MOUNTAIN BIKING PROGRAM GUIDE

This document provides the recommended minimum standards that all BSA council operated mountain bike programs should maintain. Biking programs offered at high adventure bases, because of their scale and customer profile, will vary in terms of scope, challenge and cost and are not addressed here. This document should be used in conjunction with its companion piece, “Mountain Biking Design Guideline”

A quality mountain bike program should be rooted in education, stewardship, and skills progression. The program should provide learning opportunities for all riders, but remain challenging enough to build confidence and self-esteem at the same time.

BSA Mountain Bike (MTB) Program Standards

These are the recommended minimum standards that all BSA mountain bike programs should maintain. Local councils may customize their own standards to fit the needs and goals of their programs.

- Supervision
  - MTB program must be supervised by adults at all times and adhere to the BSA youth protection guidelines.
- Training
  - MTB staff should be trained in bike maintenance, mechanics, and inspection.
  - MTB staff must be trained in properly fitting bicycles and protective equipment to participants.
  - MTB staff must be trained in appropriate first aid, proper emergency procedures, and Emergency Action Plans.
  - MTB staff must be trained in assessing participant ability levels, choosing appropriate terrain, and teaching a proper progression of skills
- Equipment
  - MTB equipment must be thoroughly inspected before/after each use.
  - Routine inspection and maintenance of fleet must be properly documented and be in accordance with manufacturer recommendations.
- Personal Protective Equipment
  - All participants and staff must wear a helmet when riding.
  - Extra PPE such as, gloves, full face helmets, knee pads, elbow pads, protective jackets, shorts, and MTB specific neck braces are encouraged as appropriate.
- Trails
  - Onsite MTB trails must be thoroughly inspected.
  - All technical trail features should have alternate roll-able lines. This means that as a newcomer to BMX you can ride the course safely without having to leave the ground and then progress to jumping as your skills and confidence improve.
- Ratios
  - Every ride with more than 4 participants should have 2 staff members as a lead guide and a sweep guide.

- Rides with 4 or fewer participants may use one lead guide as long as the guide is always within audible contact with all participants and BSA Youth Protection standards are met.
- When riding at skills courses, pump tracks, or similar areas, if participants are all within sight and riding within a contained area, only one instructor is required per 8 participants as long as BSA Youth Protection standards are met

Program Equipment

Bike Selection

The type of bike you purchase for your program should be based on the available budget, but more importantly based on the specific type of riding/terrain that your course/trail contains and the age range of the participants.

Types of Mountain Bikes: Depending on the intended use, mountain bikes come in a wide variety of types and sizes. In recent years, bike technology has rapidly advanced and many of those improvements have trickled down into lower priced point bikes. When choosing bikes for a program fleet, it is important to consider maintenance, what type of riding participants will be doing and cost.

Figure 1

Mountain Bikes can generally be put into categories describing the type of riding they are designed for. Cross-Country (XC) bikes tend to have less suspension, steeper frame geometry and are built more for rolling uphill and downhill (fig. 1).

Figure 2

Trail, All-Mountain (AM) and Enduro bikes tend to have more suspension, more slack (set back) geometries and tougher components (fig. 2). These bikes are usually built for longer climbs and longer descents. When pedaling uphill, the pedaling efficiency (power transfer) will typically not be as high as a XC bike.

Figure 3

The Enduro however, will be more stable on the downhill. Downhill (DH) and Freeride (FR) bikes tend to have a lot more suspension, very slack (set back) frames geometries, and are usually very heavy due to much tougher components (fig. 3). These bikes are very difficult to ride uphill and riders usually use vehicle shuttles or ski resort chairlifts to get to the top. DH and FR bikes are

not recommended for mountain biking programs unless it's a downhill specific program. Most programs will use XC or AM bikes depending on terrain and program goals.

There are many other types of mountain bikes that will fit into more niche areas of the sport. It may also be possible to buy year end "left overs" from a manufacturer at significant discount. See the resources section to learn more about these bikes.

