Kenya Snakebite Awareness Training Handbook

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Snakebite Awareness Training
Introduction to the Training Handbook

This handbook was developed for community leaders, non-profit organizations, and others interested in the prevention of snakebite in Kenya (we will use the word “trainers” to describe these people). Its purpose is to provide trainers with information on creating training objectives, training and assessment techniques for adults, training evaluation, and the basic information needed to teach community members about snakes, envenomation, and snakebite prevention. The handbook provides practical information including several examples of how to avoid snakes when outdoors, and prevent snakebite at home. Because of the expertise and training involved in handling and removal of snakes, it has not been included in this manual. If you are interested in learning how to remove snakes safely, please connect with a reputable individual or organization that can provide you with that training and practice so you can become proficient with the necessary techniques and equipment. One such organization is East African Reptiles (https://eastafricanreptiles.com).

The material as constituted in this manual is primarily for the adult learner, but it could be adapted with age appropriate activities for children and youth. The entire handbook will be distributed free of charge on the Internet and each section can be downloaded individually from https://upendoconservation.org. If you are one of the trainers, we would encourage you to look through the entire manual, and then use the parts of it that are most applicable to your context and community.

A word about the photos provided for snake identification (separate document): this manual was primarily created with the snakes of western Kenya in mind as that is where the Upendo Conservation Area is located. Some of these snakes will be common in other areas, so their information will be useful if you are elsewhere in Kenya. It would be quite a task to include ID photos for every snake in Kenya, so I have included only the most common venomous species. If you want more detail, i suggest that you buy a copy of "Dangerous Snakes of Africa" by Stephen Spawls and Bill Branch. Also available is the Kenya Reptile Atlas (www.kenyareptileatlas.com) which has downloadable documents on the dangerous elapids (cobras, mambas, etc.), vipers (and adders), and colubrids (boomslangs, tree snakes, etc.). I would also encourage you to contact Robin James Backhouse, who has made a poster of many of the snakes of Kenya which would also be useful in identification. He can be contacted via email at rjbackhouse@hotmail.com for more information about how to obtain this poster.

I would also encourage trainers to use the resources of the African Snakebite Institute (https://africansnakebiteinstitute.com). Although they are based in South Africa, there are two things in particular that might be useful from their website. They have available, free of charge, ID cards for many snakes throughout Africa with natural history information and key characteristics for identification. These can be printed and laminated for use in your training program. They also have other resources, like books, videos, posters, and snake handling equipment. Secondly, they have an app which is free to download to your phone, and this has snake ID cards plus important first aid information that would apply to Kenya.

Acknowledgements: This manual would not have been possible without the help of several people. First of all, thank you to Silas Wekesa Muchenje, the community organizer and trainer who first got me involved in conservation in Kenya through the Upendo Conservation Area in Myanga, Bungoma. He has been the backbone of the efforts to train people in his community about snake awareness, and was instrumental in delivering the first snake awareness training module I created. I am grateful for our partnership and his friendship.

I would also like to thank Makayla Johnson of Nazarenes For Creation Care and the Nashville Zoo for her assistance with gathering and writing materials for the initial training module used by Silas Wekesa Muchenje on behalf of the Upendo Conservation Area.

I would like to thank Thea Litschka-Coen for being a role model for this kind of work in Eswatini through the Eswatini Antivenom Foundation (www.eswatiniantivenom.org). The work she has done is amazing and has been an inspiration for me. Their website also contains resources that would be valuable to trainers.

A big thank you to Stephen Spawls, Florian Finke, Robin James Backhouse, Simone Krakowski and others for their initial review of this handbook.

I would particularly like to thank Stephen Spawls for the use of his photographs and information from the book he wrote with Bill Branch entitled “Dangerous Snakes of Africa” which is available on https://www.amazon.com. I also thank Robin James Backhouse for the use of his photography for early training efforts, and the admins and members of the Facebook group East African Snakes, Other Reptiles & Amphibians who have taught me so much about

the herpetofauna of Kenya and East Africa and have been an encouragement to both Silas and I. If you need help with the identification of snakes or other herps from East Africa, this is a great group of people, many with herpetological expertise, that can surely help you.

I would like to thank the tremendous list of donors who have made the training through the Upendo Conservation Area possible with their generous giving.

Finally, and most importantly, I would like to thank the Creator for the creation (and/or evolution) of snakes and calling them very good.

Now, please use this manual to go out into your community and make sure that people know how to live together peacefully with snakes and prevent snakebite. Cheers!

Part 1: Training Strategies For The Trainer

Snakebite Awareness Training
Part 1: Strategy 1 - Training Objectives

Before you start your snake awareness training program, you should plan what you want the outcomes of the training to be. These outcomes can be written as training objectives. Objectives are a statement about what you hope the outcome of the training will be. It must be something that you can measure, and also something that requires an action. Here are a couple of examples of objectives for a snakebite awareness training course:

- Upon completion of the training, participants will be able to:
    - Identify the venomous snakes in our community
    - Give examples of how to avoid snakes, including around the home
    - List the steps that should be taken if you or a companion are bitten by a venomous snake

These objectives are specific to the training participants. If these are your training objectives, then you could assess whether each participant can do these things before graduating from the course.

However, sometimes you might have other objectives to evaluate the effectiveness of the training in the community - how does the training change behaviors? Here is an example of how that type of objective might be used:

- Upon completion of the snakebite awareness training, there will be a 50% reduction in the number of snakebite casualties at the local hospital in the six months following the training.
- We will train 25% of the community in snakebite prevention techniques by the end of the year.

In this case, the objectives are measurable and apply more to the community as a whole. The first one is directly related to how people's behaviors change as a result of the training. The second has to do with how many people are actually trained within a specific time period.

These are just examples of training objectives and how they can be used for evaluating the success of your program. However, your objectives must be specific to the community in which you are working, and you should seek the opinions of community members as you make your objectives.

The objectives should be reviewed with the participants at the beginning of the training course so they understand the outcomes of the training for themselves and the community.

At the beginning of the first training session, you should ask the following k

1. At the end of the course, what do you hope you will have achieved?
2. What types of learning do you like best?
3. What are the biggest barriers to you achieving your learning goals for this course?
4. How do you hope this course will improve the quality of your life?

inds of questions at the beginning to find out the expectations that participants have for the course. Here are some example questions you might ask:

5. What are your expectations for this course? What do you hope to learn?
6. What are your motivations for taking this course?

Snakebite Awareness Training
Part 1: Strategy 2 - Training Materials

This training manual was designed for training in western Kenya. It is usable elsewhere with the possible exception of the photos of the snakes themselves, which might be different depending on the part of Kenya in which you are completing the training. For example, if you are on the East Coast of Kenya, you will likely need to include the green mamba in your training, which is not found in western Kenya.

Having said this, to begin this training, there is really only one thing that is an absolute must in terms of materials - the training photos which will need to be printed in color. It is highly recommended that these photos be laminated as well to help the photos stand up to a lot of wear and weather. The photos will be a valuable visual aid to help people learn to recognize and identify the venomous snakes in your area. I have included a few additional snake species in a separate file that are found in other parts of Kenya, but this should not be considered a comprehensive list.

The photos are available with this training manual and have the following titles:.

- Characteristics of Snakes Used For identification in Western Kenya
- Characteristics of A Few Common Venomous Snakes in Other Regions of Kenya
- African Snakebite Institute identification cards for some species of snakes

There are some other materials that may not be absolutely necessary, but if you can afford them, they might be very valuable for the training. These include:

- Large flip charts with white paper
- Markers for trainer
- Paper pads for writing notes

If they are available to you, these are important for demonstrating some first aid tips:

- Compression bandage or strips of clean cloth
- Compression pad or clean cotton cloth
- Something to use as a splint: pieces of wood, rolled up newspaper, sticks at least one meter long
- Strips of cloth long enough to go around two legs and be tied tight.
- Black marker

The following are more expensive first aid items that could be useful if you had access to them:

- Mouth covers for assisted breathing
- Bag resuscitation device

Snakebite Awareness Training
Part 1: Strategy 3 - Getting Started By Using Icebreakers

At the beginning of a training session, you may have a group of people that don't know each other very well. As such, it might be difficult to get people to participate. Or some of your participants may be tired or distracted and need to get focused.

To help people get to know each other and generate enthusiasm at the beginning of the class, we can use questions or games to get people working together - these are called icebreakers (which are ships that break up ice in a river or the ocean so ships can pass through). In this section, we give you some examples of these icebreakers and you can choose which ones you think will work best with your group.

EXAMPLE ICEBREAKERS

Best/Worst - a simple icebreaker to implement in your small group. Ask each person to share their best and worst moments from the previous week. The entire icebreaker should not take longer than 10-15 minutes depending on how large your group is. This is an easy one to use and gives you good feedback on how the people in your group are doing in a general sense. If people are not engaging with the question, you can prompt them with follow-up questions to help them remember what they did during the week. It can also help if you initiate the icebreaker by answering the question first, giving everyone else time to think about their answers.

Most Unique: Go around the room and have each person share something that makes him or her unique or unusual, such as “I’ve never left the village I was born in” or “I am one of 10 children in my family.” The more unique the facts, the more fun the icebreaker becomes.

Line Up: This game requires your group to line up in any type of determined order without speaking to one another. For example, ask your group to line up in order of their birthdays, starting with the earliest in the year. Or have them line up in descending birth order, from oldest to youngest. The prompt could be anything, as long as there is something they can order themselves by. The game is engaging because they have to figure out how to line up correctly without talking.

Hope, Fears and Expectations: best done when participants already have a good understanding of their challenge as a team. Group people into twos or threes, and ask people to discuss their expectations for the event or work ahead, including their fears and their hopes. Gather the group's response by collating three to four hopes, fears and expectations from each group.

Burning questions: this gives each person the opportunity to ask key questions they hope to cover in the event or training. Again you can use this opportunity to discuss key terminology and scope. Be sure to keep the questions and refer back to them as the event progresses and concludes.

Problem Solvers: ask participants to work in small groups. Create a simple problem scenario for them to work on in a short time. *For example, your friend has been bitten by a snake, and she is now having trouble breathing. This is a symptom of what kind of snakebite? What should you do to help your friend?* Once the group has analyzed the problem and prepared their feedback, ask each group, in turn, to present their analysis and solutions to the wider group.

Word Association: this helps people explore the breadth of the area under discussion. Generate a list of words related to the topic of your event or training. *For example, ask participants what words or phrases come to mind when they hear the word "snake"? They might then suggest: "danger," "poison," "witchcraft," "evil," and so on.* What are some of the main themes that come across in their answers? You can use this opportunity to introduce essential terms and discuss the training topics for the day.

EXAMPLE QUESTIONS YOU MIGHT ASK FOR ICEBREAKERS OR STARTING A CLASS

Ask the participants to keep their answers short so everyone has a chance to respond. Just pick one or two of these to go with an icebreaker or at the beginning of a lesson after the icebreaker.

- How old were you when you first encountered a snake?
- Would you say that you like snakes or dislike them? Why?
- Do you think snakes are ugly or beautiful?
- Do snakes disgust you or make you afraid? Why?
- What would you do if you found a snake in your house?

- Do you think snakes are harmful to people or helpful? Why?
- Do you associate snakes with evil or witchcraft? Why?
- What would you do if you saw a snake on the road or path in front of you?
- Have you been bitten by a snake? What was your experience?
- Do you think snakes deserve conservation and protection?
- Do you think your attitudes about snakes would change if you knew more about them?
- What would you like to get out of this training? What are your expectations?

Snakebite Awareness Training
Part 1: Strategy 4 - Learning Activities About Snakes

It is important that participants feel engaged in their learning. To help trainers accomplish that, we have prepared the following activities for active learning about snakes and snakebite. Select and use these at an appropriate point during your training. Suggestions about when to use these are including with most exercises.

True or Not True

Note: This should be completed after the initial information is shared about snakes.

I am going to make a series of statements. If you think that statement is true, I want you to give me a thumbs up 👍. If the statement is not true, I want you to give me a thumbs down 👎. If you are not sure, stick your thumb out to the side. Are you ready?

1) Snakes are reptiles. (yes)
2) Snakes have bones. (yes)
3) Snakes are the same temperature as their environment (yes)
4) All snakes are dangerous. (no)
5) Snakes bring bad luck (no)
6) A snake uses its forked tongue to taste its environment (yes)

7) A young snake is much more poisonous than an adult snake (no)
8) Snakes shed their skin (yes)
9) Snakes have eyelids (no)
10) Snakes have ears (no)
11) A snake can bite you even after it is dead (yes)
12) All snakes lay eggs (no)
13) Snakes are important because they control rodent populations (yes)
14) Angry snakes chase people (NO)
15) All people that like snakes and handle them are witches (NO)

Snake ID Knowledge Competition

This activity assesses how much the participants know about snake identification (ID). Break your participants up into two or more groups. Take turns asking each group to answer the questions below. Assign 2 points for a correct answer, and 0 points for an incorrect answer. If one team answers incorrectly, the other can "steal" one point by answering correctly. Have the losing team do something for the winning team if possible.

Example Questions:

1. Name or describe the two types of pupils a snake can have (can make shapes with the hands).
   Answer: round or vertical (like a cat)

2. Name or describe the two types of scales a snake can have.
   Answer: smooth or keeled

3. Name or describe the three possible head shapes for a snake
   Answer: rounded, triangular, or coffin shaped

4. Name the three things to look for regarding body markings
   Answer: plain, striped, or patterns

5. What pattern can you find on the back of a puff adder (can use hands to describe)?
   Answer: V shape

6. What color is the inside of a black mamba's mouth?
   Answer: black

7. What should we look for in terms of tail length?
   Answer: whether it is long or short

8. What should we look for when describing a snake's body type?
   Answer: slender (little finger sized), moderate (thumb sized), or thick (wrist size).

Snakebite Prevention Role Play

In this role play, two groups of participants will act out a scene where they are walking down a path, checking their home before they go to bed, or working around in their compound. They will act out the things they should do to be safe in these situations.

This type of role play should be repeated often during training sessions to help build the knowledge and confidence of the participants, as well as developing their communication and problem-solving skills.

When to use: after reviewing the steps for avoiding snakes when walking, in your house, and in your compound.

Safe Environment: Establish a safe environment up front so that people will know that it is ok to make mistakes and try different things because that is how we learn. Be supportive.

How to use: From your participant group, select two groups each having 2-3 people. One of these groups will demonstrate bad behaviors that might result in a snakebite. The other group will demonstrate good behaviors that can help to prevent or avoid snakebite. You can assign roles to each member, or let them assign their own roles. The groups should act these out as if in a story, skit, or play. Before they do the role-play, have them describe the situation and setting of where it will take place. Have the participants that are watching the two groups **actively listen** so they can provide feedback when finished.

