



# Bed bugs Go To School: Staff



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# Bed Bugs go to School

"Bedbugs are sighted at a Jersey City School and officials stated they will confine them to the 3<sup>rd</sup> floor and not close the school despite outside pressure" -Dec. 20, 2010

"Bedbugs are invading classrooms at alarming rate" ("It was, like, 'OMG, there's bedbugs in the school,'" )-NYC, NY - Nov. 5, 2010



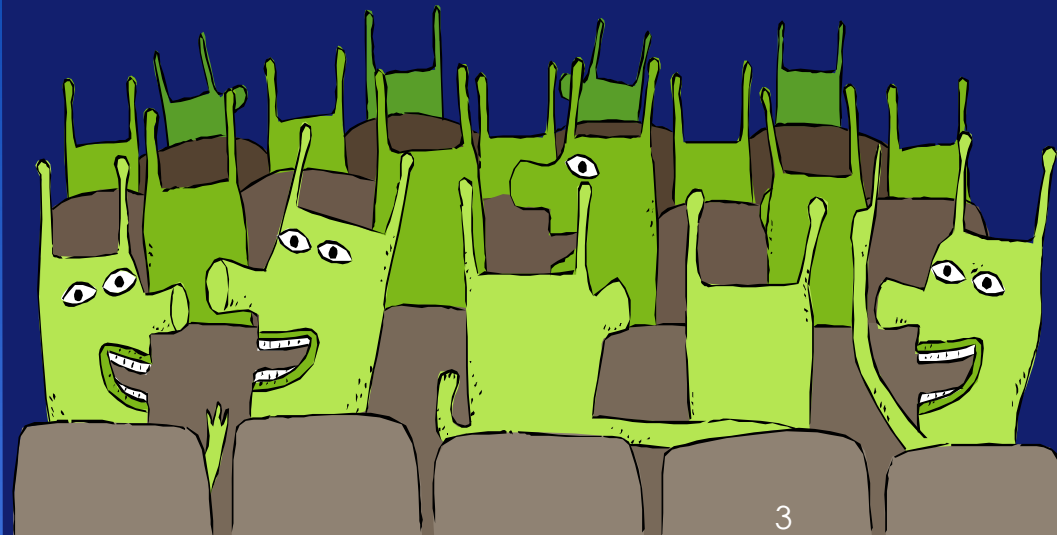
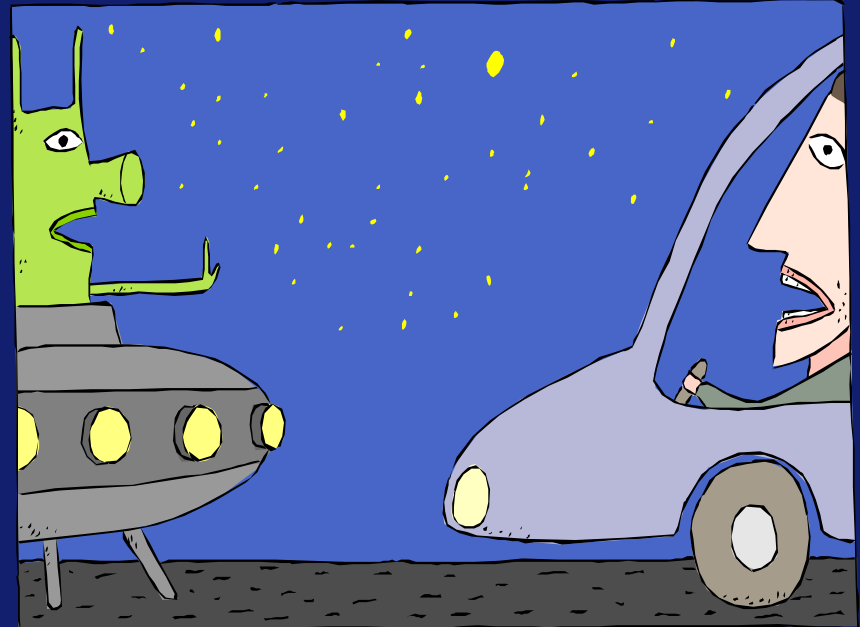
"Kentucky school bans backpacks and lunchboxes after bedbugs appear..." -Sept. 7, 2010

Two NJ schools are sprayed with pesticides due to the sighting of one bed bug. No timely notice was given to parents. Oct. 11, 2011



# Where can we find Bed Bugs?

- a) cheap hotels
- b) expensive hotels
- c) apartments
- d) private homes
- e) theatres
- f) office buildings
- g) busses & taxis
- h) trains & subways
- i) airplanes
- j) schools



# Where do the bed bugs come from?

- Students or staff bringing bed bugs to schools may have infestations at home.
- Observe students book bags, outer garments and clothes for signs.

Work with parents to:

- promote effective management of bed bugs in homes.
- help prevent new infestations with education.





# Bed Bugs in Schools



Bed bugs in New York City schools:  
In 2009 – 2010 school year: 1000 reports  
In 2010 – 2011 school year: 4000 reports

# Bed Bug

## “Fear and Loathing”



- Why are bed bugs such a challenge?
- The issue of bed bugs in a school can be emotional and generate anxiety in parents, students and school staff.



**Panic & Hysteria. Don't let it happen to you!**



# Things to Avoid:

- Overreacting.
- Closing the school.
- Sending a student home.
- Allowing staff to apply pesticides (unless they are state certified applicators).
- Widespread pesticide applications, unless necessary.
- Stigmatizing students.



# How can schools be proactive?



The formula for success in dealing with bed bugs is to educate everyone.

- Have a plan of action.
- Follow this bed bug management approach.
  1. **Plan to remain calm.**
  2. Develop policies at the school district level.
  3. Develop procedures and responsibilities staff.
  4. Educate all stakeholders.



# Code of Practice



## When a Bed Bug is Found...

- Decide how to respond to a single bed bug found on a child.
- Decide how to respond to one or more bed bugs are found in a classroom.
- Have a code of practice in place for both situations.
- Communicate this code of practice to all faculty and staff.