Suspension

Travel indicates how far the suspension system can compress to improve control and maneuverability. Some mountain bikes, known as *rigid*, do not use suspension. These bikes are not as common for program use because they are more difficult to control and do not necessarily provide the experience that today's participants are looking for in a mountain biking program. A *hardtail* is a bike that utilizes suspension only on the front fork. The range of travel is typically 80-100mm. Hardtails are usually less expensive to purchase and slightly less expensive to maintain. *Dual-suspension* (DS) or *full-suspension* (FS) mountain bikes have suspension on the front fork and in the rear area of the frame. The rear suspension is typically compiled by a linkage and pivot system. Depending on the build, FS bikes can be both more expensive initially and more expensive to maintain. These bikes however, are designed for rougher trail, can be more comfortable to ride, and can give riders improved confidence to try new skills.

Bike Fit

Bike fit is an important aspect to think about when purchasing equipment for a rental fleet. It is more difficult for a participant to succeed on a bike that does not properly fit. Larger bikes can be intimidating for beginning riders, which could negatively affect their experience on the trail. The goal is to help set each participant up for success so that they might develop a long term interest in fitness and the out of doors. This might not happen if they are using bikes designed for someone twice their size. Generally speaking, participants should have about an inch of space between their crotch and the top tube of the bicycle and the rough seat height should rise to their hip when standing. Sizing varies widely by brand and style of bike. Work with a bike company or shop to figure out the proper sizes to purchase for your program's participants.

Materials

The primary materials used to manufacture mountain bikes today are aluminum, steel and carbon fiber. Titanium and wood are also used in niche areas of the market. At the moment, aluminum bikes are the standard for a program fleet. They are cheaper and lighter than steel while maintaining durability and strength. This may change in the near future as carbon frames and components are slowly trickling down to lower priced builds.

Components

Components are all the parts attached to the frame, including both the simple and complex mechanical pieces that enable a bike's full functionality. The type of components on each bike are also known as the "build" or "spec." Most companies offer each frame in multiple builds tiered by price. When thinking about what build to buy, remember price, durability, and maintenance ease. If you're buying multiple frames for different disciplines, you may still be able to keep the builds standardized as much as possible. This will make maintaining the fleet much easier and less expensive because parts can be purchased in larger/bulk quantities.

Mountain bike technology has come a long way and many features that used to be considered high end for a bicycle, are now available at lower price points. Hydraulic disk brakes are extremely common on mountain bikes and are fast becoming the standard on rental fleets.

The drivetrain is another area where technology is getting better by leaps and bounds. Drivetrains are usually expressed in how many gears or “chainrings” are in front by how many gears are in back on the “cassette”. For example most entry level bikes are either 3x7, 3x8 or 3x9. This means there are 3 chainrings up front and either 7, 8, or 9 gears on the cassette in back. On higher end mountain bikes, there has been a recent shift almost entirely to a 2x10 or 1x11 configuration. A common misperception is that bikes with more speeds are better. While a 3x9 has more speeds, a 2x10 can still have the same or larger range depending on size of the chainrings and cassette. These systems reduce the tendency for beginning riders to “cross load” their chains, which can help keep the entire drivetrain in better working condition and reduce maintenance costs. Bikes with 1x9, 1x10 and 1x11 do not need a front derailleur, therefore can be less expensive to maintain, easier to learn on (less pieces to focus on), and drop chains less often. Think about these options as price and technology trickles down.

Wheel Size

Increased variety in wheel sizes has become a marketing focus of the bike industry over the past several years. The old wheel diameter “standard” for mountain bikes was 26”, which is still the standard for most rental fleets today. This size is good for beginner programs with an emphasis on younger riders, but also serves the needs of smaller and technical riders. Recently, many bike companies turned their attention to the 29” wheel. Despite being slightly heavier (with a comparable build), the 29” wheel reduces the approach angle of the tire compared to a 26” by 6 degrees, which makes it easier for riders to roll over trail obstacles. Depending on the model, the larger wheel size tends to raise the riders center of gravity. Smaller riders will usually appreciate 26” or smaller wheels. Kids’ specific bikes have wheel sizes of 12”-24”. A recent compromise to both the 26” and 29” wheels was the introduction of a 27.5” wheel. Marketing efforts by bicycle companies have touted that this wheel size maintains the travel benefits of the 29” wheel, but the maneuverability of its 26” counterpart. There is a purpose for each wheel size, but it is possible that 27.5” will continue to gain traction as the new “standard” in the coming years. Whichever wheel size is chosen, it is helpful to standardize the fleet for maintenance consistency.