Feedback: After the role play, take time to discuss the results. Ask those that had a role to discuss why they made certain choices. Give each group positive feedback on things the role plays should have included, or where choices made could have ended up in a snakebite.

Variation 1: Assign each group to demonstrate through a role play one of these:

- How to avoid snakes when you are walking into town or to the garden or field

- Steps you can take to prevent being bitten by a snake inside your house
- Steps you can take to prevent snakes from being in your compound

Variation 2: Begin the role play with a **demonstration** by one or two people. Ahead of time, ask one of the participants if they would like to assist you by acting out what it might be like for someone to be bitten by a snake. Give them enough time to prepare for the role they are playing. Once the role play is over, ask the group to help him/her know what they should do once bitten.

Recognizing Symptoms of Snakebite

These scenarios can be used throughout the training individually to test how well people are retaining the information.

Now that we have gone through all of the symptoms of snakebite, let's see what you can remember about the symptoms you might experience with different types of snakebite. I will read you a short story of something that might happen to you, and I will then ask you some questions that you need to answer. Listen carefully for clues in the story. I will let you discuss the question with a neighbor for a minute before calling on someone to answer.

Scenario 1

Your son comes in from playing outside and says his ankle hurts. You look at the area, and realize he has been bitten by a snake.

1) What should you do?

Possible Answers:

- See if he can describe the snake - how long, color, pattern, behavior
- Keep him calm and still; immobilize the wounded area as much as possible
- Keep wound below heart
- Remove jewelry, clothing, or anything constricting around bite site
- Gently clean the wound with water
- Get him to a hospital as soon as possible

2) What should you NOT do?

- Take the time to go to the traditional healer
- Do not attempt to kill or capture the snake
- Do not apply a tourniquet
- Do not try to suck out the venom
- Do not burn, shock, or freeze the bite area
- Do not drink alcohol or take sedatives for pain

Scenario 2

You are walking down a path when you feel a sharp pain in your leg. You see a snake crawling away. You have been bitten by a snake.

After the bite, you feel very little pain, but your skin near the bite is starting to tingle, your muscles start to twitch, and you feel dizzy. After a few minutes you are having trouble breathing.

What part of your body is being affected?

(Answer: your nerves are being affected)

What should you do?

(Answers: Get to the hospital as quickly as possible, keep the affected limb still, clean the wound with water, apply a pressure pad or bandage, if possible immobilize the limb with a splint [tie the arm to the body or one leg to the other], keep the affected limb at the level of the heart)

Scenario 3

Your husband comes in and says he thinks he was bitten by a snake when he was grazing the cattle. He is feeling a lot of pain near the bite marks, there is swelling of the affected limb, and he feels pain in his armpits. His skin starts to bruise and blister.

What part of his body is being affected?

(His cells and tissues are being affected)

What should you do?

(Answer: Get to the hospital as quickly as possible, keep the affected limb still, clean the wound with water, **NO PRESSURE PAD OR BANDAGE**, if possible immobilize the limb with a splint, keep the affected limb at the level of the heart)

Scenario 4

You are walking through the forest, and as you pass by a bush, you feel a stinging pain in your left arm. You continue to walk home. Once you are home, **after an hour** you start to feel nausea, vomiting, and diarrhea. Your wound starts to bleed freely.

What part of your body is being affected?

(Your blood is being affected)

What should you do?

(Answer: Get to the hospital as quickly as possible, keep the affected limb still, clean the wound with water, **NO PRESSURE PAD OR BANDAGE**, if possible immobilize the limb [tie arm to body or one leg to the other], keep the affected limb at the level of the heart)

Scenario 5

You have just encountered a spitting cobra when you were outside of your home, and it spat venom into your eyes.

What symptoms will you experience?

Answers:

- Pain in your eyes and watery eyes
- Can't see
- Swelling in your eyes
- Whites of eyes turn red
- Uncontrollable blinking or twitching of eye
- Eyes affected by bright lights

Which of these should you do?

1. Rub your eyes?
2. Rinse your eyes with water or milk for 5-10 minutes?
3. Tie a piece of cloth over eyes or wear dark glasses?
4. Go to bed and wait for the pain to go away?

Answers:

- 2 and 3 are true
- Never rub your eyes
- Always get to a hospital for treatment - don't wait!

Scenario 6

You are walking down the path to the garden, and you are bitten by a snake with a thick body, short tail, triangular head, and a V-shaped pattern on the back.

What type of snake is it? Choose between puff adder, black mamba, or forest cobra.
[Puff Adder]

You are walking down that same path to the garden, only this time you are bitten by a snake that is black with yellow on the throat and black bars or blotches in the neck area as well. The snake rears up and flattens its neck while hissing.

What kind of snake is it? Choose between puff adder, black mamba, and forest cobra
[Answer: forest cobra (black mambas aren't black)]

MORE DISCUSSION STRATEGIES

Here are some more discussion strategies that you can choose from to help your participants learn information together. In the process you can assess how well everyone is learning.

This Or That - Make an imaginary line with an object at each end as markers. Ask everyone to line up on the line. In your mind, choose one end to be the "agree" side, and the other end to be the "disagree" side. Then say, "I am going to read out loud a statement that has only two possible answers - agree or disagree. If you agree with the statement, I want you to move to this end of the line (point to it). If you disagree with the statement, I want you to go to the other end of the line. Once everyone has agreed or disagreed, I will ask each side to defend their answer."

Types of Questions You Could Ask:

- I should check the floor around me before I get up in the morning.
- I should step over a rock when I see it on the trail in front of me.
- Walking to the market alone at night is ok as long as I tell someone
- Snakes are evil
- Burning tires will drive away snakes
- I should look in hidden areas and the ceiling for snakes before I go to bed
- I can leave my clothes on the floor of my house - snakes will avoid them
- ***Come up with more of your own questions ...***

Conversations - Place participants into a few groups of 4-6 people. Give each group a discussion question to talk about (examples: why should we care about snakes? Are snakes evil? What symptoms might I experience if I am bitten by a snake? What are some of the things I should do or not do when bitten by a snake?)

After a 2-3 minutes of discussion time, pick one or two participants from each group to move to a different group, while the rest of the group members stay in place. Once in their new group, each group will be given a similar, related question (an extension of the first one) to discuss; however, the new and old members of the group can also share the key points from their last group's talk.

Repeat this once or twice more using different people to move each time.

Think-Pair-Share: Ask all the participants a single question, and ask them to think about their answer without talking to anyone else. Once you've given them a minute to think, have them pair up with ONE other person and share what they think is the answer to the question. Once you have share together, the trainer will bring everyone back together and everyone can share their thoughts about the original question.

Snakebite Awareness Training
Part 1: Strategy 5 - Closing Activities

At the end of a training session, it is important to assess how well the participants understood and retained the material. A good ending to the training should include:

- Reviewing the key points of the day's training
- Questions to assess participant understanding
- Determining what key conclusions participants have drawn from the training
- Finding out what questions the participants still have about the information from the training
- Outlining what is coming up in the next training

In the section below are some ideas for assessing participant understanding, determining the conclusions drawn, and finding out what concepts still require more training.

EXAMPLE CLOSING ACTIVITIES

The following closing activities are from this website https://www.edutopia.org/blog/22-powerful-closure-activities-todd-finley)

So What?: Have students answer this prompt: What information from the lesson will be important to know three years from now? Why?

Role-Play: Have participants model a real-life scenario. For example, have them enact what might happen if someone was bitten by a snake.

Beat the Clock: Ask a question. ***For example:*** *what are the symptoms of a bite from a black mamba? Or why are snakes important to the ecosystem?* Give students 10 seconds to talk with peers before you call on a random student to answer. Repeat.

Review It: Ask a question - *for example, what are three types of markings that help us identify a snake*. Direct participants to raise their hands if they can answer the question. Call on someone to give the answer. The rest of the participants agree (thumbs up) or disagree (thumbs down) with the response. You can see how many people understand by how many correct responses are given (thumbs up).

The following icebreakers are from this website: https://p7cdn4static.sharpschool.com/UserFiles/Servers/Server_92164/File/General%201/Lesson%20Closure%20Activities.pdf)

Daily Dozen: Choose 2-3 questions from this list and ask participants to respond about the day's lesson.

- The thing that made the most sense to me today was...
- One thing that I just don't understand is...
- When someone asks me what I did in snake awareness training today, I can say...
- One thing I would like more information about is...
- I need more examples of...
- I enjoyed...
- The most important concept that we discussed today was...
- Today's class would have been better if we had...
- I was confused by...
- The thing we did in class today that best fit my learning style was...

- The one thing the teacher did today that best fit my learning style was...
- The one thing the teacher did today that did not work well for me was...
- This point is really clear...
- One thing that squares with things I already know is...
- An idea that is still going around in my head is...

Be The Teacher: Participants present to the group three key ideas they think everyone should have learned.

I Care Why? - Participants explain the relevance of a concept to their life or how they might use it. For example, learning to check the floor around me before I awaken and move is relevant to my life because if I don't, I might get bitten by a snake that entered my house.

Three W's: Participants discuss:
- What did we learn today?
- So what? (relevance, importance, usefulness)
- Now What? (how does this fit into what we are learning, does it affect our thinking, can we predict where we are going)

Pair/Share - Tell the person next to you two or three things you have learned today, then I will have each group share a report of what they have learned.

EXAMPLES OF IMPORTANT QUESTIONS TO ASK TO GAUGE PARTICIPANT UNDERSTANDING

- Hold up a picture of one of the snakes, ask people to identify it, and state what characteristics they used to identify it

- What symptoms should you experience if you have been bitten by a snake with venom that attacks your nerves? Which types of snakes have this kind of venom?
- What symptoms should you experience if you have been bitten by a snake with venom that attacks your cells? What types of snakes have this kind of venom?
- What symptoms should you experience if you have been bitten by a snake with venom that affects your blood? What types of snakes have this kind of venom?
- What characteristics of snakes can help you identify the type of snake?
- What behaviors might you see that signal that a snake is aggressive or threatened?
- You encounter a forest cobra on the trail in the Upendo Conservation Area. What should you do to avoid being bitten?
- Your friend has been bitten by a snake on your way home from town. What steps should you take with your friend before help comes?
- Tell me three steps you can take to keep your home and compound free of snakes
- Give examples of what you can do to avoid stepping on a snake when walking outside or into town
- Why should you not go to the traditional healer for snakebite?
- Why should we conserve snakes? Why are they important in nature? How are they helpful to humans?
- If you are able and know how to do this properly yourself, have participants demonstrate how to put a splint on an arm or leg using a piece of wood, strips of cloth, or whatever is on hand.

Part 2: Lessons

Snakebite Awareness Training
Part 2: Introduction - Why We Are Here

Hello, and welcome to the beginning of our snake awareness training course. Thank you for attending today, and also thanks to the community for allowing us to do this educational program. My name is [INSERT YOUR NAME] and I am from [ORGANIZATION OR COMMUNITY]. I will be assisted by [NAME] in delivering this course to you.

At the end of this training, here is what you should know or be able to do:

1. Identify the most dangerous snakes that are found in this part of Kenya.
2. Recognize the symptoms associated with different types of snakebite
3. Remember a few simple steps to follow if you are bitten by a snake
4. Take precautions as you walk outdoors to prevent snakebite
5. Take steps to prevent snakes from entering your home or compound

Some of you might be wondering, “Why are we talking about snakes and snakebite?” We are talking about this because this is an important issue that affects the lives of a lot of people in our community, and in other communities across Kenya. Let me share three stories to help us think about why we are here.

Conjester grew up in a village where she was warned that snakes are a great enemy, and if she was bitten she would die. So she grew up knowing that if she saw a snake she must run away or

hit it with a stick to kill it because if she didn't, it would kill her. Then in 2010, she lost her dear 17-year-old daughter Emily to snakebite. After school in the evening, Emily went to fetch vegetables on the farm. After she returned from looking for water, she found Emily sleeping. She inquired what was happening because that was unusual. Emily said while crying that she was bitten by a big snake while fetching vegetables. Immediately Conjester took her to the traditional healer with a swollen left leg. By then Emily was in pain and she could not talk well. As usual, the healer spit on the area where Emily was bitten, but at this time Emily could not talk and she was breathing very fast. The family was encouraged to give her uncooked eggs, but they decided to take Emily to the hospital instead. Unfortunately, they did not move more than 100 meters from the healer's home before Emily passed away.

Here is another story: *Catherine shared that until the introduction of the snakebite awareness training, she could not listen to anything concerning snakes, or any picture of a snake. This was because her grandmother Zipporah, who is now 83 years old, was bitten by an unknown snake while assembling firewood in the late evening outside her house about 18 years ago. They discovered too late that it was a snake bite when she was really in pain. She was taken to a traditional healer because of traditional beliefs and the lack of an available medical institution. This left her right leg paralyzed and later all of her lower limbs were affected; she is now in a wheelchair. At her age, she needs constant support.*

Finally, one more story: *In the year 2020, Doricas went shopping with her friends in town late one evening when it was becoming dark. As she was walking and talking, she was in bare feet and she stepped on something. When she checked she saw a black*

snake moving away. She shouted "SNAKE" and all of her colleagues ran away. Immediately, she felt pain on her left foot and noticed blood and realized she had been bitten by that snake. Her friends were nowhere to be found. She tried to go home, but it was so painful. She was finally assisted so she could go to the traditional healer - who was not there. By midnight, she was in a nearby hospital. After treatment, she was required to pay 21000 Kenyan shillings. It was so difficult to raise such money, and she had no option but to sell the only cow her family had for milk.

These stories show the effects that a snakebite can have on someone's life here in Kenya. I know that some of you can relate to these stories. There are some snakes that are so dangerous that if you don't get help right away, you might die. If you don't die from the bite, you might have serious injuries that affect the quality of your life, and for some people that might mean having a limb removed if the bite is serious enough. Snakebite can also have a financial impact on a family - if an adult is no longer able to work due to injuries, or the cost of medical treatment is too high, it might mean the family has less money to live on.

I am sure that many of you have similar stories, and might like to share those with the group. We are here and we are listening, and would like to know your story. I would just ask for the sake of time that you keep it brief if possible so we have enough time for others to share their stories.