# Provide Basic Bed Bug Information



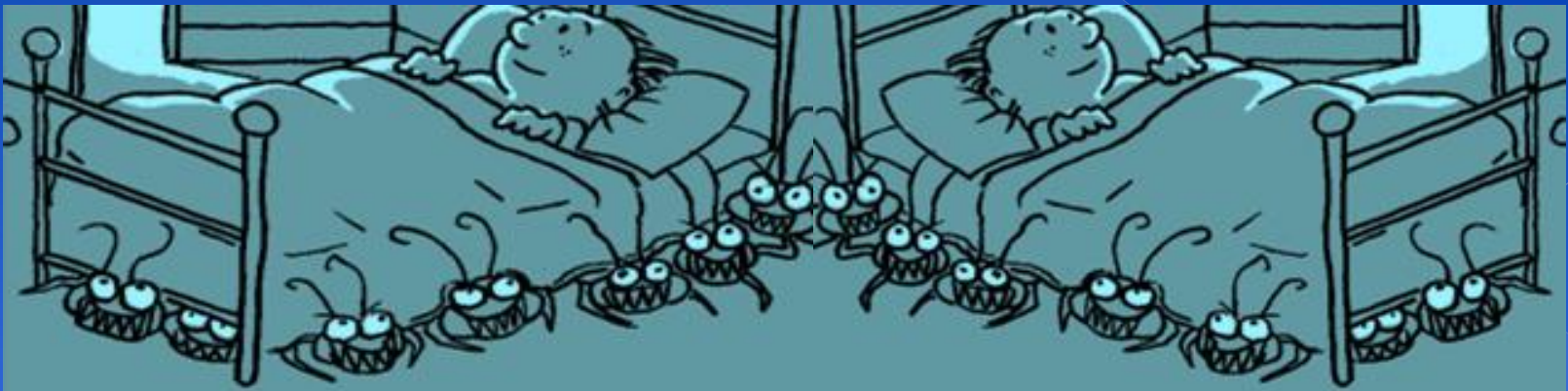
Engage the school community about:

- Basic bed bug biology and habits.
- How to recognize bed bugs, and their evidence.
- Educate about responsibility regarding bed bugs and school responses.
- The school should be proactive – not reactive.
- Know who to contact if you have questions.



# Let parents know that:

- Your school has a bed bug action plan.
- **Anyone** can get bed bugs.
- The school **will not close** unless necessary.
- Parents have a role to play.
- Advise the school if bed bugs are found at home.
- Controlling bed bugs at home means fewer to no bed bugs in schools.
- Send a bed bug awareness flier home on how to avoid bringing bed bugs to school.



# Common Bed Bug Myths

You only get bedbugs if you are dirty.



- Bed bugs are not a sign of sanitary issues.
- They're after only one thing.
- They thrive where humans sit still for more than an hour.
- Multi-family housing, hotels, offices, and even schools are prime locations for bed bugs.



# Common Bed Bug Myths

## Are bed bugs only active at night?

- While bed bugs prefer darkness, keeping the light on at night won't deter them from biting.
- They are most active between 2 and 5am.



# Can you identify the bed bug?



**1** Tick



**2** Tick



**3** Bed bug nymph



Carpet Beetle  
**4**



Cockroach  
**5**



Adult Bed bug  
**6**



Cockroach nymph  
**7**

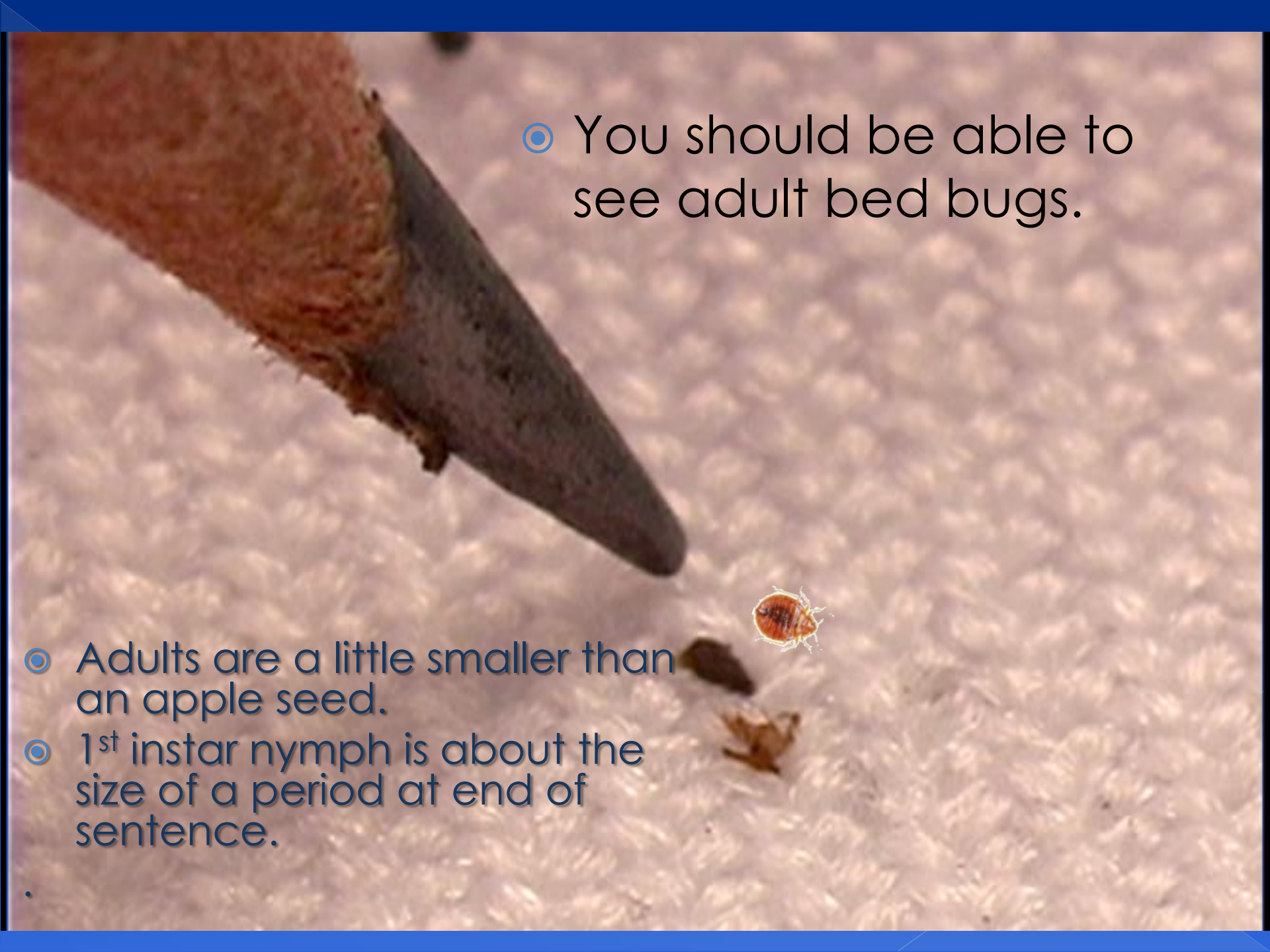
# Common Bed Bug Myths

**You can't see  
bed bugs with  
the naked eye.**

Although they are  
tiny, adult bed  
bugs are easy to  
see.





- 
- You should be able to see adult bed bugs.