General Recommendations:

Instruction & Staff:

Ultimately, mountain bike participants have safety in their own hands and can make mistakes. It would be naïve to expect an injury free program, nevertheless safety risks can definitely be mitigated with proper assessment and instruction for each rider. There needs to be a solid process to assess the skill levels of participants to know what trails and features are appropriate. Then there needs to be real instruction to teach participants required skills to be riding at a more advanced level.

Quality training is the key to ensuring that instructors have the ability to adequately assess and instruct mountain bike skills. Instructors should be trained in proper bike fit, trailside mechanics,

technical body movements, instruction, and first aid. Even when the risks have been mitigated as much as possible, instructors should be well trained in wilderness first aid skills and concussion awareness. At the moment there are a few different mountain bike instructor certification programs. Two large and well recognized certifications are IMBA's Instructor Certification Program (ICP) and the Professional Mountain Bike Instructor (PMBI). There is also a BSA Mountain Bike Instructor program at the Summit National Training Center in WV.

Program Logs

Each time a bike is used, it is imperative that you document its use in a program log. A program log sheet should include the specific bike number, ride time, date, type of group riding, the number of youth/adults, and which staff members facilitate the ride. Keeping a log of how many times each bike is ridden and whether or not any specific problems were encountered is an essential part of running a safe program and maintaining the bike at the highest standard.

Maintenance and Local Bike Shop Partnership

Maintenance is a serious consideration for any MTB program. Mountain bikes require constant maintenance which can be expensive in both materials and labor. There are many factors that can affect maintenance costs, including type of bike, quality of materials, terrain and roughness of trails, climate conditions, and skill of the riders. Paying a little more for middle range componentry compared to less expensive low end components can greatly reduce maintenance costs.

Hiring a good mechanic to train your staff can help reduce maintenance costs. It is in your best interest to create strategic relationships with local bike shops to pursue better pricing on bikes, parts, and maintenance work. Good stewardship should be a part of the program and supporting local bike shops helps support the biking industry as a whole. Whether or not you perform the maintenance in house or send the bikes to a shop, it is essential that you keep detailed maintenance logs and routine safety inspection worksheets on each bike. See the resources section for an example maintenance and bike build checklist.

Conclusion

Creating a quality mountain bike program will provide youth with meaningful access to a sport growing in numbers and popularity. Many Scouts are requesting additional biking opportunities within their local councils. As this trend increases and the biking industry continues to grow, pursuing well planned mountain bike programs can provide economic incentive for both your program and local communities. Councils, troops, and camps are highly encouraged to reach out to local bike clubs, bike shops, and IMBA Chapters for help in creating mountain biking programs. These are great resources for Scouts, but Scouts are potential resources for helping these groups and their local biking communities through meaningful service. BSA mountain biking programs should leave a lasting mindset for education, stewardship, and skills progression in a way that engages the community and ignites a generation of future riders.

Related Documents, References & Resources:

- Mountain Biking Design Guide
- Guide to Safe Scouting
- Cycling merit badge handbook
- "Trail Solutions" IMBA, Boulder, CO
- "Managing Mountain Biking" IMBA , Boulder, CO

Internet:

- http://www.uci.ch/mountain-bike/about/
- https://www.imba.com/resources/trail-building/designing-and-building-sustainable-trails
- http://www.singletracks.com/mountain-bike/club.php
- Guide to Safe Scouting – A guide to staying safe in all BSA activities with a specific section on bicycle safety. Online at: http://www.scouting.org/scoutsource/HealthandSafety/GSS.aspx
- Heads Up: Concussion – a CDC program aimed at recognizing and preventing concussions with resources, information and policy guides for youth sports. Online at http://www.cdc.gov/concussion/headsup/index.html
- IMBA – the International Mountain Bicycle Association has a plethora of resources to help councils and troops build mountain programs and sustainable trails. They can also help to get into contact with local advocacy and trail building clubs. Online at https://www.imba.com/
- PTBA – The Professional Trail Builders Association is a great resource for finding local trail companies. Online at http://trailbuilders.org/
- Gravity Logic - This company is often recognized as the originator and best at creating bike parks and flow trails. Online at: http://www.whistlergravitylogic.com/
- Progressive Bike Ramps - This company makes quality pre-fabricated skills courses, trail features and pump tracks. Online at: http://progressivebikeramps.com/

Books:

Managing Mountain Biking by IMBA – Detailed guide on creating an effective mountain bike program.