[GIVE PEOPLE SOME TIME TO SHARE WHAT HAS HAPPENED TO THEM WITH REGARD TO SNAKEBITE]

Thank you all so much for sharing your stories. It is true that something needs to be done about the issue of snakebite in our communities. The answer is not to kill all of the snakes, because

they serve important functions in nature. Despite this, we acknowledge that if a dangerous snake is endangering your family you might need to kill it. While we all might hope for better treatment facilities, or better roads to get us to the hospitals, or more antivenom to be available, much of that is out of our hands.

But there is something we **can** all do. We can all take responsibility for the things we can control For example, we can (1) learn how to identify the snakes that are really dangerous in our community, (2) be aware of steps we can take when walking outside, living in our houses, or working and playing outside of our houses to prevent or avoid snakebite, and (3) know what to do and what not to do if you are bitten by a dangerous snake.

Here is an example from a recent training elsewhere in Kenya. A participant named Juliana who had finished the snake awareness training said, “I have kept a tree forest for years on my land. Until recently, I had not cleared my compound, so snakes appeared regularly from the forest. The snake awareness training has really changed the face of my home. The compound has been cleared and cleaned, and for the last month snakes have not visited me”. She was really thankful because the snake awareness training gave her practical steps for keeping snakes away from her home and compound. This is what we hope for you after this training is completed.

This is what we are trying to accomplish in this training.

Are you ready to begin?

Snakebite Awareness Training
Part 2: Lesson 1 - Myths and Misconceptions

OPENING: *Start the lesson with asking the participants to share about things that they have heard or beliefs they have about snakes. You might hear things like "snakes can sting with their tails" or "snakes are evil". At this stage, just let the participants share - don't try to prove them right or wrong. Make note of these ideas people have about snakes so that you can try and address them in this lesson or later in the course.*

There are many beliefs about snakes, and many of them are myths and misconceptions that humans have to help them understand the world around them. Many of the beliefs we have about snakes came from religion. For example, some African religions believe that snakes are evil, and are associated with witchcraft. Other African religions believe that snakes are good, and worship gods that are in the form of a serpent. In fact, killing a python in some West African religions was considered a death sentence.

Let's explore some of the beliefs that people have about snakes that persist today. I am going to ask you to make yourself vulnerable by telling the group what you think about these beliefs. But remember, this is a safe space, and we can be honest and truthful with each other and still be treated with respect.

[THIS WOULD BE A REALLY GOOD PLACE TO DO EITHER THE TRUE OR NOT TRUE OR THE THIS-OR-THAT ACTIVITY FOUND IN THE LEARNING ACTIVITIES LESSON]

From one of those activities - If you believe this statement, do this _____. (thumbs up or move to the end of a line) If you do not believe this statement, do this _____. (thumbs down or move to other end of line).

All snakes are dangerous or poisonous

Myth: there are far more snakes that are harmless than there are dangerous or poisonous ones. In Africa, there are 500 different kinds of snakes, and of these only 137 are considered dangerous to humans in some way. That is just higher than 25% or ¼ of all kinds of snakes in Africa.

Snakes are cold and slimy

Myth: snakes are not slimy; they feel like leather. Snakes cannot maintain their body temperature, so their body is the same as the environment around them. When they sit in the sun, they are warm. When they are in the shade or it is cold outside, they are cold.

Snakes have no bones

Myth: snakes are animals that have a backbone and ribs

Snakes are deaf

Myth: while snakes do not have external ears, they are able to sense vibrations in the ground - that is why if you walk with heavy footsteps, snakes will often slither away to avoid you.

Snakes stare at people OR snakes have hypnotic powers

Myth: snakes appear to stare at people because they have no eyelids and cannot blink. Snakes are not able to hypnotize anyone on their own.

Snakes go blind in the heat of summer

Myth: snakes shed their skin, and when they do, their eyes turn white because the clear scale that is about to come off gets cloudy as it moves away from the old one. This temporarily affects the snake's vision.

Snakes can grab their tail and roll away like a wheel or hoop.

Myth: there is no truth to this at all. There has never been a reliable report of this happening.

Snakes seek revenge when their mate is killed

Myth: snakes have limited amounts of energy, and cannot waste what little they have finding the person that killed their mate; they have to use it to find food or they will die. Furthermore, snakes do not mate for life, so most snakes have no idea who their mate is unless it is mating season.

Angry snakes attack people

Myth: snakes are more afraid of you than you are of them. When startled by a human, a snake would much rather escape from you than stand and fight. However, if you are in the way of a snake''s only escape route, they may come towards you. Some cobras and mambas do come forward if their intention is to bite.

Young snakes are more dangerous (poisonous) than adults

Myth: young or juvenile snakes have less venom to inject than adults, however the degree of poison is the same. The amount of venom delivered by young and old snakes varies, so it is hard to predict whether one snake will deliver more venom than another. It depends on the circumstances.

Snakes have the ability to sting you with their tail
Myth: although some snakes have tails that end in a point, there is no stinger in the tail of a snake, so they cannot sting you.

There are some kinds of snakes with a head at each end of the body
Myth: some of the snakes in Kenya look like they have a head at each end - these are generally called blind snakes or worm snakes and they tend to live underneath the ground surface. However, there is a distinct head and tail in these snakes.

Milk attracts snakes
Myth: milk does not attract snakes. In fact, most veterinary scientists say that reptiles cannot digest dairy products.

The best way to get rid of snakes is to burn tires or pour oil around my property
Myth: neither of these will keep snakes away, and there is no snake repellent that will work either. Burning tires or spreading oil is actually not good for humans either, as it can cause problems for your lungs. Oil can also pollute water sources.

If I am bitten by a snake, I should tie a piece of cloth tight above the wound to keep the venom from going to my body (tourniquet).
Myth: tourniquets should never be used on a snakebite, especially from a viper, adder, or spitting cobra bite. The bite of these snakes causes considerable swelling, and a tourniquet could (1) shut of circulation, and (2) keep the poison in the affected limb where it could cause more damage.

If I am bitten by a snake, I should have someone suck out the poison.

Myth: once venom is injected, it is impossible to suck out all of the venom, and if the person has a cut in his/her mouth, the venom can get in their bloodstream and start to affect them. Venom extractors in first aid kits do not work either.

A snake in your house means you are cursed

Myth: a snake in your house means that your house is not very safe and you will need to take precautionary steps to make sure there are no snakes in your house or your compound. However, snakes are animals with no power to curse you.

Anyone who handles snakes practices witchcraft

Myth: While it is true that snakes can be used by those that practice witchcraft, there are many people who handle snakes that are not witches. Some people use snakes in their religious services - even some churches. Others love to handle snakes because they find them to be fascinating creatures. It is how snakes are used that makes the evil - in and of themselves they are God's creatures and are good.

All snakes are evil

Myth: this generally comes from a misunderstanding of Genesis chapter 3 in the Bible. There it says that Eve was tricked by a snake ("serpent") into eating from the tree that God said was not allowed. In this case, the snake or serpent represents the devil or Satan. However, if you also believe the creation story, snakes were among the creatures that God created and said that they were very good. David wrote in the Book of Psalms that God has love and compassion for all he has made, and that would include snakes. And there are many positive references to snakes in the Bible. So, no, snakes are not evil - they are just one type of animal on this

planet that is perfectly adapted for its lifestyle and has a right to eat and to defend itself. It just so happens that some of them catch their prey and defend themselves with venom that has the potential to harm a human - just like humans have the potential to harm, and have killed a lot of snakes in defense of their families.

So there are a lot of things that we have been taught since childhood, or taught by our religions, that are not true about snakes. Because of these things, our actions toward snakes are generally driven by fear. In your village, and throughout Africa, people have fear of snakes for a good reason - there are many snakes that can cause harm or death to you or a family member, or can cause you to lose your financial or food security when you have to pay a lot of money for treatment. However, not every snake is dangerous - in fact, many are beneficial to have around because they help to control rodent populations that cause disease and eat your food supplies or seeds.

So as we go into our training, we need to consider these points:

1) We can replace our fear with respect - we can recognize a snake, keep our distance, avoid the places where snakes may be hiding,, and know what to do if there is an unfortunate incident where you are bitten by a snake
2) We should regard every snake as dangerous unless we can be 100% accurate every time about its identification
3) We can be sure that some dangerous snakes are not found in our area - for example, there are no green mambas in western Kenya.
4) We can learn to recognize the dangerous snakes so we know to stay away from them

5) If a venomous snake is in a place where it might cause harm to our families, especially children, then unless there is a snake removal service nearby to remove the snake, it may be necessary to kill it
6) We can learn how to recognize snakes that are not dangerous so we will not kill them unnecessarily

In order to accomplish these things, we need to learn more about snakes and why they are important, and how to recognize some of the more common dangerous snakes in our community.

Snakebite Awareness Training
Part 2: Lesson 2 - What Is A Snake?

As you begin this lesson, ask the participants what they think they know about snakes. Do snakes have bones? Can they hear? Can the tongue sting you? Let them answer freely without correction, so that you can direct their learning to address misconceptions they have about snakes during the lesson.

Let's start this training with learning about snakes and their characteristics.

Why is this important? - it is important to understand the characteristics of snakes and their behaviors so that you can know when you might have an encounter with a snake and why. Also, so that we don't just kill every snake we see, we need to understand why they are important in nature so we will kill a snake only when it is a threat to yourself or your family.

<u>What is a snake?</u>

Snakes all have a tubular body, and they do have bones. Snakes are different from other reptiles in that they have no legs. Without legs, they employ a variety of different movement styles. The one that most of us recognize is the S-shaped, side-to-side movement [***demonstrate this with your hands***] that a snake uses to wind its way through the environment. However, if you have ever watched a puff adder move, it looks like a caterpillar or worm inching its way forward.

Because they have no limbs to hold onto their food, snakes have curved teeth that are designed for grasping and holding onto food. They can expand their jaws really wide, and use their lower jaws to pull their prey into their mouths.

Snakes have other sensory organs that help them understand their surroundings. Snakes do not have external ears and no vocal cords to make sounds - except that they can hiss. However, ***they can sense vibrations in the ground***. They have a forked tongue that picks up scent particles around them which can be used to find prey and mates. Some have heat-sensing pits that allow them to find warm blooded prey at night. Snakes also have good vision, and ***their pupils can sometimes tell us whether they are active during the day or at night***. People often think that snakes are staring at them, but that is because they have no eyelids to blink.

Why is it important to know these things? Because all of these sensory organs are used by a snake to detect you when you are coming toward them, and if you understand that, you know that they will sense you and move away as long as they have a route to do so. They would rather flee than fight.

You will soon learn that getting an idea of the length and thickness of a snake is useful for its identification. Some snakes are much heavier and thicker than others. Heavy snakes include the rock python and the larger vipers, such as the puff adder and rhinoceros viper. The larger cobras and mambas are thick snakes as well, although not as thick as the vipers. Many snakes, such as green snakes and sand snakes, are about as thick as one of your fingers.

Snakes also vary in length. The longest snake in Africa is the rock python, which can measure 4-6 m in length - it is also the heaviest

snake. The longest venomous snake in Africa is the black mamba which can be up to 4 m in length. The smallest snake in Africa is the Brahiminy blind snake, which is only 2-6 inches long.

Snakes are covered with scales made of the same materials as your fingernails. These help to protect the body and keep it from drying out. Scales can either be smooth or keeled. Keeled scales have a ridge down the center of each scale. ***If you can see the type of scales a snake has, it will help you to identify it.***

Shedding

Snakes grow throughout their lifetime, but their skins do not grow with them. So periodically, a snake has to shed its skin because the body outgrew it. During this time the skin gets dry, they turn dull in color, the eyes become cloudy, and they stop eating. ***Because they can't see very well during this time, they can become nervous and feel threatened more easily.*** When it is time to shed, they rub up against a rough object to pull the skin off of their body inside out.

Basking

When you are outdoors, you might encounter a snake in a sunny spot or on a warm rock. Like all reptiles, snakes are unable to maintain or regulate their own body heat, so their body temperature is the same as their external environment. So when it gets too cold, a snake will move into a sunny spot to warm up its body. This is called ***basking***. When snakes need to cool off, they find a shady spot or a burrow where they can lower their body temperature.

This snake is increasing its body temperature by laying on a warm rock in the sunshine. Photo courtesy of MattysFlicks under the Creative Commons Attribution 2.0 Generic license.

Where do snakes live?

Why is it important to know where snakes live? If you know where snakes live, then you know the kinds of dangers that might be present when you go there, and it might make it easier to identify a dangerous snake if you are bitten.

Some snakes spend most of their time ***in trees***. Examples of these include the green mamba, boomslang, harmless green snakes, bush vipers, and tree snakes.

Green bush vipers spend their time in trees (photo courtesy of Matt Muir under the Creative Commons Attribution-Share Alike 4.0 International license without changes.

Other snakes like to spend much of their time ***on the ground*** in forests, savanna, or deserts. Examples of snakes that live on the ground include carpet vipers and desert horned vipers, puff adders, Gaboon vipers, and rhombic night adders. Forest cobras spend much of their time on the ground, but are graceful climbers and also good swimmers, so they might be found in other habitats. Black mambas are also equally at home on the ground or in trees.

Snakes can also live ***under the ground*** in the soil or in burrows. Examples include the burrowing asps (stiletto snakes), blind snakes, and worm snakes. These snakes usually have small eyes as compared to other snakes.

Lineolate blind snake (photo used with permission from Stephen Spawls).

Some snakes live ***in or near water***. Examples include water snakes and marsh snakes. In some locations, forest cobras are considered to be semi-aquatic as they spend much of their time around water.

Some snakes live ***in sandy desert*** environments. The desert horned viper and carpet viper are two examples.

Carpet viper or saw-scaled viper. Photo used with permission from Stephen Spawls.

It is important to note that there are many kinds of snakes throughout Kenya, but they are not all found everywhere in Kenya - some are found widely across Kenya and others are isolated to small sections of Kenya. For example, the green mamba is only found along the east coast. If you see a green snake in other parts of the country, it is likely to be a harmless green snake, or perhaps a dangerous boomslang, but not a green mamba.

What do snakes eat? And who eats them?

Snakes are known to eat rodents and other small mammals, fish, frogs, lizards, other snakes, and birds. The African rock python is capable of eating animals the size of a small antelope. Some snakes, like the rhombic egg eater, eat bird eggs. When they are young, some snakes feed on insects.

Snakes are eaten by leopards, hyenas, and other carnivores; other snakes; large lizards (Nile and savanna monitors); crocodiles; large fish; some of the larger frogs, and predatory birds (snake eagle, secretary bird). (See photo below courtesy of Charles J. Sharp under the license Creative Commons Attribution-Share Alike 4.0)

Black-chested snake eagle eating snake

Hunting

Some snakes are active hunters and move around looking for food. Snakes that use this type of hunting are generally faster moving, such as the green snakes, boomslang, and some cobras. Other

snakes tend to find a spot to coil up and then wait for unsuspecting prey to walk by before striking. These are known as ***ambush predators***. An example ambush predator is the puff adder. A puff adder sits by a trail waiting for an animal to come along that it can eat. If you pass by too close to where they are waiting, they might bite you.

Activity Periods

It is important to know when a snake is most active to understand when you might have an encounter. Some snakes are more active during the day; we say they are diurnal. These snakes tend to have round pupils. On the other hand, some snakes are nocturnal - they are more active at night and many of them have vertical pupils. Some, like the forest cobra, can be active at any time of day.

Snakes also tend to be more active during the rainy season, or at night after a good rain. They can also be active during mating season as they try to find a mate.

Reproduction

Snakes breed at various times in the tropics, but in Kenya it is generally a month or two before the start of the wet season. Cobras, mambas, boomslangs, twig snakes, night adders, tree snakes, carpet vipers, and many harmless snakes lay eggs, while puff adders, Gaboon vipers, and many other vipers tend to give birth to live young.

During the mating season, some cobra and mamba males “fight” over the right to breed with a female. The two males twist around each other, but do not try to bite each other. It is more like a dance or wrestling competition to see who can outdo the other. The winning male gets to mate with the female.

Why are snakes important in nature and to humans?

Snakes play an important role in our ecosystems by controlling the populations of some animals, including rodents. Rodents are carriers of diseases and also get into our food supplies. In some ecosystems, the role of snakes can be so important that removing them causes problems for the entire ecosystem. **A good snake to have around your house for rodent control is the brown house snake** (see below). They are harmless to humans and cannot kill you. There is no need to kill this snake - just put it in a bucket and move it to an area away from your house.

Brown house snake. Photo used with permission of Stephen Spawls.

Snakes are important to people, too. Besides controlling pest populations, the chemicals in the venom of some snakes are useful as medicines. For example, snake venom has been used to produce medicines that thin your blood, which is important if you have some types of heart conditions.

Threats

While this training manual is about saving human lives from snakebite, we should also acknowledge that humans have killed a lot of snakes, whether intentionally or accidentally. Humans have an innate fear of snakes, and will kill them whether harmless or not. People driving on roads will often swerve on purpose just to run over a snake. However, this fear can be changed if people take the time to learn about snakes like you are!

In Kenya, perhaps the biggest threats to snakes include:

- Loss of snake habitat (destruction) from expanding human populations, agriculture, and cutting forests
- Breaking snake habitat up into small pieces (fragmentation)
- Making habitat less suitable for snakes (degradation)
- Introduction of invasive species and domestic animals that eat snakes and snake eggs
- Snake diseases spread by humans
- Harvesting of snakes for food, skins, and pets
- Snakes killed accidentally or on purpose by vehicles on roads
- Snakes killed by people out of fear

Conservation

Because snakes play an important role in the function of our ecosystem - the ecosystem that supports our lives, it is important to conserve and preserve snake populations and the habitats where they live. Here are some important steps we should take toward snake conservation:

- Learn more about snakes and the habitats in which they live as part of your community; learn how to tell the difference between the most dangerous snakes from those which are harmless

- Teach your children to have a healthy respect for snakes and kill them only when necessary to protect yourself or your family

- Do your best not to kill non-venomous snakes in your home and compound, and only kill the venomous snakes when they are a threat to you or your family.

- Work together with your community to protect the last remaining habitats for snakes and other animals before they are gone.

Avoiding Snake Encounters With Our New Knowledge

So why do we need to know all of this information about snakes? How does this prevent us from having a deadly encounter with a snake? Consider these points:

1. If we know snakes have fragile rib bones, we can learn to be more cautious about stepping on them.
2. We can keep our distance when we see a shedding snake, knowing that it is more vulnerable and perhaps aggressive during that time
3. We can use the knowledge that snakes are sensitive to vibrations to walk with heavy footsteps when out on a trail or in the bush - this might make them move away from us
4. If we know when snakes are active (day or night, wet season/dry season) we can be more cautious during those times and take actions to avoid them during those periods.
5. If we know that some snakes, like puff adders, conceal themselves along a path where prey is likely to travel (they are ambush predators), then we can be very observant when walking in places where they might be concealed (tall grasses), and use a stick to probe the ground in front and alongside us.
6. If we know snakes are often found in certain types of habitats, we can be more aware and practice good prevention skill when in those habitats.
7. On hot days, we can be particularly careful in shady areas, because snakes may go there to cool down after basking in the sun
8. Because we know snake habitat is shrinking, we can understand that snakes may be driven toward human settlements by human activities and be observant as we carry out our daily activities in those settlements.
9. We can work with our communities to protect snake habitat (for snakes and other wildlife) so they are less likely to move into human settlements.

Review Questions:

Try incorporating these into some of the assessment activities provided in the lesson “Learning Activities” or just ask the participants to answer these.

1. What tools do snakes use to sense their environment? How does that help you avoid snakebite?
2. What is the largest non-venomous snake in Kenya? The largest venomous snake?
3. How do snakes control their body temperature? Why might knowing that prevent a dangerous encounter with a snake?
4. What are some of the places that snakes live? How might being aware of these places help you avoid snakebite?
5. How do snakes act when they are shedding? Why is that important for you to know?
6. What do snakes eat? Who eats them?
7. Why are snakes important in nature?
8. What are some ways that humans threaten snakes?
9. What can we do to conserve snakes?

Snakebite Awareness Training
Part 2: Lesson 3 - Characteristics Used to Identify Snakes

NOTE TO TRAINER: the photographs in this lesson (or similar ones) are also available as slides that you can have printed and laminated if possible. These can be passed around for participants to look at while you are talking about them. Hold up the larger photo that matches the photo below so they can see it, then pass it around.

_____

It is important to be able to identify various kinds of snakes in your community so that you can avoid a dangerous encounter with a venomous snake. Also, being able to identify the type of snake when you have been bitten, or at least to describe its characteristics, can give important information to medical workers so they know how to give you proper treatment.

So what characteristics are important to recognize? The important ones are:

- Body length and appearance
- Body markings and colors
- Scales
- Head shape
- Pupil shape
- Tail length

When you first encounter a snake, it may be moving quickly or be concealed in some way. So out of this list, what are the ones you should remember first? The three things you will most likely notice are:

1. **How long is the snake?** Compare it to something you know. Is it as long as your foot or longer? Is it as long as you are tall or longer?
2. **How thick is the snake?** As thick as your fingers? As thick as a broom or shovel handle? As thick as your wrist or forearm?
3. What **color** is the snake, and does it have any **stripes or patterns**?

If you can see it, Is the head shape oval and rounded, or similar to an egg, or somewhat triangular? Head shape and the other characteristics may be harder to see because you might need to be a lot closer to determine those.

Let's look at some examples.

Body Length and Appearance

One of the first things to look at is how long the body is, and its general appearance - is it slender, thick, or somewhere in between? How long is the snake in meters? The average person is about 2 meters tall and your foot is about 25 centimeters. Is the snake longer than you are tall? Is it the size of your foot or two feet? Do the best job you can to estimate the snake's size.

Here is a puff adder. You can see how thick its body is.

Photo used with permission of Stephen Spawls

Compare the puff adder to this Battersby's green snake, which is much more slender or thin.

Photo used with permission of Stephen Spawls

When considering thickness, compare it to something you know. Is it as thick as a pencil? A broom handle? Your fingers? Your wrist or forearm? Your leg?

Body Markings and Colors

Next, we want to look at the body markings and color.

This Battersby's green snake is basically all one color. We would say this snake has plain coloration.

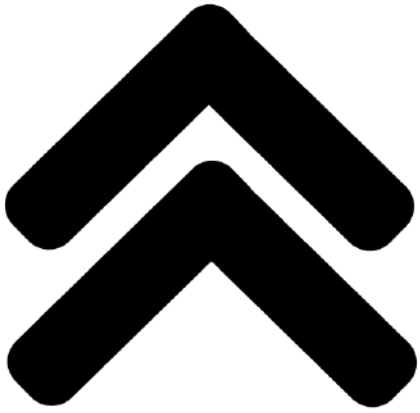
Photo used with permission of Stephen Spawls

In terms of color, look at the overall body color, but also look for the colors of any spots, stripes, or patterns (see below).

One thing you can look for is whether the body has any stripes. This northern stripe-bellied sand snake has stripes:

Photo used with permission of Stephen Spawls

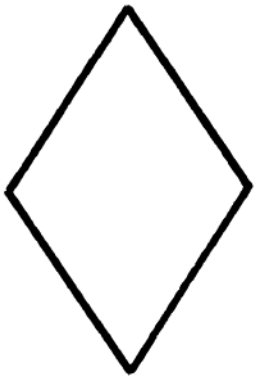
If there are no stripes, look for other patterns on the snake's body. This puff adder has repeating "V" shaped markings called chevrons.

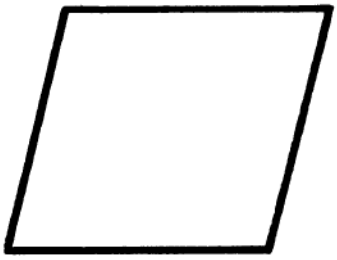


Repeating V pattern or chevron

Photo in the public domain

This rhombic night adder (and also the rhombic egg eater) has a distinctive pattern roughly similar to a rhombus. There is also a V shaped marking on the head.





Rhombic night adder photo used with permission of Stephen Spawls.

This white-lipped snake (below) has bands of white dots on a dark background as well as the white lip

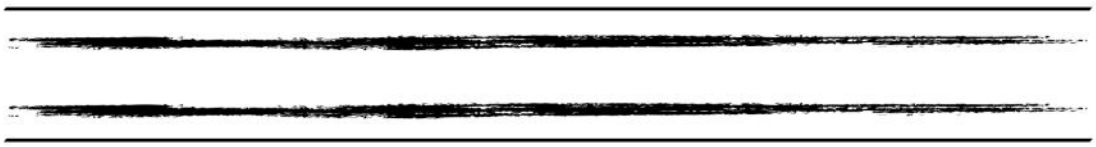
Photo used with permission from Stephen Spawls

Patterns might not cover the entire body. For example, this forest cobra has black bands and spots on a yellow background in the throat area.

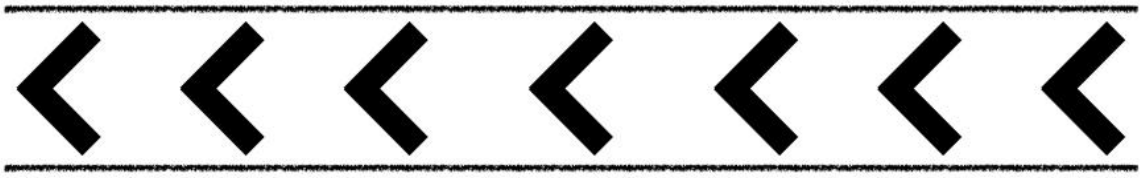
Photo used with permission from Stephen Spawls

Below are some of the common patterns found in snakes - some are seen on the back and others along the sides:

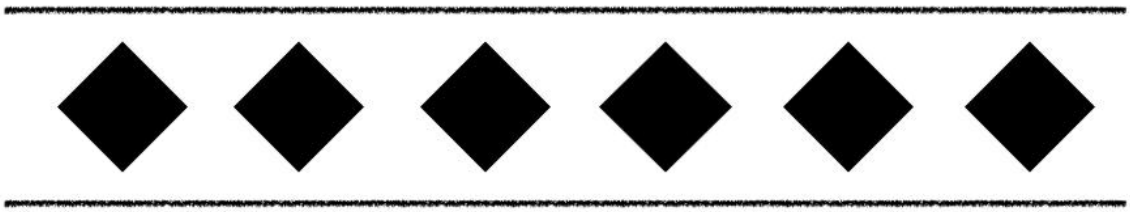
Stripes



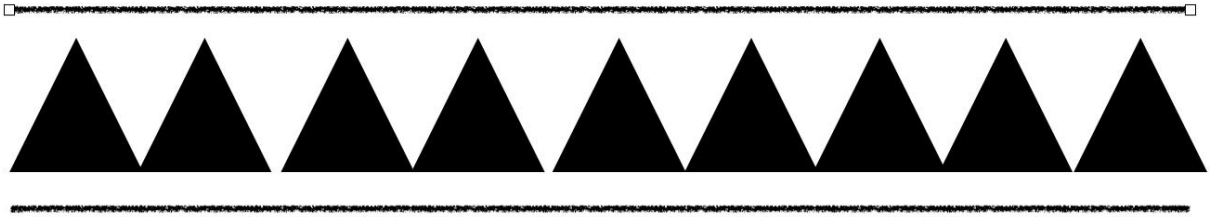
V-shapes or chevrons



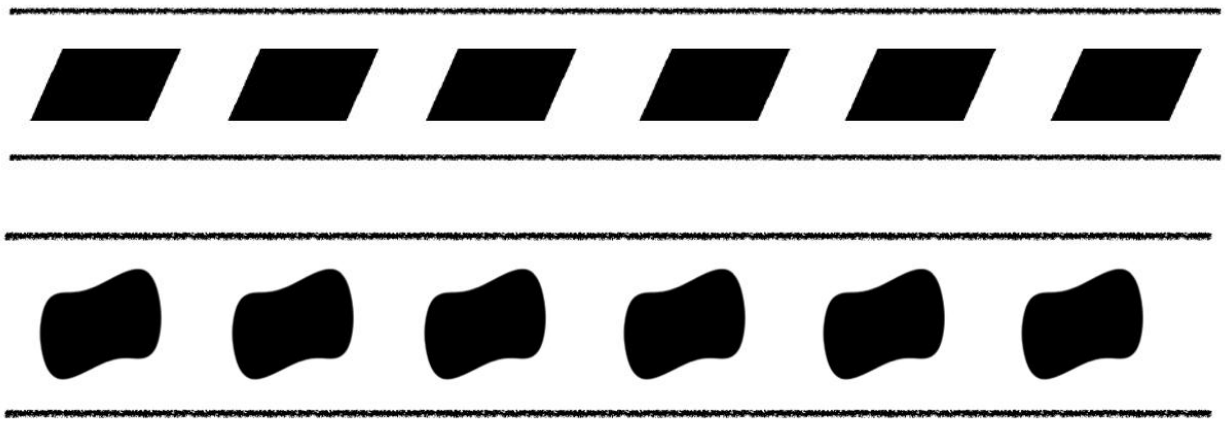
Diamonds



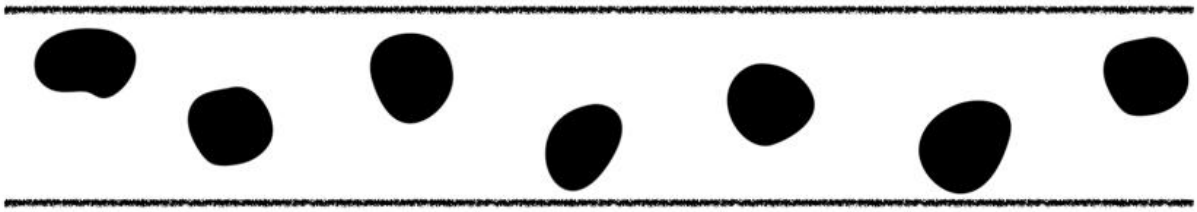
Triangles (usually along the sides)



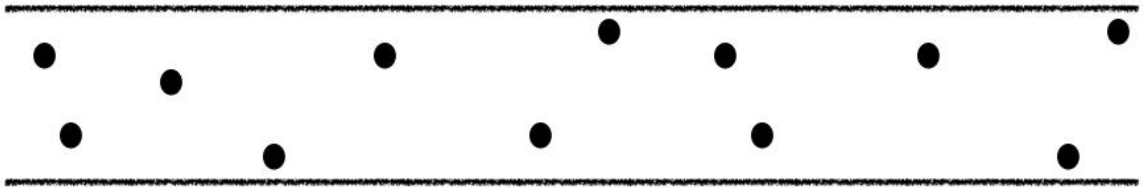
Rhombic patterns



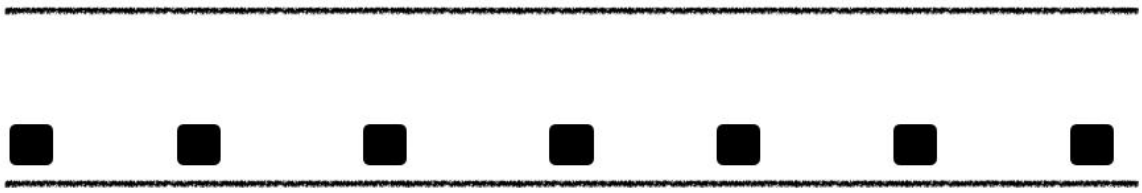
Blotches



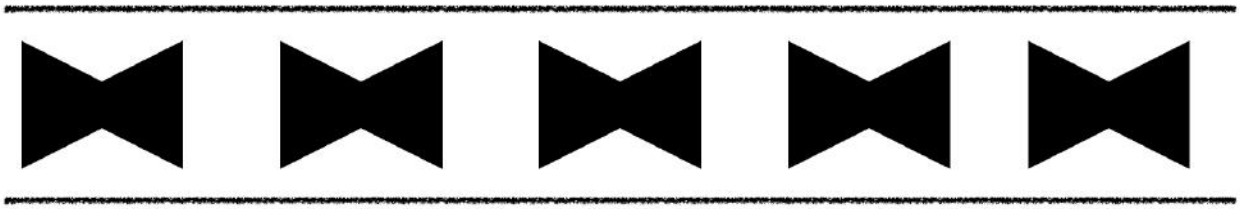
Random spots or flecks



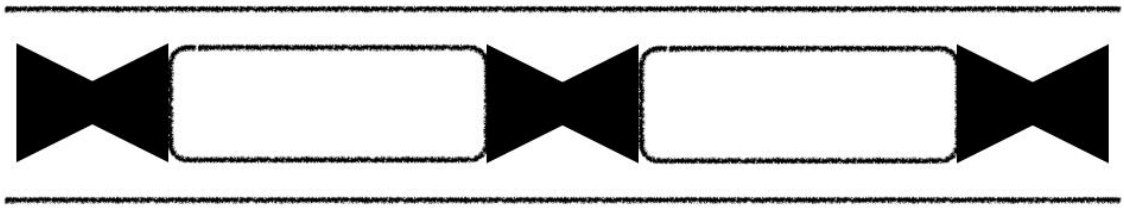
Row of dots (usually along the sides)



Butterfly or hourglass pattern



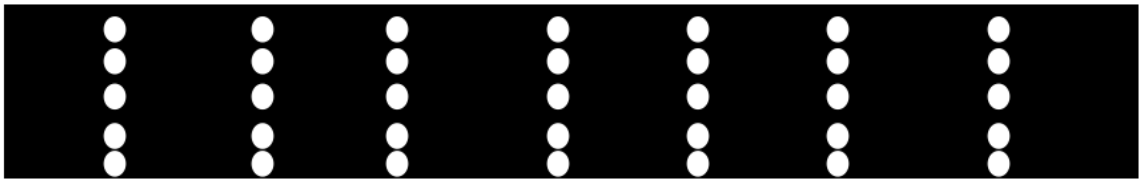
Combination of hourglass/butterfly with rectangular shapes



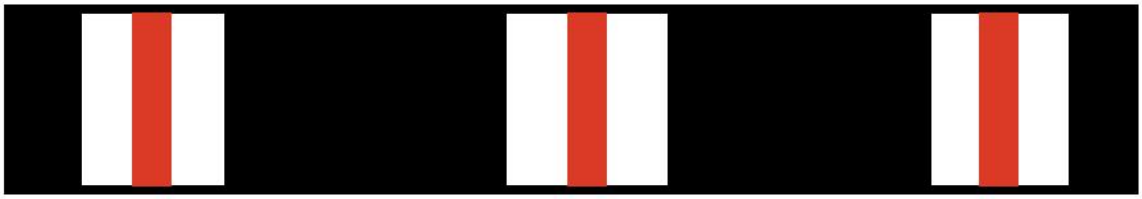
Single bands

Double bands

Single bands made of white dots



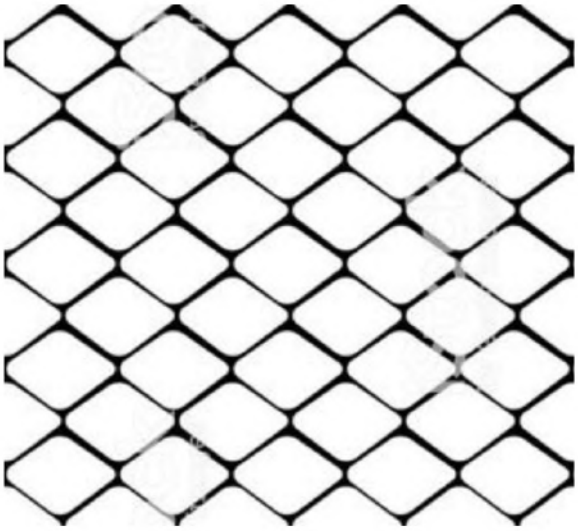
Colorful bands



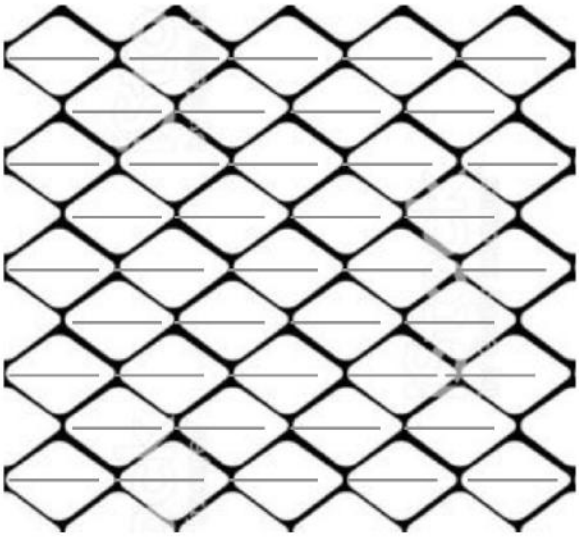
Scale Type

Look at the scales on the snake's body if you can do so safely. ***Make note of whether the scales are dull or shiny.***

Snakes have two types of scales: smooth (top) and keeled (bottom).



Smooth Scales



Keeled Scales

The puff adder and rough-scaled bush viper have scales with a ridge down the middle. These are called keeled scales. (Photo courtesy of Bernard Dupont. This file is licensed under the Creative Commons Attribution-Share Alike 2.0 Generic license with the following change: zoomed in on scales).

The scales of the Jameson's mamba do not have these ridges and are thus smooth scales.

Photo in the public domain

Head Shape

Look at the head of the snake from a safe distance. What is its general appearance? Some snakes have heads that are more rounded or oval shaped and elongated; in these snakes, there is not much of a size difference between the head and body. Here is an example of a rounded or oval-shaped head:

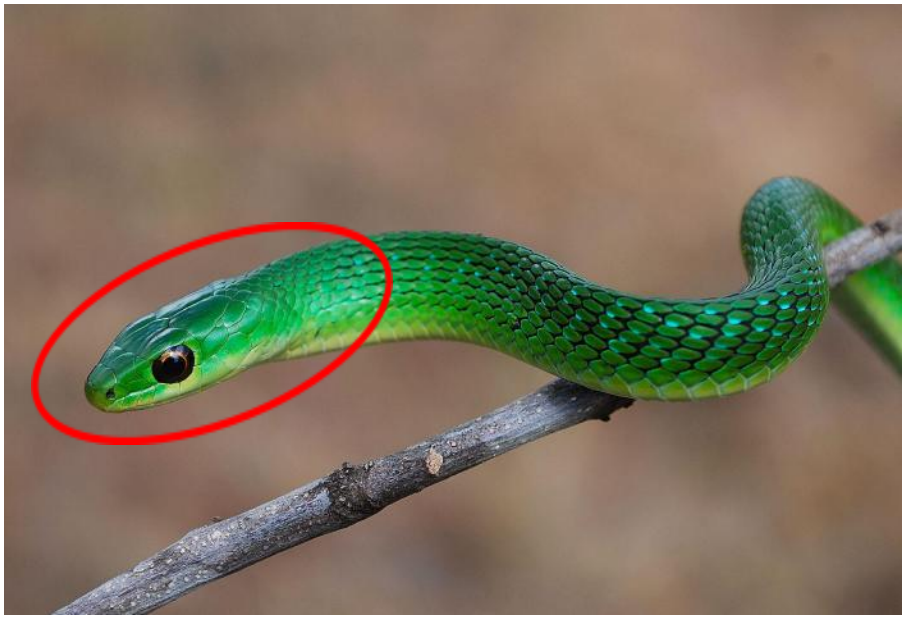
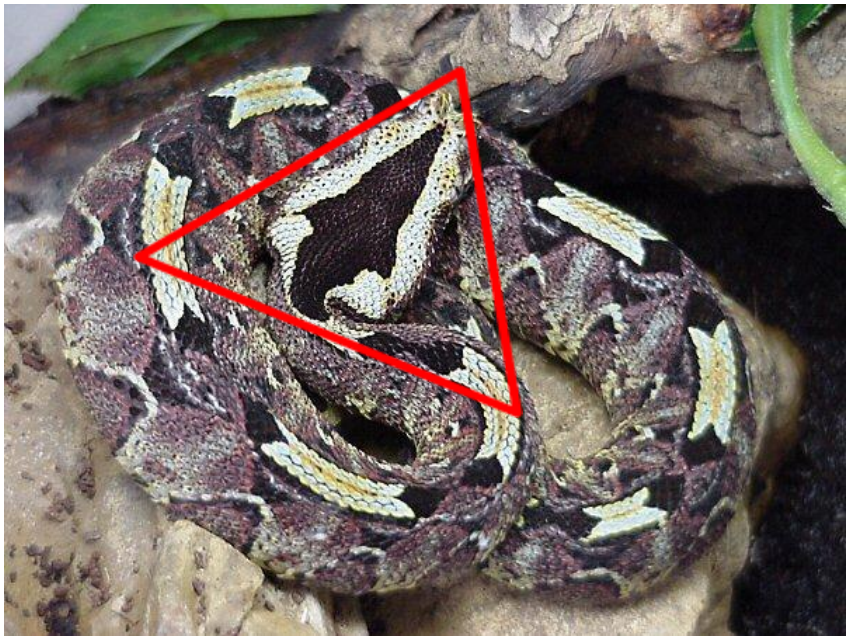


Photo used with permission of Stephen Spawls

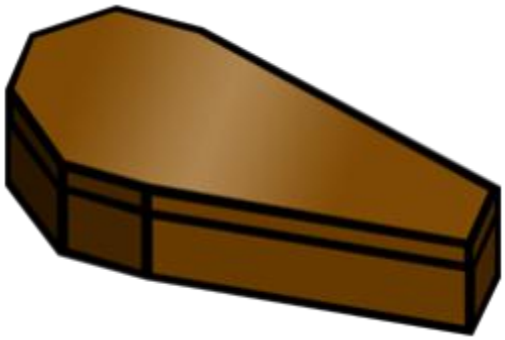
Other snakes have a broader, more triangular head and a distinct neck. Look at the head of this rhinoceros viper. See the triangular shape? The venom glands on the back of the head help form this triangular shape. There is even a triangular pattern on the back of the head. (photo courtesy of Dawson licensed under the Creative Commons Attribution-Share Alike 2.5 Generic license without changes).



Some snakes that do not have a triangular shaped head can flatten the head out to make it look triangular when they feel threatened. An example is the white-lipped snake below.

Photo used with permission from Stephen Spawls.

Finally, the mambas have a coffin-shaped head.

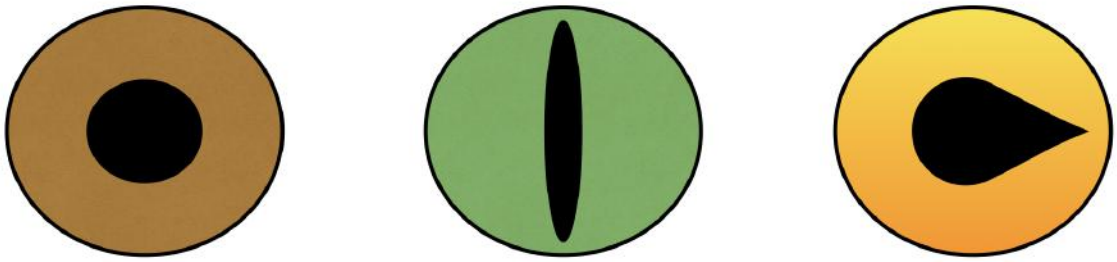


Coffin Shape

Photo by author

Eyes and Pupil Shape

Look at the shape of the dark part of the eye, known as the pupil. You can also look at the color of the area around the pupil, known as the iris. In snakes, there are basically three shapes of pupils (in order - round, vertical, and teardrop shapes):



On this boomslang, ***the head is egg-shaped*** (rounded), the ***pupil is round***, and the ***iris is green***. Snakes with round pupils have better vision during the daylight hours..

Photo used with permission from Stephen Spawls

On this puff adder, the pupil is not round, but is more like a vertical slit (oriented up and down, not side to side) similar to those on a cat. Snakes with these types of eyes have better night vision. (Photo courtesy of Julius Ruckert licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license without changes.)

You should also make note of whether the eyes were large and obvious, or small and inconspicuous.

Tail Length

Look at the length of the tail. Usually, you will see a change in how thick the snake is in the last third of the body's length. This is where the tail begins.

This is the tail of a black mamba. You can see that the tail is long on this snake:

Photo used with permission from Stephen Spawls

This Gaboon viper has a short, stubby tail (photo is in public domain).

Some Other Thoughts

If you happen to own a cell phone with a camera, USE IT! If you can take a picture of the snake, you can always identify it later, or show it to someone else who might be able to identify it.

Also, you must be aware that there can be a ***great deal of variation in the colors and patterns of individual snakes***, so two snakes of the same type might look very different. Nevertheless, do your best to describe the snake you see and relay that information when necessary to health care workers.

In addition, **make note of the behavior and position** of the snake. Where did you see it? In a tree? On the ground? In water? Was it moving slowly or rapidly? Did it raise its head up, spread a hood, hiss, strike, open its mouth? Did you see it during the day or at night? Did it spit in your direction? Did it move away from you? Any of these kinds of details can be very important in identification of the snake.

Being able to identify a snake by its characteristics takes time and practice. The next time you see a snake, you might try to look at the characteristics you remember from this lesson, but always do so at a safe distance of at least 3-5 meters (most snakes can strike from a distance of up to ⅔ of their body length)..

Having said this, you should also be aware that snakes can move very quickly, so ***getting a good look at a snake is not always easy.*** And sometimes you are just too far away, or the snake is in a tree or bush, or it is blending into its surroundings. In these cases just keep a safe distance and leave the snake alone - but ***stay alert!***

These are both Blanding's tree snakes, but they have very different coloration (top is male, bottom is female).. Photos used with permission of Stephen Spawls.

Snakebite Awareness Training
Part 2: Lesson 4 - Identifying Snakes From Photos

This lesson will require the use of photo identification slides that are available separately on the Upendo Conservation Area website (https://www.upendoconservationarea.org). These should be printed in color and laminated to make them more durable for multiple uses.

Note to trainer *- you do not have to introduce every snake that you want your participants to identify all in one session. Scatter them throughout the training so there is always an active component of identification throughout the training.*

Let's begin. Now that you know the kinds of characteristics that we can use to identify snakes, it is time to put those characteristics to good use. We are going to use them to identify the snakes from our community and nearby. We will focus on the venomous snakes, but will also identify a few of the more common snakes that are not harmful to humans, even though some may have a mild venom.

Here is what we are going to do. I am going to hold up a photo of a snake that we are going to learn to recognize. I will point out the important characteristics of the snake, and tell you why it is dangerous. Then I will pass the photo around for everyone to look at.

We are going to start with some of the most dangerous snakes from our region in western Kenya - the mambas and cobras. The first snakes we are going to learn about are these:

1. Black mamba
2. Jameson's mamba
3. Brown forest cobra
4. Egyptian cobra
5. Black-necked spitting cobra
6. East African garter snakes

Note to trainer: *hold up each photo to group, show them the important characteristics for identification, and why it is dangerous (type of venom). Pass the photos around until everyone has had time to look at the photos and see the identifying characteristics. When you are satisfied they can identify the characteristics of the first five snakes, test their knowledge by showing them unmarked photos of each type of snake and see if they can identify the snake based on the characteristics they just learned.*

Now we are going to test your knowledge - we want to see if you can identify these first five snakes from other photos. I will hold up an unmarked photo and I want you to put up 1 finger if you are unsure of the type of snake on up to 5 fingers if you are very certain you can identify the snake and share what characteristics you based your identification on.

Note to trainer: *once you have tested their knowledge, move on to the next five snakes or do this at another point in the training. Keep repeating these steps until all snakes are covered.*

Now let's take a break from identification and learn a little bit about threat displays (go to that lesson).

Now we are going to introduce you to another important group of dangerous snakes from our area - the vipers and night adders. We are going to include one non-venomous snake in this group because it looks like one of the venomous snakes.

1. Puff adder
2. Gaboon viper
3. Rhinoceros viper
4. Rhombic night adder
5. Rhombic egg eater (non-venomous look-alike)

Again, let's take a break from identification, and learn a little bit about why we need to be alert when we are outside - because many snakes can hide in their environment because of their coloration and patterns - called camouflage (go to that lesson)..

To wrap up identification, let's do two things:

1. I want to show you some vipers and adders that are mostly found near us in the Kakamega and Nandi forests - we won't learn how to identify these because they seem to be isolated to those areas.

2. Let's learn about some of the non-venomous snakes that are found in our area, and these we will want to identify.

1. Vipers and adders (show photos and point out key characteristics only)
    a. Green (variable) bush viper
    b. Rough-scaled bush viper
    c. Forest night adder
    d. Velvety green night adder

2. Non-venomous snakes (show photos, point out characteristics, and then test their knowledge with new photos).
    a. Brown house snake
    b. White-lipped snake
    c. Cape wolf snake
    d. Battersby's green snake
    e. Northern stripe-bellied sand snake
    f. Lineolate blind snake

The key to the participants learning these is to bring them out in every training session and see if they can remember the key characteristics and identify the snakes correctly.

Also, ***reinforce that identification is important because it can help give clues to hospital workers*** if you are bitten and they need to know what kind of snake it was to treat you properly.

Snakebite Awareness Training
Part 2: Lesson 5 - How do I know if a snake feels threatened?

Why is this important? - If you can recognize the signs of when a snake feels threatened, you can reduce the likelihood of a bite by slowly backing away or giving the snake an escape route..

Threat Displays

A snake ***feels threatened*** if there is danger nearby, or if a potential predator gets too close. A snake will ***feel cornered*** if there is no escape route for them, so they will hold their ground, make a threat display, and potentially try to strike. Mambas and cobras may move toward you as a threat or to strike. However, one thing a snake will not do is chase you.

Here is an example of a ***threat display in a Blanding's tree snake*** (photo used with permission of Stephen Spawls).

What can we see in this picture that indicates a threat is nearby? The snake is tightly coiled with the front of its body raised up off the ground. Its mouth is open and may be hissing. The head is flattened and looks more triangular. These are all signs that the snake is feeling threatened..

Here is the ***threat display of a boomslang***. You can see the neck and front third of the body is flattened from side to side. The tongue flick may also be part of the threat display.

Photo used with permission from Stephen Spawls

Instead of flattening the neck from side to side like the boomslang, **the cobras** raise the front part of their body up and spread a hood, which is flattening the neck from top to bottom. The idea of the hood is to make the snake look much larger and more threatening. Cobras can also open their mouths (gaping), hiss, and for some species, spit their venom.

Photo used with permission from Stephen Spawls

Mambas can also spread a hood, although it is not as wide as the hood of a cobra. Here is a black mamba displaying its hood.

Photo used with permission from Stephen Spawls

Review Questions

1. What might you see that tells you a snake is feeling threatened?

Snakebite Awareness Training
Part 2: Lesson 6 - Snakes and Camouflage

Why is this important? - you need to be aware that snakes are the masters of hiding in plain sight. To avoid being bitten, you need to be alert and always checking the ground in front of you.

Many snakes have the right coloration and patterns to blend right into their environment. Here is a **saw-scaled or carpet viper** that blends right into the rocks (photo courtesy of Ashwin Baindur under the Creative Commons Attribution-Share Alike 4.0 International license.

And here is a **puff adder** almost perfectly concealed in some grasses and red dirt (photo used with permission from Stephen Spawls):

This **Battersby's green snake** blends in perfectly with the green leaves in the trees where it spends most of its time (photo used with permission from Stephen Spawls)..

This **desert horned viper** blends in very well with its sandy environment, and can even bury its body in the sand leaving only the eyes and top of head exposed (photo courtesy of Holger Krisp under the Creative Commons Attribution 3.0 Unported license without changes).

Snakebite Awareness Training
Part 2: Lesson 7 - Venomous Snakes and Venom

FOR THE TRAINER: Let's talk about the difference between venom and poison. Venoms and poisons are made from chemicals that produce a bad reaction in someone that has been bitten. In English the word we use is "toxic". Venom is a substance that produces a bad reaction when it is injected under the skin, like medicines are injected with a syringe and needle. Poisons are generally thought of as chemicals that cause a bad reaction when they are eaten or inhaled through the nose or mouth. If there is no word for "toxic" or "venom" in the language you are using, you should feel free to use the word poison so that people will understand. In this training, I will use the word "venom" but you can substitute poison if that works better for the people you are training.

Snakes use a variety of methods to capture and kill their prey. Many snakes just bite their prey and swallow it whole. Others, like pythons, wrap loops of their body around their prey after biting, and squeeze the air out - this is called **constriction**. The third way is to inject harmful chemicals called venom to kill their prey.

A venomous snake is one that generally uses hollow or grooved fangs in the front or the rear of the mouth to inject harmful chemicals into another animal - even humans. The chemicals are most often made and stored in glands located behind the eyes on the back of the head. A hollow tube called a duct connects the venom gland to the fangs. In the photo below you can see a puff adder with venom drops on the end of the fangs.

Photo used with permission of Stephen Spawls

Types of Fangs

There are three kinds of fangs that are found in venomous snakes. The first two types are found at the front of the mouth. In snakes like the **vipers,** the fangs are **large and fold up** along the top of the mouth when the jaws are closed. An example is this Gaboon viper (photo courtesy of Brian McKay licensed under the Creative Commons Attribution 2.0 Generic license with no changes).

Cobras, mambas, and their relatives have **short, fixed fangs** that cannot fold up. Here is an example of where you can find a black mamba's fangs.

Photo used with permission from Stephen Spawls

Finally, **some colubrid snakes** like the **boomslang** have fangs in the **rear of their mouths**. Because of the location of these fangs, these types of snakes usually chew the venom into their prey..

Photo used with the permission of Stephen Spawls

I should mention that in some parts of Kenya, there are snakes called burrowing asps or stiletto snakes (see photo below). These snakes can be very dangerous for two reasons: (1) they can stick their fangs out of the side of their mouths and envenomate their prey or a threat, and (2) there is no antivenom for this snake's venom.

Stiletto snake photo used with permission of Stephen Spawl

What Is Venom?

Venom is used by snakes for three things:

1. To quickly stop their prey from moving and kill them
2. To start the digestion process before swallowing the prey
3. To cause pain in another animal (for defense)

The chemicals that are in the venom generally do some combination of the following things:

1. Stop the nerves in your body from working properly, which stops your muscles from functioning properly, which can cause you to stop breathing and die. ***Snakes with this kind of poison that affects your nerves and muscles are the non-spitting cobras and mambas, and potentially the tree snakes***.

2. Cause pain and tissue damage at the place where the snake bit you. ***Snakes with this kind of poison that causes cell death are the spitting cobras, the adders, and the vipers***.

3. Cause your blood to get thinner so that you bleed more easily, OR causes your blood to clot more easily which blocks blood vessels and cuts off circulation. ***Snakes with this kind of poison that affect your blood are the boomslangs.***

Snakes can, to some degree, control the amount of venom delivered when they bite:

- Venom is expensive for the snake to make and so they only use it when necessary.
- Sometimes there is no venom injected and this is called a **dry bite**.
- You should never assume that you were not injected with venom. Get to a hospital quickly if you are bitten by a venomous snake.

The only reliable and effective method for treating a venomous snakebite is antivenom. Antivenom is made by injecting small amounts of venom into an animal such as a horse or rabbit. The animal builds up defenses against the venom. Part of the blood is removed from the animal after a period of time, and it is processed and purified to make antivenom. When someone is bitten by a venomous snake, the antivenom can be injected into the victim to help the body fight against the effects of the venom. For powerful venom, like that found in black mambas, it can take a lot of antivenom to counteract the venom.

Unfortunately, antivenom is not always available in Kenya, and some of the antivenoms are not effective against the snakes found in your country. This is why it is important to learn how to prevent snakebite like you are doing in this course.

Next let's start to consider what happens if you are bitten by a venomous snake. What are the symptoms that accompany each type of venom? Let's find out ...

Snakebite Awareness Training
Part 2: Lesson 8 - Recognizing The Symptoms Of Snakebite

Review questions for participants:

1. What are three reasons snakes use venom?
2. What are the three ways that venom can affect your body?

_____

If you've been bitten by a venomous snake in Kenya you can call an emergency services number at +254 729403599 for additional help

_____

Ok, so venom can affect your nerves, your cells and tissues, or your blood - or even some combination of these. It is important for you to recognize the ***symptoms*** of bites from a venomous snake, because those symptoms can help health care workers give you the proper kind of treatment for snakebites. Let's learn those symptoms.

_____

Venoms that ***affects your nerves*** (non-spitting cobras, mambas, and tree snakes)

- Symptoms
    - You may feel very little pain near the bite marks
    - You may feel tingling of the skin near the bite
    - You may get dizzy and lose consciousness

    - You may have droopy eyes and blurred vision
    - Your muscles may start to twitch uncontrollably
    - You may experience nausea and vomiting
    - You may start to have trouble breathing and eventually stop breathing
        - If this is the case, someone will need to provide life support until you get treatment (See “A Few First Aid Tips for Snakebite”)

What do I do if I experience these symptoms after a snakebite?

- Move away from the snake into a shady area
- Stay calm and still to slow the spread of venom
- Make note of the time the bite occurred
- Remove clothing from area of bite, as well as any jewelry
- Apply pressure by one of these two methods (African Snakebite Institute):
    - Apply a cotton pad over the wound and bandage it onto the arm with a pressure bandage or cloth strips. See “A Few First Aid Tips for Snakebite”.
    - Loosely apply a pressure bandage by wrapping it from the end of the limb furthest away from the heart and wrapping toward the heart. See “A Few First Aid Tips for Snakebite”.
- Mark the site of the bite on the pressure bandage so a doctor can quickly find it
- Add a splint to the bandage to keep the affected limb from moving (see guidance on how to do this in another section of this training document
- Get to a hospital as soon as possible for medical treatment

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Venom that ***affects your cells and tissues*** (spitting cobras, adders, and vipers):

- Symptoms
    - The venom from these snakes destroys your cells and tissues
    - You will experience a great deal of pain and swelling at the site of the bite
    - You may also experience pain and swelling under your arms (lymph nodes)
    - You may see bruises under the skin and blisters on the skin
    - You may see watery blood seeping from the wound
    - You may experience low blood pressure and dizziness when walking or when you try to stand up
    - You may lose consciousness (faint)

What do I do if I experience these symptoms after a snakebite?

- Move away from the snake into a shady area
- Stay calm and still to slow the spread of venom
- Make note of the time the bite occurred
- Remove clothing from area of bite, as well as any jewelry
- Because these bites cause a lot of swelling, it is not advised to use a pressure bandage
- Add a splint to the affected limb to keep it from moving. See the lesson on “A Few First Aid Tips for Snakebite”.
- Get to a hospital as soon as possible for medical treatment

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For venom that will ***affect my eyes*** (spitting cobra):

- Symptoms
    - You will have a lot of pain in your eyes
    - Your eyes will get watery
    - You will likely lose your vision
    - Uncontrollable blinking or twitching in eye
    - Your eyes may swell to the point you cannot close them
    - The whites of your eyes may turn red
    - Your eyes may become sensitive to bright light

What do I do if I experience these symptoms after an encounter with a spitting cobra?

- Flush the eye out with an abundance of water, saline, or if necessary, milk for 5-10 minutes, making sure to rotate eye to get venom out of all parts of the eye
- Tie a piece of cloth loosely over the eyes, and wear dark glasses if you have them
- Do not rub your eyes
- Go as fast as possible to the nearest hospital for treatment - the faster the treatment, the less likely you will be to lose your eyesight

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Venom that ***affects your blood*** (boomslang):

- Symptoms

    - The venom is slow-acting, so you may not experience the effects for many hours after the bite
    - The venom will thin your blood and allow it to flow freely - you may have uncontrolled internal or external bleeding
    - You may experience nausea, headache, and sleepiness

What do I do if I experience these symptoms after a snakebite?

- Get medical attention immediately, even if you do not feel any symptoms after a few hours
- Remain still and calm to slow the spread of the venom
- Remove rings or other jewelry or tight fitting clothing that could constrict if swelling occurs
- According to the African Snakebite Institute, you should NOT use a pressure bandage around the affected limb

TRAINER: Once you have gone through all of these symptoms, review it as many times as necessary to make sure people can recite to you the symptoms. Consider using a role play to act out what to do, or give them scenarios to assess their learning. Several of these scenarios are given in the ***"Learning Activities" section of this handbook.***

Snakebite Awareness Training
Part 2: Lesson 9 - A Few First Aid Tips for Snakebite

The information in this section does not substitute for getting proper training in first aid from an official organization such as the Kenya Red Cross or St . John's Ambulance. It is provided here as an aid for how to use these techniques for snakebite situations.

Applying A Pressure Pad

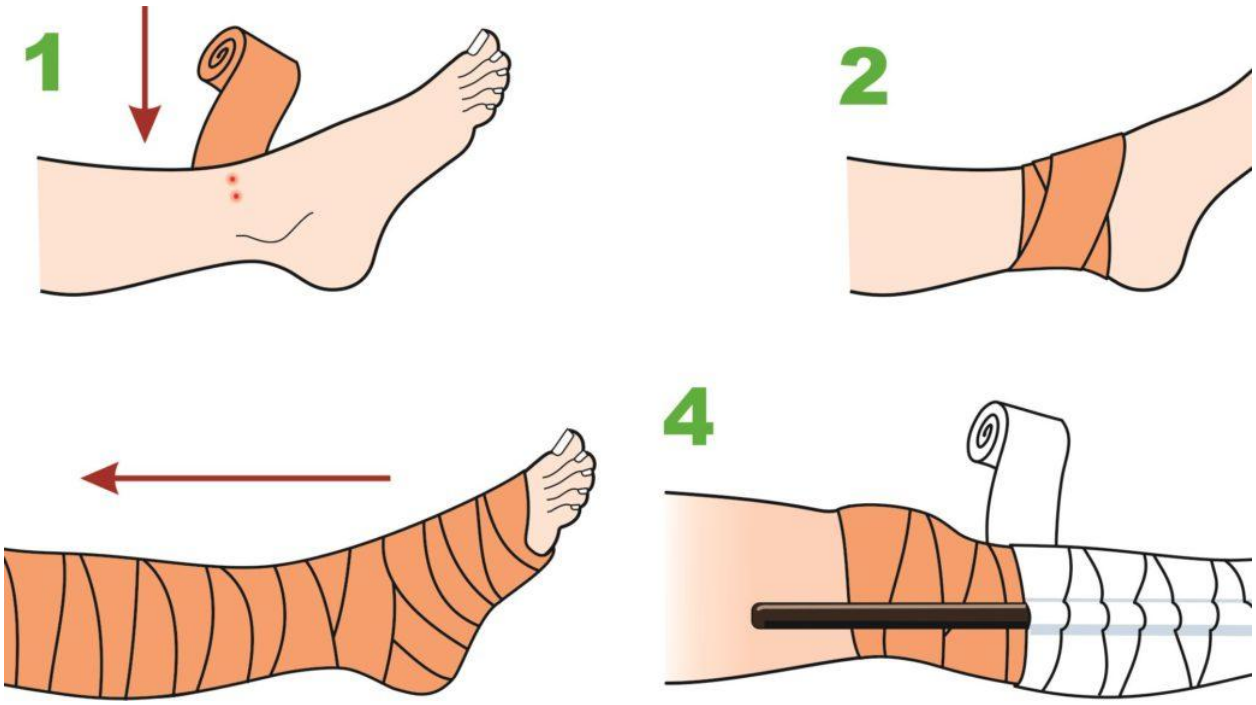
The following photos are ***credited to the African Snakebite Institute (africansnakebiteinstitute.com)*** and demonstrate how to apply a pressure pad. These photos have not been altered in any way.


AFRICAN SNAKEBITE
INSTITUTE.com


AFRICAN SNAKEBITE
INSTITUTE.com

Attaching A Splint With A Pressure Bandage

This technique should only be used for bites from a non-spitting cobra (forest cobra, Egyptian cobra, etc.) or a mamba (green, Jameson's, black). Using this technique for other bites may cause complications.



Source:
https://www.parasuniversal.com/2019/12/snake-bites-venom-important-information-please-share-by-rob-timmings/

What materials can be used to make a splint? According to St. John's Ambulance, ***splints can be made from padded boards, tree limbs, rolled newspapers, a piece of wood, or by tying the limb to the body or an adjacent, uninjured limb*** (obtained from https://www.stjohnvic.com.au/news/what-is-a-splint-and-how-to-make-one/).

Videos about how to splint a limb can be found here:

1. https://youtu.be/qnOeiMa8mMc
2. https://youtu.be/lLkw4BXa7pQ

Assisted Breathing With A Pocket Mask

The following photos are ***credited to the African Snakebite Institute (africansnakebiteinstitute.com)*** and demonstrate how to give assistance to someone who is having trouble breathing due to snakebite (usually cobra or mamba bites). These photos have not been altered in any way.

This is called a pocket mask. The valve in the mask does not allow the person giving assisted breathing to come into contact with the victim's body fluids.

Source: africansnakebiteinstitute.com

When the valve is placed over the mouth, it should look like this:

Source: africansnakebiteinstitute.com

When breathing into the mask, it should be a slow breath that just causes the chest to rise. For adults, give one breath every six seconds, for children give one breath every five seconds, and for infants one breath every four seconds. This type of breathing should be continued until the victim is in a healthcare facility or has been transferred to an ambulance with a trained crew.

Snakebite Awareness Training
Part 2: Lesson 10 - Healer or Hospital?

If you live in rural Kenya and you have a health problem, you are likely to go to the traditional healer. Traditional healers offer holistic treatments for physical, mental, and spiritual ailments. Often there are beliefs that snakebite is a result of a spiritual problem, such as witchcraft, curses, or sinful behaviors. You may choose to go to the traditional healer because they are more accessible, cost less than going to the hospital, and some of the remedies work for various types of ailments.

Herbs for traditional healing

It should be noted that if you are bitten by a snake that you know for sure is not venomous, you can keep the wound clean and it will heal on its own. If you are bitten by a mildly venomous snake, you may have some pain, swelling, and maybe itching at the site of the bite, but you will likely heal on your own. However, if you are bitten by a highly dangerous snake, including but not limited to a boomslang, mamba, cobra, puff adder, or carpet viper, you will need medical treatment as fast as possible. ***If you are unable to identify the snake that bit you, you must assume it is a bite from a highly venomous snake and you must get to a hospital quickly for treatment.***

In stories from snakebite victims about visiting a traditional healer, treatments for snakebite may consist of the following; the healer spits on the wound or cuts the wound; the healer tries to suck out the poison; an herbal treatment is applied or swallowed; a black stone is placed on the wound; the healer suggests eating paraffin or raw eggs to help treat the effects of the bite; or application of a tourniquet. ***There is no evidence to indicate that these things will have any positive effect*** on a bite from a highly dangerous, venomous snake. Furthermore, these types of remedies can actually ***add to the harm*** being caused by the snakebite. Certain herbs may help with reducing pain, but that does not counteract the harm caused by the venom to your nerves, cells and tissues, or blood.. If applying a black stone helps to keep you calm and your heart rate slower, this will help keep the venom from spreading faster - but does nothing to absorb the venom.

When it comes to a bite from a highly venomous snake (mambas, cobras, vipers, puff adders, night adders, and others), the remedies of the traditional healer cannot help you. The poison from a snake can make its way through your body rapidly, and the parts of the body it affects can start shutting down. To repeat, the remedies of

the traditional healer are not effective against venomous snakebites. ***If you are bitten by a venomous snake, you are risking your life if you do not get to a hospital immediately for proper medical care and hopefully antivenom.*** Taking time to go to a traditional healer will only increase your risk of dying or losing a limb.

Traditional healers can play a very important role in snakebite cases by referring people with obvious signs and symptoms of severe envenomation to a local hospital. We encourage any community engaged in snakebite prevention to work with the traditional healers to help them understand the symptoms of snakebite and to act as a link between the victim and the hospitals.

Reminder: If you've been bitten by a venomous snake in Kenya you can call an emergency services number at +254 729403599 for additional help

Snakebite Awareness Training
Part 2: Lesson 11 - Preventing Snakebite When Outside

A Note About the Sources Of This Information

Many of these tips and ideas come from the book “Dangerous Snakes of Africa” by Stephen Spawls and Bill Branch and are used with permission.

Other tips and all photos were taken from this website and are used with permission: https://www.wikihow.com/Avoid-Snakes

This lesson can be used together with the pictures in the ***“Preventing Snakebite” slides*** *available with this manual.*

Because of the factors involved in getting adequate medical care for snakebites in Kenya, the best hope for most people is to avoid snakes altogether to prevent snakebite. This is easier in some parts of the country than others where there are many more snakes. Nevertheless, in the next couple of lessons, we want to help you know what to do to avoid as much as possible a situation where you might suffer from a snakebite. If you develop good habits, it will be easier to do them routinely and stick with them.

Some of these may seem uncomfortable, awkward, or just not necessary, but they could save your life if a snake tries to bite you. Likewise, some of these are expensive and you may not be able to afford them. Do whatever you can from this list to give you the best chance of avoiding a snake encounter.

Start by asking the participants, "Where are the places where you think you are most likely to encounter snakes?" After they give some answers ask, "What are some things you could do to avoid seeking snakes in those places?" Then move on to the lesson below.

What are ***the places where you are most likely to encounter a snake outdoors*** in areas other than your compound (use the slides provided to show pictures of some of these to participants)?

1. On a warm road at night
2. After a rainstorm
3. Walking down a narrow path through tall grasses
4. Walking on or off trail through a forest
5. Rocky areas where snakes can be concealed
6. Walking in sandy desert areas
7. Walking under tree branches or a fallen tree
8. Gathering firewood or fetching water

To give yourself the best chance of living through a snake encounter, you should be prepared ahead of time:

- **Manage Your Fear By Learning About The Snakes In Your Area** - the more you learn about snakes, the less you will fear them but still respect them and what they can do. If you learn about snake behaviors, you can also learn what to avoid to prevent snakebite.

- **Snakes Do Not Want To Attack You** - one thing we can learn is that snakes would much rather move away from you than confront you. They bite when you step on them, harass them, or they feel threatened by your actions.

- **Understand Snake Habits** - know where snakes like to hide, or where they like to spend time - perhaps for basking in the sun or cooling off in the shade. Good hiding places include rocks and rock piles, trees, logs and branches on the ground, and bushes. Snakes with good camouflage can hide in leaves, sticks, and grasses. See if you can find the snake in this picture.

One situation where you might encounter a snake is if you are walking from one place to another. This could be on a dirt road, or it could be on a path through the forest or fields on your way to work or to a garden. Here are some tips for avoiding encounters with snakes in these situations:

1. **Go Prepared** - If you have a phone, take it with you. If you have any type of compression bandage or splint, take it with you. Take a torch with good batteries so you can see after dark. Wear adequate footwear - do not walk through snake territory in bare feet or sandals. Boots would be the best bet as snakes often bite the foot or ankle. Long pants can offer some protection, but snakes can bite through most clothing. Take a walking stick.

2. **Always Walk With Someone** - if someone is with you when you are bitten by a snake, they can help you with first aid and then get help. ***Let someone know*** when you are leaving and when you expect to return.

3. **Be Alert To Your Surroundings** - keep your eyes focused on where you are walking; don't get distracted by your phone and take your eyes off the path in front of you; don't let people you are with distract you either. If you have children

with you, make sure you have talked to them about the situation and for them to stay alert too. Look carefully in places where a snake can be concealed.

4. **Stick To The Path** - avoid walking through tall grass, rocks, and other areas where snakes can easily hide. Stay on the path so you can see a snake ahead of it is on the path. You can then stop and wait for it to move on.

5. **Alert The Snake That You Are Coming** - walk with heavy footsteps to make vibrations that the snake can detect and move away. Always use a walking stick to probe the ground in front of you and make a thud with it to make vibrations.

Image courtesy of wikiHow.com

6. **If You See A Snake Observe Its Body Language** - snakes give warning signals that they are threatened and might bite. If a snake is curled up with its ***head raised, mouth open, hissing, inflating its body, moving its head back and forth, and for some snakes spreading a hood***, it is feeling threatened and you should slowly back away.