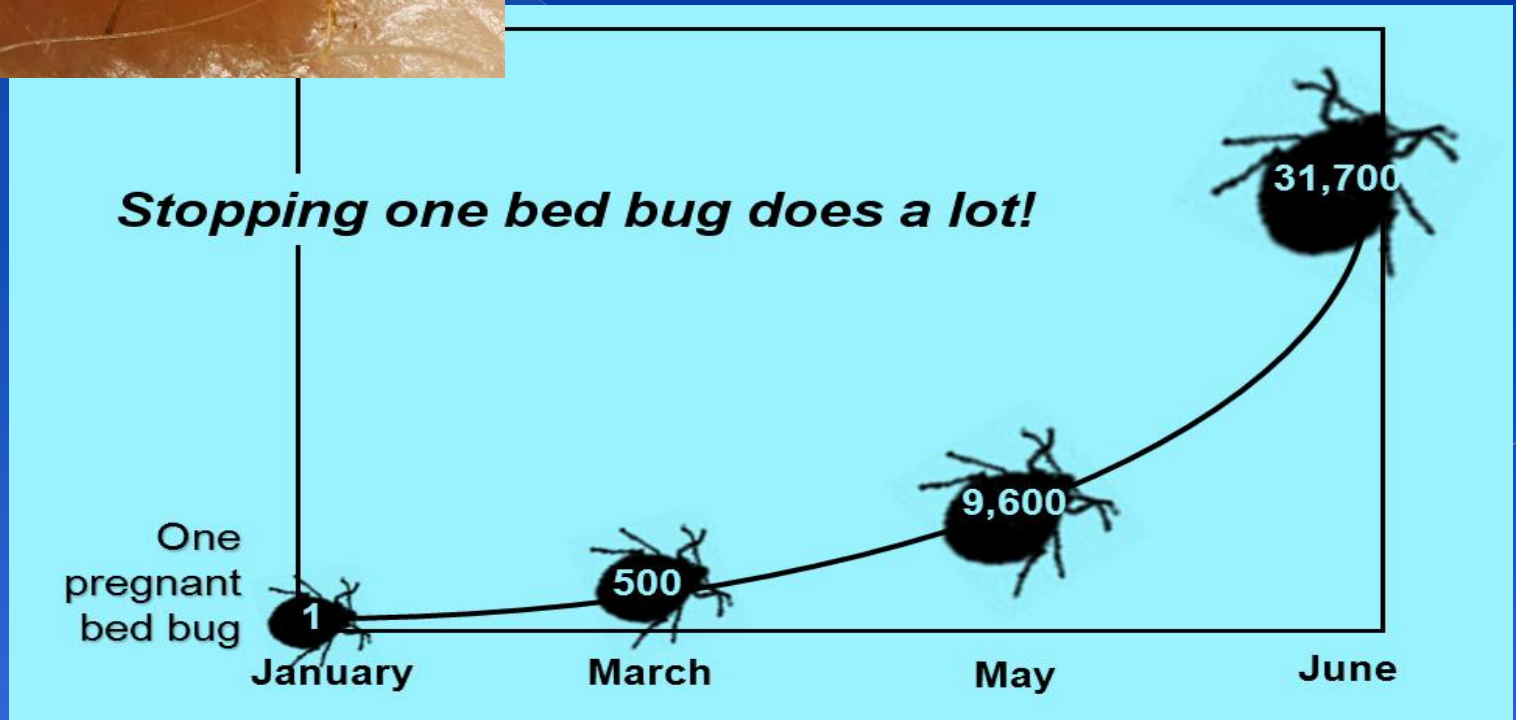
- Adults are a little smaller than an apple seed.
- 1<sup>st</sup> instar nymph is about the size of a period at end of sentence.

# Physical ID

- Oval Bodied, < ¼ inch.
- Adults: brown to red in color
- Wingless – they do not jump
- Six legs
- Nymphs are nearly colorless
  - Size of a poppy seed
- Eggs are white, 1-2mm
- Eggs glued to rough surfaces



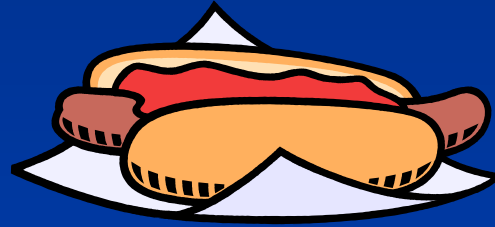
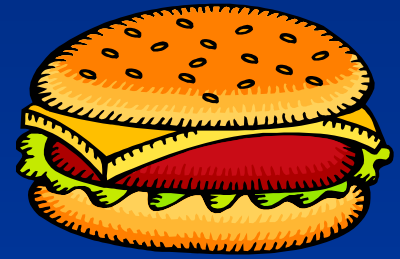
# Bed Bug Reproduction





# What do they eat?

- a.) cereal
- b.) human blood
- c.) table scraps
- d.) cockroaches
- e.) water
- f.) hot dogs
- g.) hamburgers



# Bed bug feeding



1. hungry

Flattened from top to bottom



2. feeding



3. full



Penetrate skin with beak  
and inject an anesthetic

***In 10 Minutes!***

# Bed bug characteristics

- Aggregate.
- Usually active at night.
- Attracted to exhaled  $\text{CO}_2$ .
- Attracted to body temperature.
- Most travel 15-20 ft to feed.
- Adults can survive >6 months without feeding.





# How to Respond

What are the first things you should you do if you think you see a bed bug?  
(Select all that apply)



## Scream!

- a) call the custodian
- b) inspect the area near where the bb was found
- c) Close school for the rest of the day
- d) call a Pest Control Company immediately
- e) capture it for proper ID
- f) kill it and forget it, because it is only one
- g) Notify the school nurse



- Decide how to respond to a bed bug incident in a classroom.
- 1 bed bug is not an infestation.
- Breeding infestations in a school are rare.
- An infested classroom will require professional treatment and parent notification.
- (State laws often require notification of all parents if any pest infestation is detected.)

# Common Bed Bug Myths

Bed bug bites always show up in sets of three in a row:

Breakfast, lunch and dinner.

- **Inability to identify bed bugs by the bites**
- 5 stages:
  - > no reaction;
  - > delayed reaction;
  - > both immediate & delayed;
  - > immediate reaction only;
  - > True hypersensitivity can develop





# Procedures for Students found with Bed Bugs

Discretion is critical!



- Discretely remove student from class.
- School nurse check student's clothing and belongings.
- Contact the student's parents.
- Send bed bug information home.
- Students should not be excluded from school.
- Schools should not be closed.
- Prevent bed bug hysteria.

# Inspecting for Bed Bugs



**Look very carefully.  
Can you see hitch hikers on this backpack?**

# School Bed Bug Hot Spots

- School staff break rest areas.
- Closets and lockers for coats, hats, and backpacks.
- Faculty lounge, office area or nurses office with upholstered furniture or cots.
- Classrooms with upholstered furniture.
- Schools with child care facilities or dormitories.





# 1. Inspections



- Determine the extent of the incident in order to plan a site-specific course of action.

# Inspections

- Thoroughly inspect the surrounding area where the bed bug was found.
- Include desks, floors, walls and storage areas.
- Inspect any closets or lockers used to store the person's belongings.
- Arrange for an inspection by a management professional.
- Map out bed bug sightings and confirmed findings.





# Cubbies, coat closets, and coat hooks



- Separate student back-packs and coats.
- Provide sufficient space between coat hooks so that each child's belongings do not touch those of another.
- Most bed bugs in schools will be coming in with the students and can be found on student's belongings.
- Cubbies, lockers and child storage should be emptied and cleaned at least once per season.



# Unusual Harborage



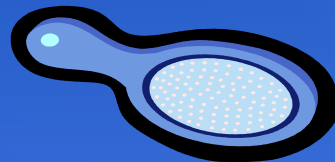
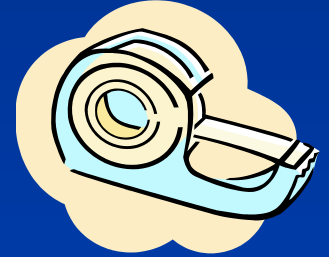
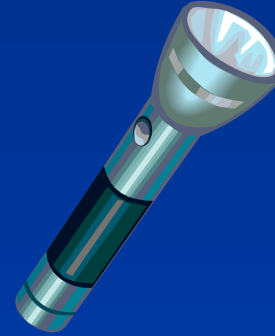
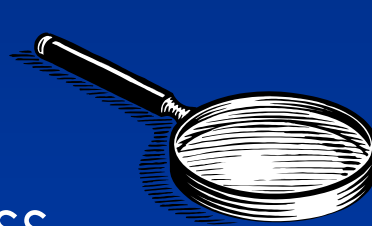
# Signs of Bed Bugs

- Confirm bed bug Identification
- Dark and rusty colored droppings.
- Shed skins.
- Blood stains from crushed bugs.
- Eggs and casings found among droppings or in crevices where adults hide.
- An offensive, sweet, musty odor.
- Live bed bugs.



# Recommended Inspection Tool Kit

- Magnifying glass
- Strong flashlight
- Plastic zip-bags or scotch tape
- A probe,
- Screwdrivers
- Small tool kit
- Cleaning wipes
- Alcohol and Cotton swabs
- Mirror





# How to Monitor for Bed Bugs

Identify the presence of multiple bed bugs.

- ◉ Interview
- ◉ Visual inspection
- ◉ Traps
- ◉ Interceptors
- ◉ Detection dogs



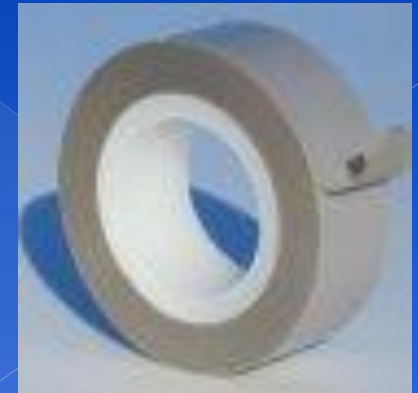
# Monitors: Sticky Traps



- Sticky traps are more effective for cockroaches and other pests, but can still catch a bed bug.



BB Alert™ Passive



# BED BUG DOGS

- ⦿ Dogs are trained to detect live bed bugs and their eggs.
- ⦿ Can inspect a room in a matter of minutes.
- ⦿ Very helpful for monitoring ongoing conditions and investigating reported problems when visual inspection finds none.





# Pest Prevention

- Seal up all cracks, holes, outlets
- Eliminate all harborages (clutter)
- Well maintained facility
- Well educated staff
- Well educated parents



# Basic Bed Bug Prevention Steps in School

- Educate staff about bed bugs and school IPM.
- Inspect room regularly.
- Reduce clutter.
- Clean and vacuum regularly.
- Isolate student belongings in clear plastic bags or bins
- Reduce items brought back and forth from school.





# Eliminate Clutter / Harborage

- The bed bug's ability to hide is one of the main reasons why it is such a formidable opponent.
- Clutter removal is an essential part of bed bug elimination.





# Limit the Items Being Brought into School...

...will reduce the chances of bed bugs being brought in.



- Identify items to leave at school until the end of the school year.
- Identify items, such as books, that can be left at home until the end of the year.
- Ask parents to frequently heat-dry bed linens, jackets, backpacks and clothes.

# Mitigation of Bed Bugs in Schools

- Don't Panic!
- Assess the situation.
- Think through your treatment options.
- The best way to get rid of bed bugs is to clean, disinfect and eliminate their hiding places.
- Do not immediately reach for the spray can.
- Turn to professionals if needed.



# What is Integrated Pest Management (IPM)?

## EPA Definition:

- Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices, with pesticide application as a last resort pest control method.



# IPM for Bed Bugs

- ◎ **Greatly reduce the need to resort to pesticides by:**

- ◎ A preventive attitude,
- ◎ A plan of action,
- ◎ An open reporting policy,
- ◎ Schedule regular inspections,
- ◎ Offer awareness training,
- ◎ React immediately.

# The Alternatives

- The most effective bed bug treatments use IPM, combining conventional products with eco-friendly alternatives to thoroughly kill the insects.
- After sanitation, maintenance and use of physical barriers, there are two other categories of non-chemical solutions to kill bed bugs:
- Temperature
- Bio-based





# Managing bed bugs:

## 1. Sanitation

- Use control tactics consistent with school IPM guidelines and regulations.
- Include nonchemical approaches such as, cleaning, vacuuming, reducing clutter, trapping.



# Vacuuming



- **Vacuuming is a very effective way to control bed bugs.**
- A thorough vacuuming may be needed with special attention to cracks and crevices in furniture and equipment, walls and floors.
- Vacuum talcum powder will inhibit bugs from crawling out of vacuum.
- Properly dispose of filter and/or bags and contents. (seal in plastic bag).

# Additional Controls: Seal Cracks



- Use silicon caulk to seal.
- Create a perimeter barrier.
- Target walls that are shared with other homes.
- Plates covering wall openings should be sealed.

# Good 'Ole Fashioned Washing

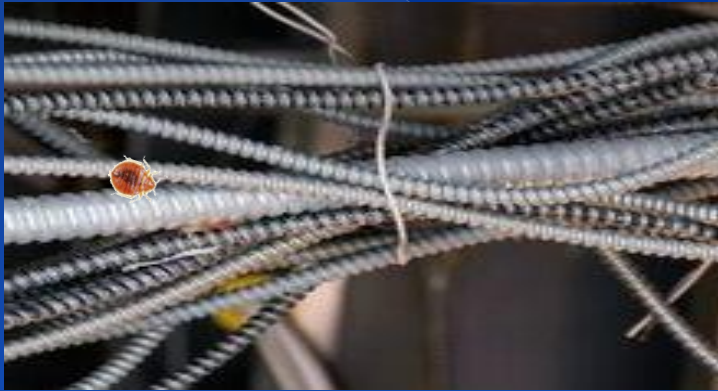
- Bleach and ammonia may not be effective against bed bugs.
- Soap and water is effective for removing bed bugs, eggs and debris from surfaces.





# For Staff and Parents:

## “Think in 3-D”



1. bed bugs may already be in or through wall voids, along pipes, or through air vent passages to rooms on either side, above, or below.

2. Other places to examine...
  - a. On the other side of the common wall.
  - b. Along the wall-ceiling edges of rooms below.



# Managing bed bugs:

## 2. Temperature:

- Bed bugs die after exposure to extreme levels of heat or cold.
- Heat treatments - immediately effective, one-day solution.
- Steam applications - ideal for surface treatments.
- No chemical residues.



# Steam Clean



- Kills bed bugs and eggs without chemical residue.
- Does not penetrate some materials.
- Time consuming. Work slowly.
- The steamer should not “blow” air forcefully or it may cause bed bugs to scatter.
- Steam temperature must be 49° C or greater.
- \*Do not apply steam to electrical outlets (not a DIY!).



# Ambient Heat Boxes



## Radiant Heat

- ❖ 2 to 8 hours of intense area heating at 113° to 140° F
- ❖ May not penetrate all areas.
- ❖ Remove electronics, plants, medicine, perishables, art, pets, etc. before treatment begins.
- ❖ May require permission of local fire department.
- ❖ Sprinkler system must be disabled. Fuses changed.

Temp	Adults	Eggs
113°F	90 minutes	8 hours
118°F	2 minutes	90 minutes
122°F	0 minutes	0 minutes



# Instruct Parents about : Laundry

- Laundering is a very effective bed bug control method.
- Wash and dry on the highest heat that the fabric can stand for 60 minutes.
- The heat in a clothes dryer is extremely effective at killing bed bugs and eggs.
- Clothing, linens and other items that cannot be washed - dry on high heat for 20-30 minutes.



# BB Treatment: Dryer

- Schools with high incidence of BB sightings might consider obtaining a dryer.
- Dryer heat is very effective for killing all bed bug life stages.
- A student's clothes can be tumbled in the dryer on high for 30 minutes.
- A dryer with a removable shelf is excellent for heating items that cannot be tumbled.





# Freezing



- Cold or cryonite may be effective without leaving chemical residues.
- *Use extreme low temperatures to kill bed bugs and eggs on contact.*
- *Can be applied to most surfaces, especially items otherwise difficult to treat including toys, books, plastics .*
- May be used for library or classroom bookshelves.
- *Seek professional advice.*

# Managing bed bugs:

## 3. Bio-Based

- Bio-based dusts, insect hormones, or essential oils may be applied to small areas.
- Diatomaceous earth and silica dust kill bugs through a physical process, as opposed to a chemical process.
- To be effective these treatments require multiple applications.

### DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

**INDOOR USE:** COCKROACHES, ANTS, EARWIGS, SILVERFISH, CRICKETS, MILLIPEDES, AND CENTIPEDES. Lightly coat a thin layer of dust in the areas where these pests are found or may hide such as cracks and crevices, behind and beneath stoves, refrigerators, sinks, cabinets, garbage cans, around pipes and drains, window frames, and in attics and basements. ~~Hit insects directly where possible.~~ Repeat as necessary.

**BEDBUGS:** Take bed apart. Dust into joints and channels. If hollow, such as square or round tubing, see that the interior of the framework is well dusted. Mattresses should be dusted, especially tufts, folds and edges. Picture frame molding and all cracks and crevices in the room should be treated.

**OUTDOOR USE:** EARWIGS, ANTS, CRICKETS, SLUGS, MILLIPEDES, AND CENTIPEDES. Lightly coat the areas where these pests are found or may hide including windows, door frames and sills, and outside of entrance ways. Repeat as necessary.

### STORAGE & DISPOSAL

Do not contaminate water, food or feed by storage and disposal.

**PESTICIDE STORAGE:** Store in a cool dry area away from heat or open flame and inaccessible to children and pets.

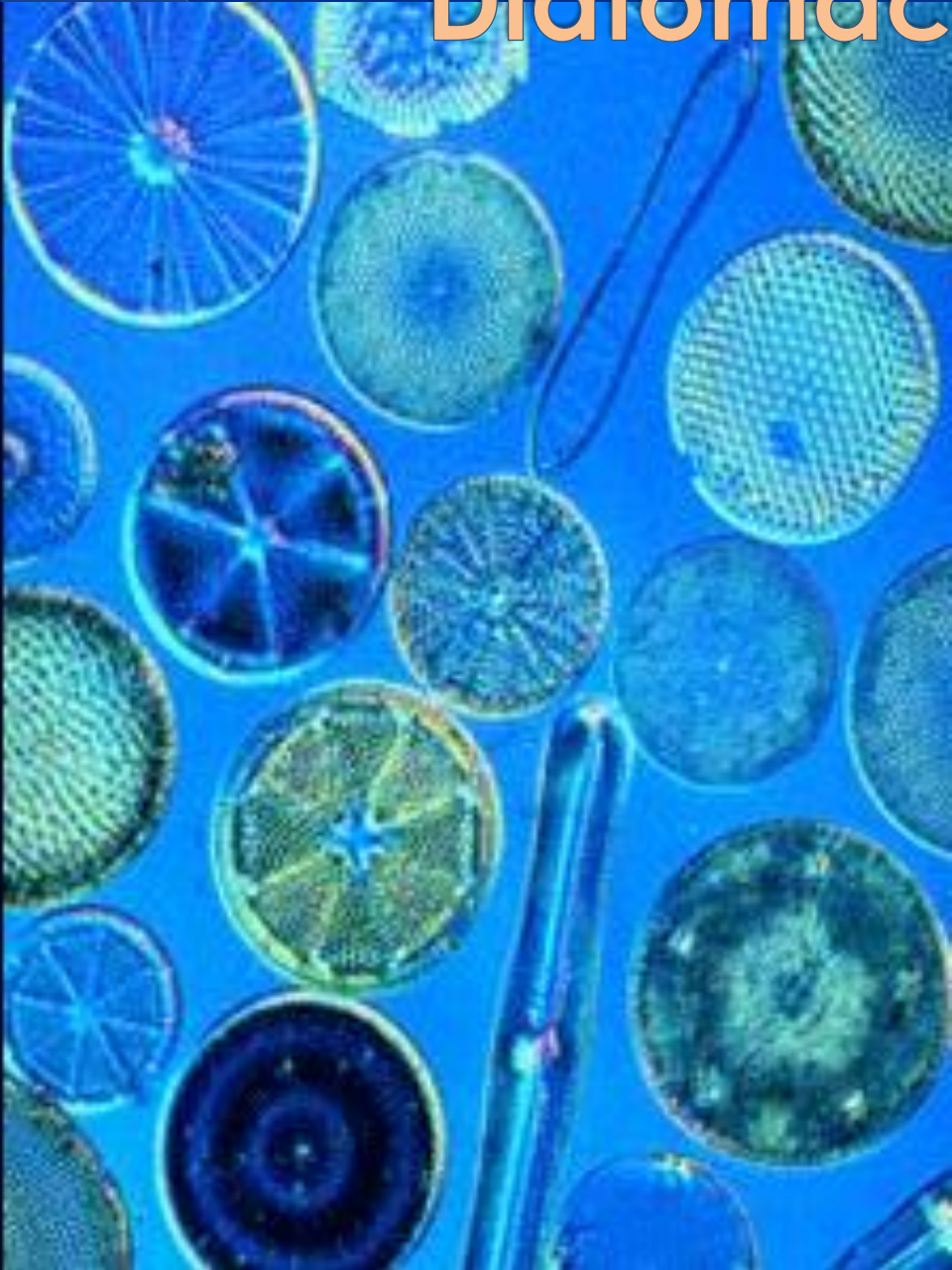
**PESTICIDE DISPOSAL AND CONTAINER HANDLING:** Non-refillable container. Do not reuse or refill this container.

**If empty:** Place in trash or offer for recycling if available.

**If partly filled:** Call your local solid waste agency for disposal instructions. Never place unused product down



# Diatomaceous Earth

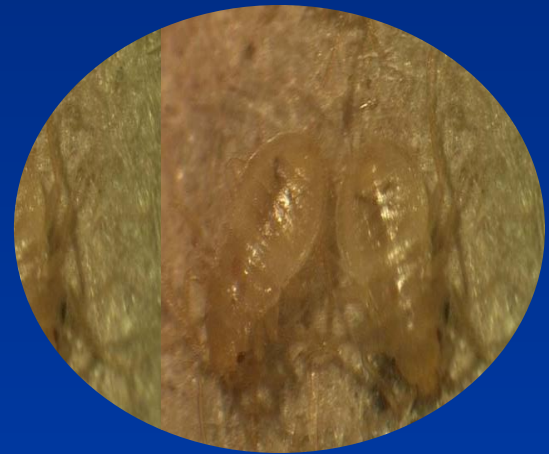


- Diatomaceous Earth is a natural, white, powder-like substance that kills insects.
- Bed bugs will have to crawl through the diatomaceous earth to be killed.
- Only allow the use of DE if **labeled for insects control and follow the instructions.**
- Do not Inhale.
- DE may be applied to cracks and crevices in the walls.
- And Applied behind wall plates.
- Do not apply when children are present or in areas that children frequent.
- It can take over 2 weeks to kill bed bugs.



# Pesticide Labels

- Check the product label to see if it is registered.



**CRAWLING INSECT CONTROL**

EPA Reg. No. 22728-14/107 EPA Establishment No. 07107-07-001

**READY TO USE**

Store and transport in an upright position.

**KEEP OUT OF REACH OF CHILDREN**

**CAUTION**

See inside panel for additional Precautionary Information

EPA Est. No. 4-NY-1  
EPA Reg. No. 4-337

Buyers Guarantee Limited to Label Claims

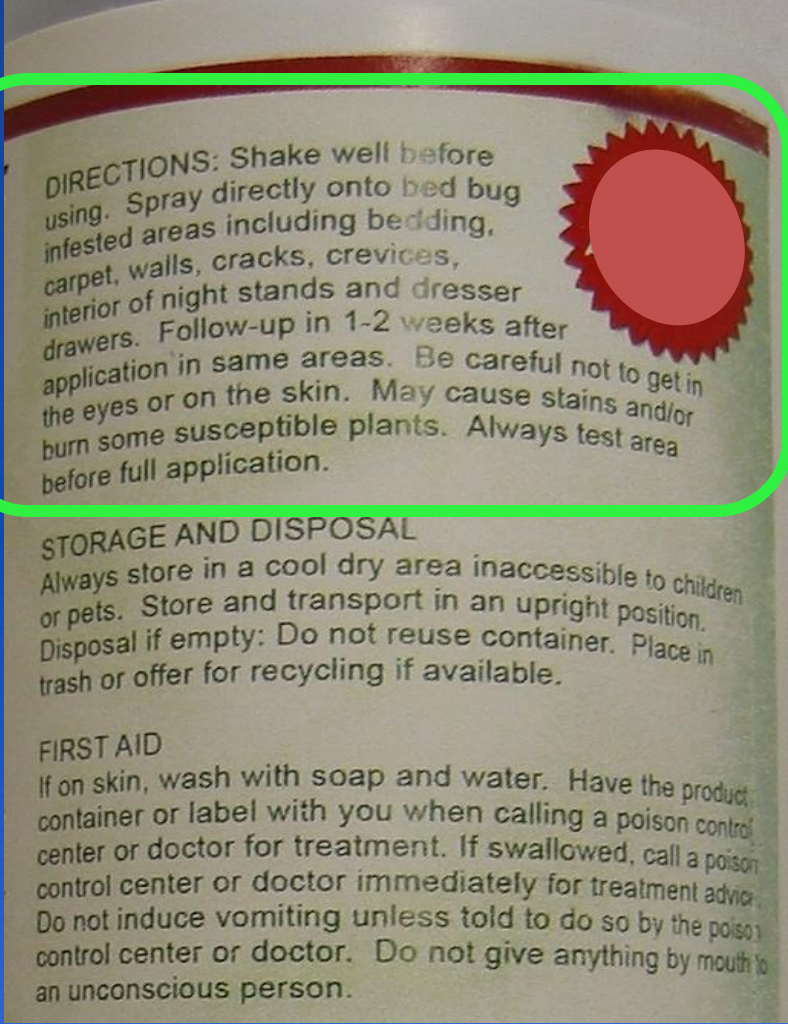
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Oriskany, NY 13424

# Managing bed bugs:

## 4. Chemical Pesticides (use if needed)



**DIRECTIONS:** Shake well before using. Spray directly onto bed bug infested areas including bedding, carpet, walls, cracks, crevices, interior of night stands and dresser drawers. Follow-up in 1-2 weeks after application in same areas. Be careful not to get in the eyes or on the skin. May cause stains and/or burn some susceptible plants. Always test area before full application.

### STORAGE AND DISPOSAL

Always store in a cool dry area inaccessible to children or pets. Store and transport in an upright position. Disposal if empty: Do not reuse container. Place in trash or offer for recycling if available.

### FIRST AID

If on skin, wash with soap and water. Have the product, container or label with you when calling a poison control center or doctor for treatment. If swallowed, call a poison control center or doctor immediately for treatment advice. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

- Traditional insecticides are designed for limited applications, such as in cracks and crevices.
- Only a professional properly licensed and trained should apply them.
- Ensure directions are followed.
- All schools should have material safety data sheets (MSDS) for any pesticide applied on school property.



# What are Pesticides?



- Pesticides are substance used to control, prevent, destroy, repel, attract, or mitigate any pest.



# Vulnerability of Children



Children are highly vulnerable to repeated exposure from the toxic chemicals found in many indoor pesticides due to their continuing organ system developmental stages.

# Pesticides and Schools



- It is important to keep schools free of pests that may cause infectious diseases and allergic reactions.
- To maintain a pest-free environment, most schools hire pest control operators to apply pesticides to control pests.
- There is an increasing concern about the possible effects of pesticides on children if pesticides are miss-applied.



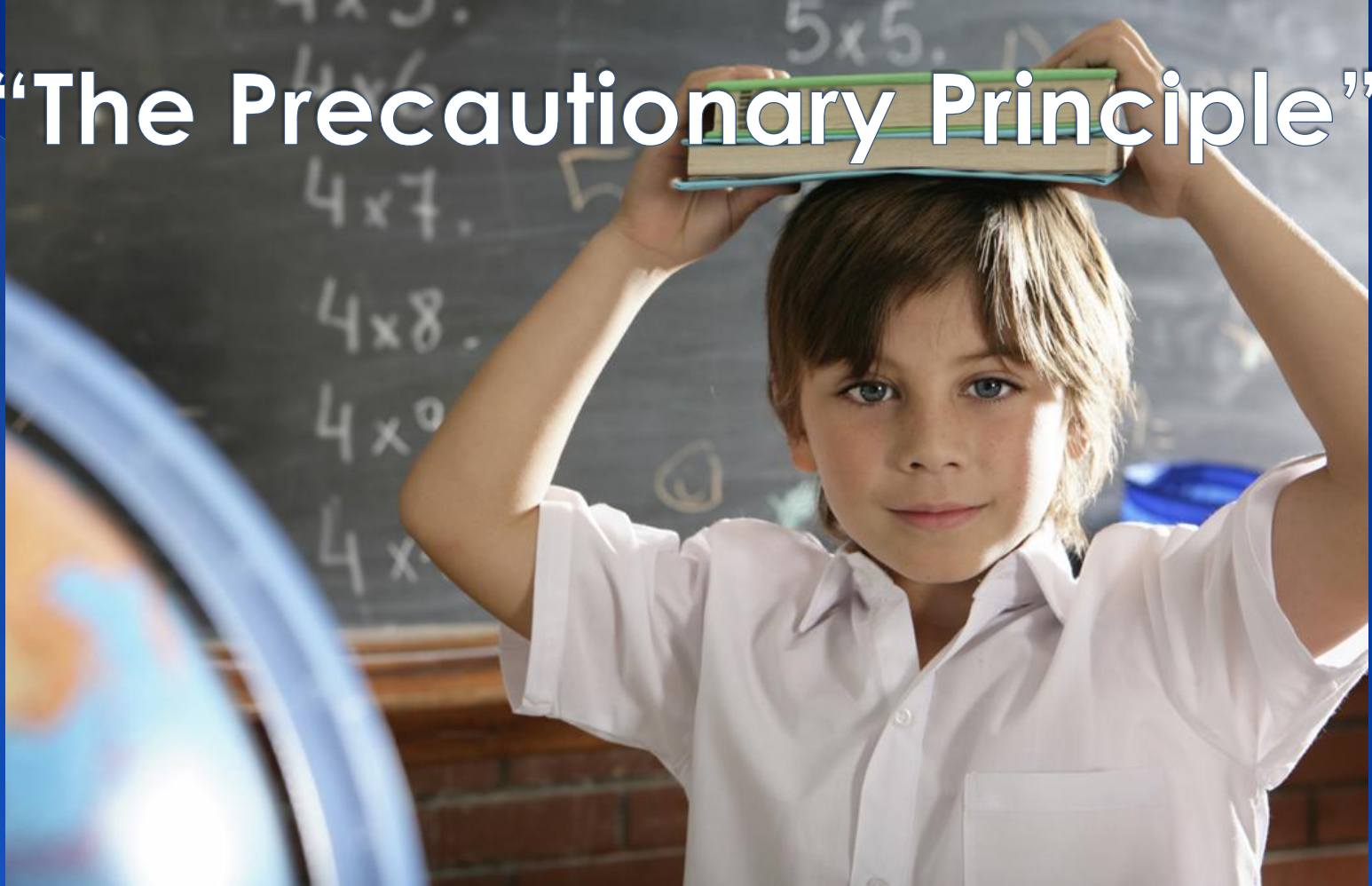
# Pesticide Use in Schools



- Many school administrators and staff turn to pesticides first.
- Not all pesticides are created equal.
- Some are much less-toxic than others.
- Pesticides should **never** be applied as routine or "preventive treatments" in or around schools.



# “The Precautionary Principle”



**An ounce of prevention is worth a pound of cure.**

Prevent children's exposure to possible harmful effects of certain pesticides, by ensuring that IPM principles are fully observed.

# What if I need to have areas for children sleeping during the day?



- Vacuum floors daily.
- Mattresses / cots should be cleaned weekly.
- Personal items sent home or laundered in-house regularly (weekly).



# Nap Blanket / Cot Storage Areas



- Walls and storage bins should be cleaned and inspected weekly.
- Safely store all blankets, bedding, clothing and stuffed toys in individual plastic boxes with lids.



# COMMON BED BUG MYTH

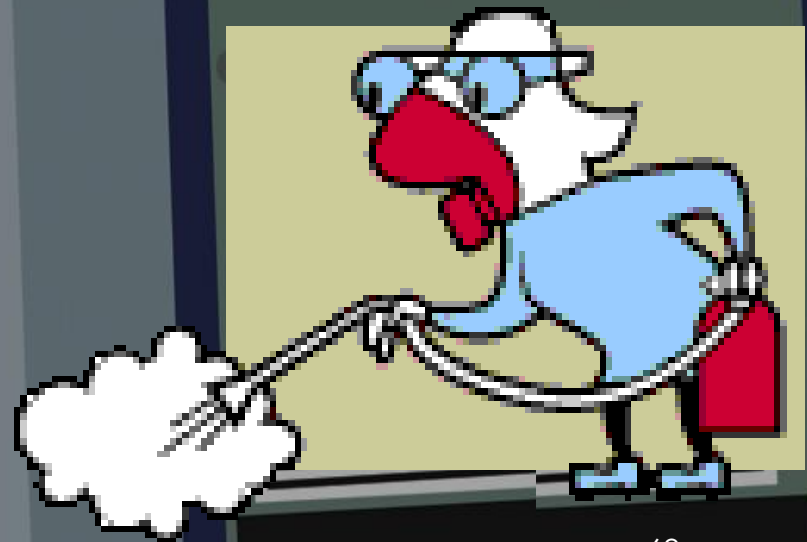
- **Pesticide applications alone will easily eliminate bed bugs infestations.**



- Proper use of pesticides may be one component of the strategy, but may not eliminate bed bugs alone.
- In addition, bed bug have developed resistance to many pesticides.
- Bed bug control can only be maintained though a comprehensive( IPM) treatment strategy that incorporates a variety of techniques and vigilant monitoring.

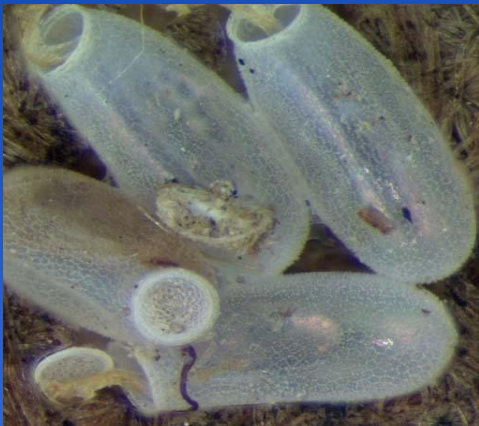
# Pesticides

- Resist demands that may arise to “spray the school” for bed bugs, especially if this comes from a contracted pest control service.
- Because of the isolated nature of any potential infestation, bed bugs' habits, their resistance to most commonly used pesticides and the constant likelihood of re-infestation by new hitchhikers, pesticides may not solve the problem.