Trail Solutions by IMBA – Detailed guide on building sustainable mountain bike trails.

Master Mountain Bike Skills by Brian Lopes and Lee McCormack – A technical manual on increasing MTB skills and techniques.

Teach Mountain Bike Skills by Lee McCormack – A great partner with the previous manual for instructing and coaching MTB skills and techniques.

Pump Track Nation by Lee McCormack - A guide to designing and building pumptracks.

Appendix 1

Example Program and Safety Talk

- Welcome
    - Program Specifics – Trail Development, Land Use Agreements, Partnerships, etc.
    - Discussion of Trail Map, Trail Features, and Signage
    - Expectation/Role of Guides/Participants
    - Challenge By Choice
    - Flora, Fauna, and Leave No Trace
    - Invoke the Stoke
- Safety Briefing
    - Preparation/Anticipation of Trail Hazards
    - Riding Techniques
    - Communication
    - Rider Spacing
    - IMBA Rules of the Trail and Trail Etiquette
    - Emergency Procedures
- Introduction to Mechanical Components and Bike Functionality – In bike stand
    - Shifting Gears while pedaling
    - Gearing ratios (Cross Loading… small-small, big-big = no good)
    - Brakes and braking techniques
- Personal Protective Equipment
    - Helmet, Pads, Water, etc.
- Bike Fit – See bike fit in the reference section
- Full Bike Inspection – Follow Inspection Checklist
- Practice Ride in Flat Wide Open Area
- Rider Assessment – Use Rider Assessment Guide
- Ride
    - Guides Lead By Example and Ride Responsibly
    - Keep the group informed of upcoming trail information and hazards
    - Reinforce Challenge By Choice
    - Stop Frequently to Monitor Group (head counts)
    - Utilize Teachable Moments
- Gear Return
    - Post Ride Maintenance Check and Bike Inspection
    - Disinfect all helmets, gloves, pads, and other PPE
    - Towel off bikes and prepare for next use
- Debrief and Wrap-up
    - Inform participants of other mountain biking opportunities and all skills progressions
    - Discuss how participants can engage the mountain biking community through local mountain biking clubs, shops, and IMBA as resources

Appendix 2

Mountain Bike Assessment Guide

Beginner-

Riding assessment: These are riders who have ridden a bike, but never or rarely on dirt. They will generally remain seated with little to no bike/body separation. Pedals will often not be level and eyes may be wandering or looking straight down at the front wheel. Speed may be way too fast or too slow with a general lack of coordination

Outcomes: Riders will be able to stand up off the seat with a neutral body position and move into a ready position. They will be able to use some bike/body separation, keep their pedals level most of the time, brake smoothly and look ahead with their eyes. Riders will know about shifting, but may not shift smoothly yet. They will feel comfortable on all greens and be ready to try blues.

Activities: Beginner riders should stay on relatively smooth trails about 3'-4' wide. These trails should have small climbs and small descents to practice climbing and descending skills combined with shifting. Work on the basic skills of body position, bike/body separation, pedal position, braking and basic shifting techniques.

Intermediate-

Assessment: Riders have a neutral body position with a decent ready position and pedals are usually level. They have little to some bike/body separation and steer both with the bike and with the bars. Riders know about shifting, but may not shift smoothly.

Outcomes: Riders will have a strong ready position and will generally keep equal pressure on pedals. They will have stronger bike/body separation and their eyes will be looking out ahead. Braking will be smooth on rougher terrain and with only one finger. Shifting will be smooth with good timing and coordination. Riders will feel completely comfortable on all blues and are ready to ride black trails.

Activities: Intermediate riders can move from smooth to rougher trails with small obstacles and easy technical sections to maneuver. They may also want to try more narrow trails known as singletrack. Singletrack is a trail just wide enough for one mountain biker, usually about 1'-2' wide. Intermediate riders should be working on moderate climbing and descending skills, with short steep sections. Work on rolling over small objects and in a flat grassy area, use games such as track-stand knockout and slow races to improve bike handling and balance.

Advanced-

Assessment: Riders have solid neutral and ready positions with equal pressure on pedals and hands. Eyes are looking forward with one finger covering brakes. Steering is with both bike lean and/or handlebars as is appropriate. Shifting will be smooth and coordinated.