7. **Don't Let A Snake Fool You Into Touching It** - snakes can attack from any position (even if appearing calm); ***some snakes fake death***; some snakes can still bite for up to an hour after their head has been cut off. Avoid these situations by not touching any snake. Also, if you are in spitting cobra territory, stay far back from any snake, because these snakes can spit their venom from 2-3 meters away right into your eyes, which could temporarily or permanently damage your vision.

Image courtesy of wikiHow.com

8. **Watch Where You Step** - keep away from cracks or ledges in rocks where snakes can hide; don't step over a branch or rock without stepping up on it and looking to see if a snake is on the other side - if a snake is there, back down and walk a different way.

9. **Watch Where You Put Your Hands** - don't touch anything without looking first; if climbing on rocks wear thick gloves and long sleeved shirts as some protection; look before grabbing onto or brushing up against tree branches; don't pick up a stick unless you know it is actually a stick.

Image courtesy of wikiHow.com

10. **Watch Where You Sit** - check the area around a rock or log where you want to sit and bang on it with your walking stick to chase away any snakes.

11. **Watch Above You** - remember that some snakes like to climb trees. Be careful if you have to walk under low branches or fallen trees.

12. **Watch Where You Go To The Bathroom** - people often urinate or defecate in and around bushes, rocks, and tall grasses where snakes like to hide. Make sure you check the area completely before doing your business.

13. **Watch Where You Walk At Night -** many kinds of snakes are active at night. If you are walking on a road, be aware that snakes often come out onto the road at night to warm themselves. If you can, carry a torch with good batteries so you can watch the path in front of you. Wear good shoes or boots - do not go barefoot or wear sandals. Avoid any place where you cannot see the path in front of you at night.

Image courtesy of wikiHow.com

Other important things to do when outside:

- Be careful walking after a rainstorm - snakes often become more active during these periods
- Don't gather firewood or move materials around after dark.
- If you need to move wood or other materials during the day, always move or roll the object toward you so a snake underneath can escape away from you.
- If you have to kill a snake that threatens you or your family, use something long that will keep you away from the snake.
- Never sleep on the ground
- Don't run over a snake on the road intentionally as it could pose a hazard to others using that road

If you see a snake when walking around outdoors, what should you do?

- Remain calm - don't panic!
- Don't approach the snake - observe from a distance
- Stay as still as you can and don't make sudden movements
- Wait for the snake to move on by itself - but keep an eye on any retreating snake
- Do not harass the snake
- If you accidentally corner a snake and it is threatened, slowly back away from it until out of range
- If a child sees a snake, they should forcefully tell their parents about it

Next we will look at how to prevent snakebite at home.

At this point, you could assess how much they have learned by doing one of the following types of activities found in the lesson ***“Learning Activities”.***

- Role-playing exercise
- Knowledge competition
- True or Not True
- This or That

Snakebite Awareness Training
Part 2: Lesson 12 - Preventing Snakebite At Home

A Note About the Sources Of This Information

Many of these tips are adapted from the book “Dangerous Snakes of Africa” by Stephen Spawls and Bill Branch and are used with permission. The same information is also available from the World Health Organization in Chapter 4 of “Guidelines for Prevention and Clinical Management of Snakebite in Africa”.

My uncle lived in Zambia for awhile, and I remember him telling me the story of getting up one night when the house was dark and seeing what he thought was his belt on the floor - but he thought to turn on a light, and there was a black mamba on the floor of his bedroom.

Nothing could be more scary than finding a 2-m long and deadly black mamba in your home at night. Or working in your garden and coming across a puff adder. But there are steps you can take that might save your life in that situation, and that give you a better chance of keeping snakes away from your home.

Consider implementing as many of these steps as you can at your home, or at your school, or other places where a snake might be found in or around a building.

Most Likely Places To Encounter a Snake In Your House

Why would snakes come into my house? The most likely reasons a snake would come into your home are:

1. There are animals present in your house, so they are looking for food
2. There are places for the snake to hide and rest

How do snakes get into my house? First of all, because of the shape of their bodies, snakes are masters at fitting into small spaces. Therefore, any hole or crack in the walls or rooftop can be a place where snakes can enter.

Many houses in Kenya, especially in rural areas, do not have a door and there are no screens or glass in the windows. So these are the two most common entrances for snakes.

Where would I most likely find a snake in my house? These are places you might want to check.

1. Under your bed
2. Behind furniture
3. In a drawer in furniture
4. In the rafters supporting your roof
5. Near food containers (waiting for rodents)
6. In a storage area
7. Under clothing left on the floor or inside your shoes/boots
8. Along the walls or in the corners of a room

Making Sure Your Home Is As Safe As Possible

1. Get into a routine of checking your home for snakes in the morning and evening before you go to bed, and stick with this routine.

2. To the degree that you can, try to seal or cover any holes or cracks in your home where a snake can get in:

    a. If you have a door, put something like a piece of rubber under the space at the bottom of the door to block it so snakes cannot crawl under the door.

    b. Patch up or cover any holes in your walls and roof so that snakes do not have an easy entrance to your house.

    c. Close your windows at night, or put wire screens over them to keep out snakes AND mosquitoes

3. ALWAYS look before you put your feet on the floor

4. Always look before you sit on furniture or on the floor

5. Before you go to bed at night:

    a. Check under your bed if you have one

    b. Check in any spaces behind furniture or pillows in the furniture

    c. Check along the walls of the room

d. If you have rafters under the roof, make sure no snakes are resting there

e. If you have a bed with mosquito nets, tuck the mosquito netting under the mattress.

f. During the night, do not get up or leave the house for a bathroom break without using a torch - remember that some snakes are very active at night

6. When you wake up in the morning:

    a. Check the floor before you get out of bed or next to your space on the floor

    b. Do a recheck of all of the places you checked before you went to bed

    c. Check inside your shoes and boots if you are wearing them during the day (not only for snakes, but also spiders and scorpions).

What to do if there is a snake in your house

1. The first thing to do if you see a snake in your house is to remain calm.

2. Get children and animals away from the snake. They are more likely to act unpredictably and cause the snake to feel threatened.

Source: wikiHow.com (https://www.wikihow.com/Deal-With-a-Snake-in-the-House)

3. Stay calm and do not harass the snake by poking it, prodding it, or getting too close to it.

4. Take a minute to assess the situation and try to identify the snake as best as you can. How long is it? How thick is it? What color? Does it have stripes or patterns? Is it raised up off the ground? Is it spreading a hood? Here are some general rules for identification (adapted from Stephen Spawls and Bill Branch in “Dangerous Snakes of Africa”)::

a. If the snake is more than 2 m long, it is probably dangerous
b. If the snake raises the front of its body off the ground, and flattens its neck or spreads a hood, it should be considered dangerous
c. Any snake with dark bars, bands, blotches, rings, or V-shapes on the throat, neck, body, or back is probably dangerous
d. Any fat-bodied snake with a triangular head should be considered dangerous
e. If it forms C-shaped coils and makes a noise when it rubs its scales together, it is dangerous

5. Avoid getting close to the snake if you are not 100% sure whether it is venomous. Stay at least 3 m away if possible, especially if it is a cobra and you don't know if it can spit.

6. Don't leave the snake alone, but keep your eyes on it to make sure it doesn't move to another area of the house

7. If the snake is non-venomous, calm, and coiled, you can put an open bucket or box over the snake to keep it secured. Don't get your feet or hands close to the snake.

8. If the snake is not venomous, and it is not moving out of the house on its own, try one of these:

    a. Make sure all doors are open and gently guide (do not push) the snake out of the room through the open doors
    b. Guide the snake into an open bucket, then put the lid on from a distance with your broom handle. Do not put your fingers near the open bucket.

Source: wikiHow.com (https://www.wikihow.com/Deal-With-a-Snake-in-the-House)

9. Try not to kill the snake if it is non-venomous because they do serve an important purpose in nature, including to humans. However, if the snake is venomous and poses a threat to you or your family, you can and should protect yourself. If you have to kill the snake, use something that has a long handle so you do not get within striking distance of the snake. **Bites or having venom spit into your eyes often occurs when people are trying to kill a snake and they get too close.** Also, once the snake is dead, do not get near the head for at least one hour, because snakes can still bite for a time once they are dead.

10. Snake removal services are available in some parts of Kenya (as well as Uganda and Tanzania). Those resources are listed

below. Even if these are not in your area, you may be able to get someone to respond if they are available.

Emergency Snake-Bite & Snake Rescue/Removal

- **KENYA**
  - **EMERGENCY SNAKE BITE: +254 729403599**
  - Kenya general/Kilifi County/Coast: +254 707577748 (Bio-Ken duty number)
  - Rift Valley: +254724223631 (Felix Namuni)
  - Rift Valley/Naivasha +254 715227493 (Benjamin Hellerstedt)
  - Nairobi: +254 723 386558. +254 707 577748 or +254 722 514398 (Kyle Ray & Anthony Childs)
  - Nairobi: +254 723271510 (Ollie Outram)
  - Kilifi County: 0734600055 (Dudley Lucas)
  - http://www.bio-ken.com/
- **UGANDA**
  - The Surgery (competent snake-bite treatment & antivenom):
    - ER Reception: +256 (0) 31 225 6008
    - Ambulance: +256 (0) 752 756003
  - The Herp Fauna Foundation Uganda: +256 752 681903 (Mukasa Emmy) mukaemy92@gmail.com
  - Thomas Price (snake removal): thomasbprice@hotmail.com, Tel. +256 794 288 721
  - James Ntulume: Tel. +256 772 400 890
- **TANZANIA**
  - Meserani Snake Park (Arusha):
    - Lyn: +255 754 440 800
    - Deon: +255 754 302 179
    - Email: snakepark@habari.co.tz

Snakebite Awareness Training
Part 2: Lesson 13 - Keeping Snakes Out Of Your Compound

Most Likely Places To Encounter A Snake In Your Compound

What are some reasons that you might find a snake in your compound?

1. Looking for food (rodents, pets, farm animals)
2. Looking for a place to hide (shelter)
3. Sunning itself to raise its body temperature

What are the types of places that snakes might be encountered based on these three reasons:

- Rocks, rock piles, brick piles, wood piles
- Tall grasses (to hide)
- Bushes and trees
- Under flat pieces of wood, metal, plastic; maybe under a tarpaulin
- In storage areas
- In outdoor furniture with cushions
- In an outhouse (latrine)
- In a fire pit
- Near animal pens or enclosures
- Near sources of water
- Other places where it would be easy for them to hide

Keeping Your Compound As Snake-Free As Possible

Just like you will develop habits to check your home as routinely as possible, do the same with the areas outside of your house. As much as possible, try to develop habits to check and fix the following (adapted from Stephen Spawls and Bill Branch in "Dangerous Snakes of Africa")::

1. Remove any hiding places for snakes, such as rock piles, wood piles, bricks, pits, and rubbish heaps. Keep the ground cleared.

2. If you see any holes in the ground near the house, fill them or block them (termite mounds, squirrel holes, and so on)

3. Keep the grass cut short - snakes love to hide in tall grasses and are harder to see

4. Cut back any tree or bushes that touch the house, as a snake can use those to climb up and into your house. Also, keep litter cleared under trees and bushes.

5. Water sources outside the house can attract snakes, or even frogs that the snakes like to eat - plus these can be breeding grounds for mosquitoes. Even the drip of a leaking faucet can be a problem.

6. Snakes are attracted to chickens and eggs, rabbits, and caged birds. Or they can be attracted by food in open containers that might attract rodents. Keep these animals or food in an area away from your house.

7. Guinea fowl and turkeys are known to attack and eat snakes, and so are cats, so these might be good to have around.

8. Animals will often give off warning signals when a predator is around. Pay attention to these signals, especially warning sounds or nervousness in the animals.

9. Sometimes you might want to go out and check on your animals at night. If you do, make sure you have a torch, and watch where you step and how close you are to potential hiding areas.

10. Be careful when moving objects or stored materials outside, as snakes can be hiding underneath or behind them.

11. If you need to lift something outside, roll it toward you and look underneath before lifting. If you roll it away from you, a snake might be hiding underneath and come toward you.

12. Check in the cushions and underneath before you sit down on outdoor furniture.

13. If you have a garden or are farming, do not use short-handled tools as these get your hands into the striking zone of a snake. Use long-handled tools if you can.

14. When gardening, be very careful about sitting on the ground and where you place your hands while working or when you get up.

15. If you have a latrine, check inside the latrine before you sit on the toilet seat.

16. Be very cautious during the rainy season, as that is when snakes become more active. Especially use caution when walking on roads at night after a heavy rain. If you are farming, be aware that snakebites often occur during plowing, planting, and harvesting.

17. If you are really concerned and can afford it, you can put up a snake barrier around your property. The barrier fence must be at least one meter in height. Make it from thick shade cloth or wire netting with a fine mesh. Attach it to posts with the bottom at least 20-30 cm underground. Make sure gates fit snugly with no gaps (courtesy of Stephen Spawls).

Snakebite Awareness Training
Concluding The Training and Getting Feedback

At the conclusion of the training, you should use one of the closing techniques described in Part 1 of this handbook to assess what the students have learned and determine who is eligible for graduation. Those that are not ready should be offered to take a few more training sessions to demonstrate they know and are able to do the learning objectives for your training.

Next, you should ask the participants to provide feedback and evaluate the effectiveness of the course and trainer. Feedback helps the trainer determine what changes to make in the course or presentation style for the next time.

Feedback and evaluation can be given through a rating system. Ask the participants to rate the following on a scale of 1-5, with 1 meaning needs a lot of improvement, 3 being ok or average, and 5 being excellent.

Trainer(s)

1. How satisfied were you with the level of instruction given? (1-5)
2. How would you rate your instructor's delivery of the training? (1-5)
3. How would you rate your instructor's communication skills? (1-5)
4. Was it easy to communicate with and ask questions of the trainer? (1-5)
5. Did your trainer meet your expectations? (1-5)

6. How would you recommend the quality of the training be improved? (no rating scale)

Training

1. How satisfied were you with this training? (1-5)
2. How relevant was this training to your daily life? (1-5)
3. What did you like most about this course? (no rating scale)
4. What did you find most challenging about this course? (no rating scale)
5. How could the learning experience be improved? (no rating scale)
6. Did you like that the course offered a certificate upon successful completion? (1-5)
7. How likely are you to suggest the training course for a friend? (1-5)
8. How satisfied were you with the length of each training session? (1-5)
9. How satisfied were you with the length of the entire course? (1-5)

It is important that you record the key points that participants make during this evaluation section so that you can work on improving the next training you do.