SCHOOL WEEK #1 - Five Spotted Knapweed Discovery Interesting Facts
SCHOOL WEEK #2 - Five Biological Control of Spotted Knapweed Discovery Interesting Facts

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SCRIPT ONE (MONDAY) Spotted Knapweed #1

(Outdoor sounds - birds, grasses and plants blowing in the wind)
VO1 or VO2
It's time for (pause) **"THE MEANEST FLOWER THAT BLOWS"**

(ominous introduction - outdoor sound effects increase intensity behind the voice)
Though nothing can bring back the hour of splendor in the grass, of glory in the flower, we will not grieve, but rather find strength in what remains behind
(meaningful pause) ... the noxious weed!

(sounds of ukelele - hula)

VO1 Is that ukelele music, Henry? I love ukelele music. It reminds me of Hawaii.

VO2 Yes it is Stephie, hula music - grass skirts, oceans, pineapple groves . . . .

VO1 pineapple groves, Henry?

VO2 Yes, pineapple groves. Oh, the life.
Stephie, did you know that more than 80% of the plants that grow in Hawaii are not originally from Hawaii?

VO1 You mean this pineapple is not from Hawaii?

VO2 Oh, the pineapple is native to Hawaii. The huge orchids and ornamentals that grow so well there are not native. They grow so big and beautiful that people brought all kinds of ornamental flowers from overseas to grow for gardens and bouquets.

VO1 Wow, they are really pretty. Will they grow here in Montana?

VO2 Not as easily as in Hawaii.

VO1 How about pineapples? I'll bet pineapples will grow in Montana.

VO2 Stephie, what makes you think pineapples will grow here?

VO 1 Look at these pretty purple plants I picked from the fields yesterday. They have tiny pineapples growing under their flowers. See?!

VO2 These aren't pineapples, that's spotted knapweed.

VO1 Spotted what? Those aren't spots they're pineapples.

VO2 These aren't pineapples, Stephie. Spotted knapweed is a noxious weed. What you see under the purple flowers are called "bracts". "Bracts" surround the seed head below the flowers.

VO1 (disappointed but teasing) Oh! I guess I'll have to put my lei and grass skirt away.

Vo2 But, good observation, Stephie.

All of the bracts together look like a little pineapple.

VO1 What are you talking about?

VO2 The tiny pineapple appearance of the leaves under the flowers helps you identify spotted knapweed. Think of the purple flowers as floating leis. The leis are supported by a tiny pineapple. That will help you remember how to identify Montana's number one threat. Spotted knapweed.

VO1 Why is it the threat, Henry?

VO2 Spotted knapweed is not originally from here. I'll tell you more

(pause) **next time on "THE MEANEST FLOWER THAT BLOWS"**

VO1 or VO2 (with outdoor sound effects creating an ominous yet hopeful close)
the meanest flower that blows can give thoughts that do often lie too deep for human tears . . .

(meaningful pause) find out more at weedawareness.org

SCRIPT TWO (TUESDAY) Spotted Knapweed #2

(sounds like tap dancing - or spoons dancing between thighs and hands)

VO2 Stephie, do you know how to play the spoons?

VO1 No, show me.

VO2 Here, put them together back to back (pause), that's it! Now, hold both of them in one hand. Put your index finger between them up near the top of the stem.

(sounds of spoons being put into position)

VO1 What now, Henry?

VO2 Now, hit them with your other hand. Hold them loosely so that the spoons can click together like casti-nets.

VO1 Oh, like this?

VO2 Yes. Now take turns hitting the spoons with your hand and then hitting them on your leg.

VO1 Like this, Henry? (sounds of spoons hitting against a leg and then a hand)

VO2 Yes. You get lots of different sounds depending upon where you hit them or what you hit them with. That's the music for spoons.

VO1 Why are you teaching me to make music with spoons, Henry? I thought you were going to tell me about the pineapple threat. You know, spotted knapweed and all.

VO2 I am, Stephie. Spotted knapweed is originally from Europe and Russia. Just like spoon dancing is from Europe. Knapweed came to America stowed away in bags of alfalfa seed for an Oregon farmer a hundred and twenty years ago.

VO1 How do you know all that?

VO2 I read it in the history book. The farmer found it growing in his alfalfa field and reported it because it had contaminated his seed crop.

VO1 What happened then?

VO2 It was found in other areas where ships docked. Scientists think it came to the United States in the dirt used for ship ballast.

(fog horns and sounds of ships at sea)

VO1 What's ship ballast?