Outcomes: Riders will use subtle body movements within their body positions to maintain equal pressure throughout their feet and hands. Riders will have a large amount of bike/body separation and will use it as is appropriate. Riders will feel comfortable on black diamond trails and will be ready to try more advanced maneuvers.

Activities: Advanced riders should work on techniques such as using a front-wheel lift to get over medium sized obstacles or up onto a small ledge and using either a roll-down lunge or a high speed drop off small ledges. Advanced riders may also start working on high speed cornering, pumping and jumping. For this use small berms, dips, rollers and table tops.

Expert-

Assessment: Riders will have solid body positions, advanced bike/body separation and will use subtle movements to maintain equal pressure. They always use only one finger to brake smoothly on any terrain.

Outcomes: Riders will be using advanced maneuvers such as clawing, ratcheting, rock dodge, roll down lunge and turning through tight switchbacks. Riders will be exploring alternative movement patterns and tactics for variable trail conditions. They will feel more confident selecting optimal riding situations based on trail conditions, slope grade, and difficulty.

Activities: Riders should work on using more advanced and subtle techniques such as clawing, ratcheting, and rock dodge. They may also apply their previous skills to progressively larger features.

Appendix 3

Forms and Checklists

Bicycle Assembly Record				
Builder:		Start Time		
Serial #				
Model		Finish Time		
Year				
Color		Total Time		
Size				

Quality Assurance		
☐	Quick Release Levers/ Wheel Nuts Tight	<< Affix Bicycle Lable Here >>
☐	Wheels True/ Hubs Adjusted/ Tires - Seated, Aired up, Directional	
☐	Brakes Adjusted/ Cables Tight	
☐	Pedals Tight	
☐	Drive Train Adjusted/ Crank arms Tight/ B.B. Adjusted	
☐	Headset Adjusted and Tightened	
☐	Reflectors on / Chain Guards/ Safety Items Installed	
☐	Stem Bolts Tight/ Handle Bar Secure/ Bar Ends Secure	Attach Other Label To Front Wheel
☐	Saddle level/ Seat post Clamp Tight/ Binder Bolts Tight	

Notes:

Assembler's Signiture		*"I certify that the bicycle described above has been assembled correctly and is in proper working condition"*
Quality Inspector:		☐ Test Ridden

PRE-RIDE BIKE SAFETY CHECKLIST

Tires	
____	Pressure 30-50 psi depending on equipment, trail, rider, and ability
____	Tread and sidewalls
Wheels	
____	Quick releases are tight
____	Spin true
____	Spin free, no rub
____	Spokes
Brakes	
____	Pressure
____	Pad surface and alignment
____	Caliper bolts are tight
____	Cables and housing
Drivetrain	
____	Crank arms straight with no play in bottom bracket
____	Pedals tight
____	Chain alignment, cleanliness and lubed
____	Derailleur alignment
____	Cables and housing
Cockpit	
____	Headset
____	Handlebars
____	No play in steering
____	Controls
Frame	
____	No cracks
____	Bolts are tight
____	Size
Suspension	
____	No visible oil leakage (small amounts of oil leaking may be okay)
____	No play side to side
____	No extra play at the beginning of travel
Seat	
____	Height
____	Alignment
____	Tight
Personal Protective Equipment	
____	Helmet (cracks, cleanliness, etc.)
____	Water
____	Pads
Inspected By:	Date:

Mountain Biking Inspection & Repair Checklist

Camp Name		Needs Attention	Repair Cost	Comments
Clean Bicycle				
Wheels:				
	True Front			
	True Rear			
	Adjust Front Hub			
	Adjust Rear Hub			
	Inspect Front Tire			
	Inspect Rear Tire			
	Tighten Cassette			
Derailler:				
	Adjust Front			
	Adjust Rear			
	Inspect Shifters			
Brakes:				
	Adjust Front Brake			
	Adjust Rear Brake			
	Inspect Front Pads			
	Inspect Rear Pads			
Bearings:				
	Headset			
	Bottom Bracket			
Fork:				
	Lube Sliders			
	Torque Legs			
Lube:				
	Cables			
	Chain			
	Clipless Pedals			
Frame:				
	Full Inspection			
Tighten:				
	Stem/ Handlebar			
	Seat/ Binder			
	Crank/ Chainrings			
	QR Skewers			
	Pedals			
	Valve Caps			
Personel Protective Equipment:				
	Visual Inspection			
Mechanic:		Date:	Inspected By:	Date: