliable high-speed internet. Students attempting to use a smart phone or tablet will suffer from inherent problems in viewing important course information, accessing shared files, creating/saving/moving files, and the ability to complete assignments using a variety of applications.

Expectations for “live” online class sessions:

1. Attendance is required unless otherwise noted by the course instructor. Treat your online learning just like being physically present in a classroom with your instructor and peers.
2. Login a little early to every session and ensure your settings are optimized (e.g. audio/speakers, mic, video view) prior to the class start. (Note: Please do not contribute to the delay of the class starting time because of technical difficulties that you did not resolve beforehand).
3. Make sure you are in a well-lit, quiet area.
4. Use a USB headset with mic whenever possible. Even inexpensive devices work well in reducing distracting background noises, helping you hear what's being discussed, and providing clear sound when you speak.
5. Ensure that you are comfortable with all of the functions of Zoom (or WebEx). Ask instructor if you need help.
6. Please work on being "present" during the class: turn off other distracting electronics, identify a desk or study area that helps you focus, and close browser tabs not required for participating in class.
7. Mute your mic unless you are speaking.
8. Show your video feed if you are comfortable doing so, it helps with communication (e.g. facial expressions and gestures can help promote understanding). Hint: You may choose to use a virtual background if you do not wish to broadcast your environment.
9. Dress and behave appropriately, follow the same expectations as if you were in the classroom.
10. Use "hand-raise" notification to ask questions unless the instructor has directed otherwise.

Canvas Online Learning Management System

The Avalanche Science Program will use the Colorado Mountain College 'Canvas' online learning management system for a significant portion of classwork. It is required that students frequently (at least twice weekly) monitor class information and be responsible for any assigned material and announcements.

Communication Expectations:

To promote learning, safety, and general academic success in the Avalanche Science Program, the following communication standards establish baseline expectations for students and faculty. (Please note that individual instructors may publish other specific standards in the course syllabus).

In general:

1. Students must take an active and responsible role in their performance during individual courses and avalanche science program as a whole. This may include communicating with the instructor or program director outside of class hours in regard to grades, assignments, class performance, professionalism, and expectations. Published office hours are generally the best opportunity for communicating with the instructor outside of class.
2. Students must work to ensure that all written communications (e.g. email, text messages, voicemails, notes, assignment submissions) with program faculty are clearly written and confirmed (i.e. the instructor acknowledges receipt of the message).
3. Class session cancellation will be communicated either by the college's emergency alert system or by the instructor via a Canvas push notification. Please note that text messages from faculty may be used in the event of short-notice changes in operational plans.



4. For emergencies during internship activities, students must contact the program director via telephone at the earliest reasonable time.
5. Student communication with instructors and college staff must be clearly written and use a basic business communication format (e.g. using a clear subject line, greeting, message, and sign-off). Spelling, grammar, and punctuation are expected to be commensurate with typical business communications for all written communications.

Email:

1. Students are required to use their college-assigned email account for all course/program related business.
2. While the program is in session, students are required to monitor their college assigned email account frequently (at least twice weekly) and are responsible for all program and course-related information delivered via that medium.

Instructor personal phones and text (SMS) Messaging:

1. Do to the intensive and often fluid structure of the program activities, students and instructors may need to communicate directly using personal cell phones and/or text-messaging. Students must be mindful non-emergency interruptions of instructors and must maintain professional communication standards at all times. Text messages from students to instructors must be confirmed by the instructor otherwise it should be assumed that the message was not received.

Program Attendance

Program students are required to attend all “on-campus” sessions, no absences are allowed. Verifiable emergency situations may be considered as exceptions on a case by case basis by the Program Director although the intensive and focused nature of these sessions may not allow for accommodation.

Each individual course and instructor will establish attendance/participation standards in their respective course syllabus. In general, attendance for all class sessions (either face-to-face or synchronous on-line) is a baseline expectation for Program students. Excessive tardiness or missed class time may constitute grounds for grading penalties, administrative withdrawal from the course, or possibly expulsion from the Program.

Attitude and Professional Behavior:

Students are expected to maintain a professional and appropriate demeanor in all field and classroom sessions as well as during internships. Disruptive or inappropriate behavior will simply not be tolerated and students deemed to be disruptive will be removed from that course or internship site and risk removal from the Program.

Students are preparing for a career where the expectation for dress, appearance, and personal hygiene reflect a professional demeanor—students are reminded to shower regularly, wear clean clothing, and maintain a professional appearance and grooming. Our goal is to educate and prepare our students with a professional demeanor that will significantly increase their chances of finding work in the industry.

Student performance, behavior, and their demonstration of professionalism will be evaluated during internship activities. Students may be removed from the program for failure to maintain Program expectations during their internship. The faculty coordinating student internship experiences will establish specific parameters for this in the course syllabus.