VO2 Ballast is dirt used to keep a boat low in the water when they're not carrying cargo. Ships would dock in America and unload their dirt and then pick up heavy boxes to take back with them to Europe. The spotted knapweed seed was in the dirt they unloaded from Europe and western Asia.

VO1 (somewhat intrigued) Are we talking PIRATE ships here. Henry? Should I put on my eye patch and get my saaaa word?

VO2 (serious) It was the late 1800s, Stephie. (teasing) But, if you really want to hear about pirates listen up . . . .

SCRIPT THREE (WEDNESDAY) Spotted Knapweed #3

(sound of sword fighting - swash buckling - pirate ships at sea)

VO 1 Henry, did you see the movie Pirates of the Caribbean?

VO2 Yes Stephie. It was really exciting. Big waves, treasure, pirates, .. all that.

VO1 So, tell me, Henry, what does spotted knapweed have to do with pirates?

VO2 Remember in the movey, the pirates that turned into skeletons when they walked into sunlight?

VO1 Ew! Don't remind me. That was scary. They were cursed to live forever.

VO2 Yes, they were.

VO1 Arrgh (pirate language), but what does that have to do with spotted knapweed?

VO2 Spotted knapweed seeds can live for what seems like forever. Maybe TWENTY years.
VO1 How do you know that, Henry?

VO2 Scientists put seeds into ten time-capsules buried in the ground. One for each year. They believed ten years worth of data would tell them how long seeds would live in the soil.

VO1 So, what happened in ten years and why did you tell me twenty?

VO2 Well, ten years passed. Each year they opened up a capsule, and the seeds were still viable with no signs of dying. At the end of ten years they ran out of capsules. Scientists really don't have proof how long seeds will live but speculate they will live MANY more years than ten. That always reminds me of the many lifetimes those pirates have to live.

VO1 Woe! Next time I see pirates in the daylight I'll think of the never dying spotted knapweed seeds. What else does knapweed have in common with pirates, Henry?

VO Pirates have treasure. Spotted knapweed has a crown.
The crown is in the soil just below the surface and just above a thick long taproot.
You can pull the plant out of the ground, but if you don't get it well below the crown
it will grow back from the root just like the pirates grew back after being shot or stabbed.

VO1 Oh gross! (cynical) Anything else morbid and scary like drinking poison brandy?

VO2 Spotted knapweed roots release chemicals into the soil that are then sucked up by the roots of grasses and other plants. The chemicals act like a computer virus, telling the plants' roots to stop growing or signaling cells to die off. Knapweed's chemicals make some plants self-destruct.

VO1 Do the other plants even have a chance to survive?

VO2 Many plants put out chemicals to claim their space. That's natural. Spotted knapweed chemicals cause more damage and knapweed survives where other plants cannot. Some humans are allergic to the chemicals and suffer asthma symptoms or serious allergic reactions. It's always a good idea to wear gloves and cover your skin when handling spotted knapweed.

VO1 Tell me more about what happens to the other plants, Henry.

SCRIPT FOUR (THURSDAY) Spotted Knapweed #4

(sounds cows snorting and grazing - horses swatting flies)

VO 1 Henry, I heard that spotted knapweed is the number one problem weed in Montana. Is that true?

VO2 Yes it is Stephie. Spotted knapweed crowds out native plants. Livestock and wild animals don't like to eat it, so where it grows, there's less good food for animals to eat.

VO1 Is that a bad thing, Henry? I'd rather eat a sandwich than raw fish. So, what's the big deal?

VO2 It is a bid deal, Stephie. Over time, the only thing growing will be knapweed. There will be no food for elk and deer. Where smaller plants once provided places for smaller animals like rabbits and mice to hide, and fish and frogs to find shelter (sounds of frogs) now there is only bare soil. Pretty soon after all of the native plants are gone, knapweed begins competing against ITSELF for food and water.

VO1 (questioning) Maybe that's a good thing? Will it compete against itself and then go away?

VO2 Its not quite like that, Stephie. Over time you will see the knapweed plants spaced out with a foot or two or bare soil between each plant. Nothing else will grow. When it rains there is no vegetation to stop the water from flooding. That causes the soil to move.

VO1 Where does the dirt go?

VO2 The rain waters flush the soil into streams and lakes.

VO1 What happens to the streams and lakes when all the dirt fills them up?

VO2 Stephie, have you seen the whirling disease reports on television?

VO1 Is that where trout swim around in circles?

VO2 Yes it is. Although scientists don't have direct proof, some believe that pathogens such as those that cause whirling disease live in the muddy sediment caused by erosion. Knapweed contributes to the muddy sediment.

VO1 This is a pretty serious conversation, Henry. I'm not sure I like what I'm hearing.

VO2 It is serious, Stephie. Spotted knapweed is the number one threat to good water. It causes farmers and ranchers to lose money trying to control it. And it causes health problems for humans, and spreads rapidly.

VO1 Henry, I've noticed that it's growing along a lot of roads and by that railroad track and power lines.

VO2 That's right, Stephie. Scientists realized that the seeds sometimes even the stems and whole chunks of the plant were hitch-hiking on cars, truck, and trains. Once knapweed takes control on these road and rail corridors, they spread out, catching rides on vehicle tires, animal fur, clothing…..

VO1 Oh, this is so serious, Henry. Can I do anything to stop all this and make things better?

VO2 It's really important that you want to do something, Stephie. Your local weed district and Extension offices have lots of information. We can talk more about what you can do

SCRIPT FIVE (FRIDAY) Spotted Knapweed #5

(sound hiking and bicycling on a trail - happy sounds)

VO1 This is great to be hiking along the side of these lakes and lying in the sun, Henry.

VO2 We climbed about 1,000 feet this morning, Stephie. Feels good doesn't it?

VO1 Oh yes. What should I do with my bag of knapweed?

VO2 Make sure it's sealed tight so the seeds don't fall out of the bag.

(sounds of closing and tying the bag closed around woody plant materials rustling)

VO1 Okay. This was fun coming up here with the other hikers to pull weeds.
We got a lot done. This should keep knapweed from spreading into the backcountry.

VO2 That's right. Pulling them now and getting the taproot to make sure the plant dies is really important.

VO1 (teasing) Taproot (pause) that sounds like a brand of root beer from a barrel. Did you bring root beer, Henry?

VO2 You're just kidding around aren't you? Getting the taproot is the only way to make sure the plant can't grow back. We don't want the plant to grow back now do we?

VO1 Did we get all of the plants or are there more beyond the trail?

VO2 We've been keeping them pulled from the trail so that animals and humans don't spread the seeds on their fur and clothing. If we can keep the seeds from increasing in number by keeping the plants pulled, over time we can ensure that knapweed plants don't move beyond where they already are.

VO1 Henry, If we pull these plants, why do you think there will be more growing here?

VO2 Good question, Stephie. Each knapweed plant can produce up to **36,000** seeds that fall around the base of the plant.

VO1 Thirty-six thousand? Wow, that's a lot!

VO2 It sure is, and knapweed seeds can survive in the ground for as many as twenty years. We'll have to come back to this same trail for twenty years to make sure we pull all of the plants. We'll have to keep pulling until there are no seeds in the soil.

VO1 What if we MISS a plant?

VO2 Remember, each plant can produce up to thirty-six thousand seeds. We'll have to start counting one to twenty again. One for each year after the new plant drops its seeds.

VO1 Oh, twenty years is a long time. I'll be . . . . out of college by then.

VO2 Are you going to take a science class in College, Stephie?

VO1 Yes, I think I'll take a class about bugs. Can we talk about bugs, Henry?

SCRIPT SIX (MONDAY) Biological Control of Spotted Knapweed #1

VO1 (exhausted) Henry! Are we almost back to the jeep? We've been hiking all day and its near dusk. (pause) Wait! Wait! There!

VO2 What is it, Stephie?

VO2 (excited) There's a yellow bug on top of this knapweed plant.

VO2 There sure is, Stephie. Look at those yellow wings!

VO1 What is it?
VO2 It's called a sulfur knapweed moth.

VO1 Where's it from?
VO2 It could be from Hungary, but more likely from Austria.
(sounds of yodeling in the distance)

VO1 That's a long way from here. How did it get here?

VO2 Scientists captured some sulfur moths in Hungary and Austria and released them in Montana in 1984.

VO1 Why'd they bring them here, Henry?
VO2 They hoped the moths would prey on spotted knapweed and reduce its ability to spread.

VO1 Do sulfur moths eat knapweed?
VO2 Yes. Many people call it the yellow-winged knapweed ROOT moth. They call it the ROOT moth because before it changes from a caterpillar to an adult moth, it feeds on the roots.

VO1 So?
VO2 With fewer roots, knapweed has less ability to grow stems and leaves. The plants are smaller, and fewer numbers of plants survive.

VO1 Are there more than just this one sulfur knapweed moth here tonight?

VO2 Let's find out. It's still early evening and it's August - just about the right time to see lots of yellow-winged knapweed sulfur moths. Let's try that new technique and see if we can see them. Here, take the corner of this white sheet and help me spread it out over these plants. (sounds of sheet unfolding and laying it over woody plants)

VO1 (alarmed) We can't see them through this sheet. Why are you covering them up, Henry? I want to see them.

VO2 Be patient, Stephie. Lift up a corner of the white sheet and look below it. I'll hold this blacklight suspended over the sheet. You should be able to see the moths.
(sounds of flying moths)

VO1 Wow! There's a bunch of 'em. They're all over.
(allow time for the impact of sounds of moths fluttering about)
VO2 Most of the moths that are attracted to the light will be males. So, we don't use this technique when we're trying to COLLECT them, only when we want to SEE them.

VO1 Oh, that was exciting. But, should we pull the knapweed plants while we're here?

VO2 There's a lot to be considered before pulling them …. we'll talk more

SCRIPT SEVEN (TUESDAY) Biological Control of Spotted Knapweed #2

VO2 Hi Stephie, here's a vacuum for you.

VO1 I don't want to vacuum. My mom does that . . . sometimes my dad.

VO2 Here's an "insect vacuum", Stephie. We hold them in our hands and gently suck bugs into this little canister.

VO1 EEeeeww!!! I'm not sucking bugs. That's sounds awful. Who would do that?

VO2 It's how we collect these root-boring moths that eat spotted knapweed.

VO1 I'm not sucking bugs up through that hose. I not going to do it.

VO2 (reassuring) Do it gently and the insects will fall right into the canister.
(sounds of gentle sucking)

VO2 Look! There! You did it! It wasn't so bad was it?

VO1 No. (pause) Let's get some more.
(sounds of gentle sucking and insects milling about)

VO1 I'm going to show my friends. What will I tell them when they ask me why I'm sucking bugs, Henry?

VO2 Stephie, did you know that spotted knapweed is the most expensive weed in Montana?

VO1 No, what do you mean?

VO2 Spotted knapweed is one of four knapweeds that cost more than forty two million dollars every year.

VO1 Who pays for that?

VO2 We all do. Some comes out of the taxes we pay. And, we spend another twenty million dollars, just in Montana, trying to control knapweed and other noxious weeds.

VO1 That's a lot of money. What costs so much?

VO2 Part of the cost comes from lost dollars that come into the state for recreation and hunting. When weeds get too bad, some trails are closed. And, some hunters won't come here and purchase licenses if there are no elk and deer, or ducks and geese to hunt.

VO1 Why won't hunters come, Henry?

VO2 Noxious weeds crowd out native plants that the deer and elk depend on for shelter and food. Once their food is gone they have to go someplace else to find it. Noxious weeds also change the characteristics of rivers, streams, ponds, and lakes - when water is no longer fit or available and the wetland plants that provide cover for birds are no longer there, the birds and fish leave too.

VO1 Oh, I get it. If the deer and elk and birds and fish leave for food, hunters follow.

VO2 Stephie, that's only one of the many negative economic impacts caused by spotted knapweed. There are lots of benefits to sucking bugs into canisters. I'll tell you more

SCRIPT EIGHT (WEDNESDAY) Biological Control of Spotted Knapweed #3

(sounds of bicycle getting closer spokes with cardboard flapper)
(sounds of dog barking - as if dog coming closer with Stephie who is riding the bike)

VO1 Daisy, daisy, give me your answer true, I'm half crazy just for the love of you - we won't have a stylish marriage, we can't afford a carriage, but you'll look sweet upon the seat of a bicycle built for two……. WEEEEEEE!!!!!!!

VO2 How do you know that song, Stephie? You're not old enough to know it.

VO1 Oh, my grandfather sings it all the time.
What do you think about my new bike, Henry?
I just cut across the field to show it to you. I think I'll name it Daisy two, just like my dog.
Daisy..Daisy…Daisy - go play. (sounds of dog barks getting farther away)

VO2 Sweet bike, Stephie. Daisy Two is a great name. Hey! Let's take a look at that back tire.

VO1 What's up with my back tire?

VO2 You picked up some spotted knapweed cutting across the field. Let's get your bike washed before you ride that bike anywhere else.

VO1 What's so important about washing my bike. It's brand spanking new.

VO2 Your brand new bicycle can spread spotted knapweed seeds everywhere you go.
Come on, now, let's get Daisy Two washed up. (sound of garden hose washing bicycle)

VO1 There! its clean. No more weeds.

VO2 Not quite done, Stephie. We need to really get into the tire grooves.

VO1 Why is that?

VO2 Scientists studied vehicles driving through knapweed infestations. They tracked how far the vehicles went, and measured how many knapweed seeds were still in the tires.

VO1 That sounds silly, Henry.

VO2 It's pretty serious. Knapweed seeds were still in the tires forty miles down the road.
Roads and trails are the main locations where spotted knapweed is spread.
Your bicycle could spread these seeds everywhere you go.
(sounds of dog barking getting closer)

VO2 Daisy, Daisy, let's get you combed out too. Can't be too careful.

VO1 Why are we combing Daisy?

VO2 Daisy ran through the field with you, didn't she? She's got knapweed seeds stuck in her coat. Let's comb them out and give her a bath, too.
(sounds of squirting water - obviously hitting Stephie with the spray) SCREAM!!!
VO1 Stop that Henry! (giggles) My turn!

VO2 Do you want to know more about knapweed?

VO1 Are you going to spray me again?

SCRIPT NINE (THURSDAY) Biological Control of Spotted Knapweed #4

(sound of a pig "rooting" "root" "root")

VO2 Look at the snout on that pig, Stephie!

VO1 Yeah! It sure does stick out. Does that help him smell his food?

VO2 I'm not sure, but it sure does make funny rooting sounds.

VO1 What is a snout, Henry?

VO2 The dictionary defines it as a projecting nose, jaws, or anterior facial part of an animal's muzzle.

VO1 Are pigs the only animals with a snout?

VO2 The spotted knapweed root weevils have long heads that look like snouts. A weevil is a type of beetle and some people call them "snout beetles".
I've got one, here. (as if handing it off to Stephie)

VO1 This one looks really funny. The nose sticks way out in front of the head (pause) and there are two antennae coming out mid-way near the eyeballs.
And look, it's clinging to me! It won't let go.

VO2 If you think it looks funny, you should hear it's name. Sy-fo-clee-own-us.

VO1 (slowly pausing for accuracy) Sy-fo-clee-own-us????

VO2 Correct. Sy-fo-clee-own-us ah-kay-teees

VO1 Woe - that's a hard name to pronounce. Why such a hard name?

VO2 The knapweed root weevil comes from Austria, Hungary, and Greece.

VO1 Really?

VO2 Sy-fo is the Greek word for "hump".

VO1 Sy-fo (pause) hump, hmmmmm

VO2 Ah-kay-tees was a character in the Ah-nee-id, a first century B C epic poem.
Ah-kay-tees was the loyal friend of Ah-nee-as, the hero of the story.

VO1 So why did they name the weevil (slowly for accuracy) Sy-fo-clee-own-us ah-kay-tees?

VO2 If you take the Greek meaning for "hump", Sy-fo
and the loyal friend, Ah-kay-tees,
you have a humped loyal friend. The spotted knapweed root weevil. The snout beetle.

VO1 Why do you think they named it a humped loyal friend, Henry?

VO2 Most likely because it may be the best root-boring biological control agent for knapweed.

VO1 Do you have any other interesting stories about spotted knapweed biocontrol agents?

VO2 If you can say it again, Sy-fo-clee-own-us ah-kay-tees three times without stopping, I will

VO1 (struggling and fading out) Sy-fo-clee-own-us ah-kay-tees Sy-fo-clee-own-us ah-kay-tees Sy-fo-clee-own-us ah-kay-tees

SCRIPT TEN (FRIDAY) Biological Control of Spotted Knapweed #5

(sounds of clapping hands in rhythm one, one-two, one-two-three, one-two-three-four - up to ten)

VO1 Why are you clapping your hands, Henry?

VO2 I'm measuring the difference between the sounds of two and ten claps.

VO1 Why are you doing that?

VO2 Because I believe there is a big difference in the sounds that I hear between two claps and ten claps. Listen
[clap twice (pause) clap ten times]

VO1 Yeah???

VO2 I'm going to clap twice - Listen to the sound between the claps - the air space.
(clap twice fast)

VO1 I didn't hear anything, Henry - there was nothing to hear.

VO2 Now I'm going to clap ten times - Listen to the sound between the claps
(clap ten times fast)

VO1 Henry, I still couldn't hear anything.

VO2 Let's do it again. Listen carefully first to two claps and then to ten.
(clap twice and then ten times)

VO1 The ten claps seemed to have a rhythm and more impact.

VO2 That's it. Did you hear it? Like the applause from an audience.

VO1 A huge audience. So what do you use those sounds for, Henry? What does it mean?

VO2 The impact of an audience compared to two single claps is a big difference, right?

VO1 Right!

VO2 Imagine the impact spotted knapweed has on other plants because its roots are capable of taking up water and nutrients **TEN TIMES** faster than native plants.

VO1 Those other plants won't be clapping even once, Henry.