Academic Policies & Requirements:

Students are expected to read and abide by the standards of conduct as described in the Colorado Mountain College Student Handbook.

Students must achieve a passing grade in each of the required Avalanche Science Program courses and maintain a 2.0 cumulative program GPA to receive the Certificate of Occupational Proficiency in Snow, Weather, and Avalanche Field Technician from Colorado Mountain College.

Students must maintain a cumulative 2.0 GPA in Program coursework to be eligible for American Avalanche Association Pro 1 and Pro 2 certification.

A failing grade in any Avalanche Science Program course may result in the student's removal from the Program. The Program committee and course instructor will determine the appropriate outcome.

Sexual Harassment and other forms of unacceptable behavior:

Harassment of any kind is unprofessional and unacceptable. All CMC students have a right to work and learn in an environment free from unsolicited and unwelcome sexual overtures. Sexual harassment is when an unwelcome sexual advance, a request for sexual favors, and other verbal or physical conduct of a sexual nature occurs. Please refer to the Student Handbook for the college's detailed policy [link below].

Additionally, inappropriate behavior such as physical intimidation/harassment, insulting or disparaging comments about race, gender, sexuality, religion, or ethnicity, jokes in poor taste which may insult a person, or using offensive language will not be tolerated. Please refer to the Student Handbook for the college's detailed policies [link provided below].

Substance Use:

Any drug or alcohol use (including marijuana) will not be tolerated during any academic or field course offered by the Avalanche Science Program. Violation of the substance abuse policy may be grounds for dismissal from the Program and possible disciplinary action from the College. Please refer to the Student Handbook for the college's detailed policies [CMC Student Handbook link below].

Tobacco Use:

Tobacco products (cigarettes, smokeless tobacco, eCigarettes, vaping, etc.) may not be used at any time during any face-to-face, in-person Avalanche Science Program coursework. Nicorette® gum or the Nicoderm® patch are examples acceptable substitutes.

Criminal Background Checks and Drug Screening:

Students are advised that, although the Program does not conduct criminal background checks or drug screening, the internship sites where students may be assigned may require these be performed. If required, students will be responsible for any associated expenses. Students may also be subject to any additional workplace standards required by our internship locations.

CMC Student Handbook:

https://cmc-wpengine.netdna-ssl.com/wp-content/uploads/filebase/CMC_Student_Handbook.pdf



Students must be familiar with and are responsible for the content of the College's Student Handbook. Student responsibilities, honesty, and the "code of conduct" listed in the handbook also apply to all academic and field courses in the Avalanche Science Program.

Safety & Equipment

Equipment

The following lists provide an outline of both required and recommended equipment for participation in Program fieldwork. It is an expectation that all student equipment be of reasonable quality, of modern design, and demonstrable utility. All student equipment is subject to the approval of Program instructors and students may be required to acquire more suitable equipment prior to participation in fieldwork. With that said, some equipment may be rented or borrowed for the specific activity and students should discuss options with faculty prior to making any purchases. Additionally, some course specific equipment is provided by the college. The course *SAO162- Introduction to SWAT* will establish equipment requirements and will provide students with specific direction on what is appropriate.

- I. Clothing- Students must have sufficient personal clothing of reasonable quality and of appropriate design to participate in extended winter outdoor activities. Personal preparedness is a primary assumption for snow/avalanche workers and the ability to maintain comfortable core temperature to participate in field activities is fundamental. This inventory includes:
 - a. Outerwear shell and pants suitable for backcountry touring
 - b. Insulation (down or synthetic, "puffy") and mid-layers
 - c. Base-layer top and bottom
 - d. Hat, gloves, mittens, balaclava
 - e. Socks
 - f. Boots suitable for moving over snow during non-touring activities (e.g. snowmobiling or trips to the snow study site on campus)
- II. Program Uniform- Students enrolled in the full certificate track will be required to purchase the basic student uniform (shell layer). Students will be required to wear this uniform during designated field sessions or other activities and during field internships. Students are expected to represent the program in a professional manner while wearing uniform components outside of designated classwork or internship activities and failure to do so may result in progressive disciplinary actions that may include removal from the Program.
- III. Personal Gear (this equipment will be reviewed during the course *SAO162 Introduction to SWAT*) - Students must have:
 - a. Backcountry ski backpack of at least 30 Liters capacity, preferably one with a dedicated avalanche rescue tool compartment.
 - b. Goggles & sunglasses
 - c. Small 1st aid kit as specified in the "first aid minimum equipment" document and sunscreen

- d. Bivvy sac or rescue tarp.
 - e. Repair kit suitable to maintain the student's own backcountry travel equipment.
 - f. Miscellaneous items such as: water bottles, thermos, multi-tool or knife.
- IV. Personal backcountry movement equipment (AT or telemark skis or split-board)- The Program acknowledges that there are a variety of snow-travel modalities used by professional snow safety workers, but due to the Program limitations of terrain access, permits, and time, all students must be able to travel on skis or split-board for program fieldwork. A key consideration for the Program is that fieldwork can be carried out efficiently and safely. While some fieldwork in simple terrain will not require specific equipment (e.g. snowshoes or winter boots would be appropriate), fieldwork in and around avalanche terrain will. With this in mind, instructors will specify on what courses and for what fieldwork students will be required to have one of the following equipment types:
- a. Telemark skis that are at least 90mm at the waist (preferably with a releasable, free-pivot binding system), fitted climbing skins, and plastic backcountry touring boots, **or...**
 - b. Alpine Touring skis that are at least 90mm at the waist with releasable bindings, fitted climbing skins, and plastic backcountry touring boots, **or...**
 - c. Split-board with suitable backcountry touring boots and bindings with fitted climbing skins (Note: ski poles are required for split-boarders).
 - d. Note: students must be experienced and proficient with the use of their chosen backcountry travel equipment.
 - e. Note: Students may also be required to use specific backcountry travel equipment as required by internship sites (e.g. an alpine skiing setup with releasable bindings for a ski patrol internship).
- V. Personal Protective equipment- The following safety equipment is strongly recommended for fieldwork in and around avalanche terrain but is not required:
- a. Airbag pack
 - b. Helmet
 - c. Note: Students may also be required to use the above equipment as required by internship sites. The Program will have a number of airbag packs available for students to use if required during their internship.
- VI. Avalanche rescue equipment- The following equipment is required:
- a. Avalanche transceiver of modern design (less than 5 years old) with 3-antennas and digital signal processing in good working condition (example transceiver models include: BCA Tracker 3, Pieps DSP Sport, Mammut Barryvox)
 - b. Avalanche rescue shovel made of hardened aluminum with an extendable shaft.
 - c. Avalanche probe pole of at least 270cm length (aluminum preferred vs. carbon).

- VII. Snow study equipment: The following equipment is required unless otherwise indicated. (Note: it is recommended that students delay purchase of these items until they have attended the initial sessions of *SAO162 Introduction to SWAT* and *SAO164, Snow, Weather, and Avalanche Observations*).
- a. 2-meter ruler, metric (rigid)
 - b. 10x or 15x loop (hand lens)
 - c. Stem thermometer, Celsius reading, digital or analog
 - d. Large Column Cutting Cord
 - e. Clinometer
 - f. Snow Crystal Card (with mm grid)
 - g. Snow Saw, 35cm minimum length
 - h. Altimeter
 - i. Compass
 - j. GPS navigation device (this could be a GPS unit or a smartphone running a navigation/mapping app such as GAIA, Avenza, or CalTopo)
 - k. Field Notebook
 - l. Pencils (mechanical or wood)
 - m. Shovel, extendable, flat blade, hardened Alu.
 - n. Probe pole 270cm min. length with scale markings
 - o. Pouch, stuff sac, or study kit to hold equipment

General Safety Considerations

- I. Fieldwork: Students will be held to a high expectation for safety awareness (e.g. risk evaluation) and practices (e.g. risk treatment) as a foundational philosophy of this Program. Students will be assessed regularly on their safety awareness and practices, and failure to demonstrate appropriate application of safety concepts and practices taught may result in removal from the Program.
- II. Independent Student Fieldwork: Students will be expected to complete some course assignments independently (without Program faculty) in backcountry winter terrain. When doing so, students must abide by Program established *Fieldwork Safety Procedures* for independent fieldwork. Program *Fieldwork Safety Procedures* include:
 - a. Filing, and approval of a completed independent fieldwork trip plan with at least one ASP faculty member.
 - b. Completing check-in and check-out procedures.
 - c. Identifying a reliable local contact for trip planning and check-out, check-in.

- d. Providing local contact with emergency procedures and contact information for rescue resources.
- e. Carrying minimum avalanche rescue equipment.
- f. Carrying Program defined minimum personal protective equipment and rescue gear, 1st aid, and repair equipment.
- g. Carrying appropriate communication device/s (e.g. radio, cell phone, satellite phone, inReach[®] device).
- h. Carrying appropriate navigation tools.
- i. All independent student fieldwork must be done with a partner of appropriate ability (preferably another Program student when possible).
- j. Carrying a Program issued inReach[®] device.



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Student affirmation of Avalanche Science Program Standards

I have read, understand, and agree to abide by the Program guidelines presented in this document

Student (Print Name): _____

Student (Signature): _____

Date: _____