# Pesticides and Bed bugs

- The majority of available pesticide products (including pyrethroid based) may not prove as effective as customers would like.
- What to Do?
- Use an IPM approach of combined methods to eliminate bed bug populations in your school and home and seek the advice of a pest management professional.





# COMMON BED BUG PESTICIDES

**What chemical pesticides are ineffective in treating bed bugs?**

- ➔ a) boric acid
- ➔ b) bug bombs
- ➔ c) Most insect repellants
- ➔ d) Many pyrethroid liquid sprays
- e) Diatomaceous earth
- f) Pyrethroid dusts and mixtures



# Boric Acid



- Boric acid does not kill bed bugs.
- Boric acid's main mode of action is as a stomach poison.
- Bed bugs only drink blood.





# Total Release Foggers (Bug Bombs)

- Create a toxic fog.
- Do not penetrate well.
- Leave residues.
- Many bed bugs are resistant to the chemicals in foggers.
- Unsafe if label directions not followed!
- Foggers may act as dispersants, initiating bed bugs to scatter into adjacent rooms or units.



[http://www.youtube.com/watch?v=DhQW9D5lsTk&feature=player\\_embedded](http://www.youtube.com/watch?v=DhQW9D5lsTk&feature=player_embedded)

EPA Video:

<http://www.epa.gov/pesticides/foggers/>

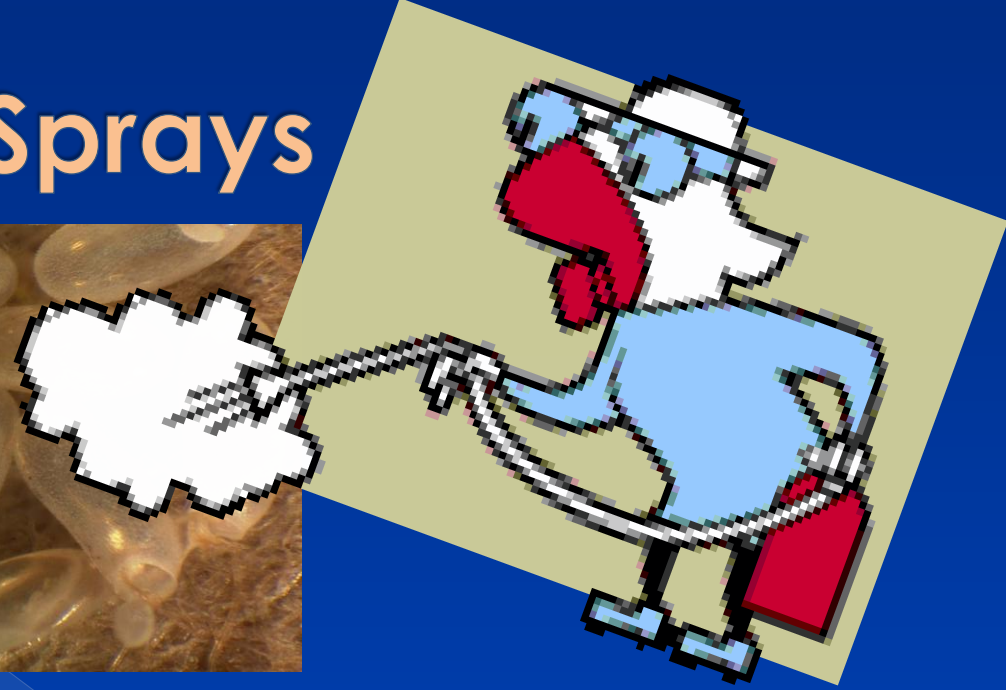


# Bed Bug Repellents



- **Bed bugs were not repelled by any of the insecticide repellents tested.**
- **These results indicate that bed bugs would not be repelled by permethrin treated mattress fabrics.**

# Liquid Pesticide Sprays



- Many pyrethroid spray products quickly kill bed bugs as they come in contact with the pesticide while it is still wet.
- Even wet pesticide sprays do not kill bed bug eggs.
- Once the liquid (spray) pesticide is dry, it usually won't be effective for residual control.
- Many other non-pyrethroid products do not have any residual properties and they will not kill eggs.

# Avoiding litigation due to bed bugs

- Have a plan in place
- *Document* your education effort
- Ensure that any pesticides used in the school :
  - > - comply with applicable state and local IPM and Pesticide Notification laws
  - > - are applied by a licensed applicator
  - > - are legal to be used for bed bugs
  - > - are legal for the specific site and location (e.g. indoors, schools, food surfaces)
- • Consult with your school district legal counsel.





# What is Bed Bug IPM?

- a) Controlling pests with pesticides first.
- b) Controlling pests with only pesticides.
- c) Controlling pests with no pesticides.
- d) Using a combination of non-chemical strategies such as maintenance and sanitation, followed by pesticides, if other methods are not as effective as desired.



# Who is responsible for reporting bed bug issues in your school?

- ⦿ a.) principal
- ⦿ b.) teachers
- ⦿ c.) maintenance/ custodial staff
- ⦿ d.) students
- ⦿ e.) parents
- ⦿ f.) IPM Coordinator
- ➡ ⦿ f.) everyone is



# Management Strategies

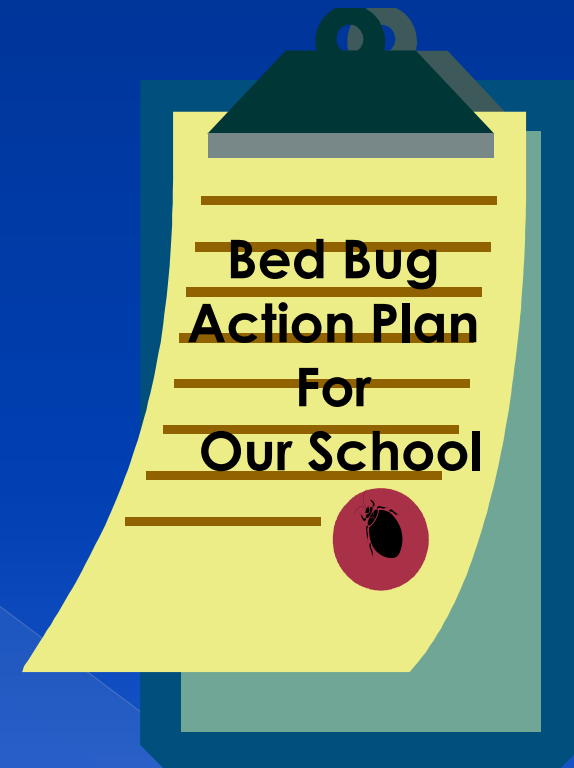
- Conduct a thorough survey.
- Respond quickly with an inspection.
- Initial vacuuming (harborages).
- Allow harborages to be treated after cleaning with properly labeled, least toxic pesticides, if needed.
- Seal shut voids in walls, floor and ceiling.
- Revisit site 2-4 weeks later.





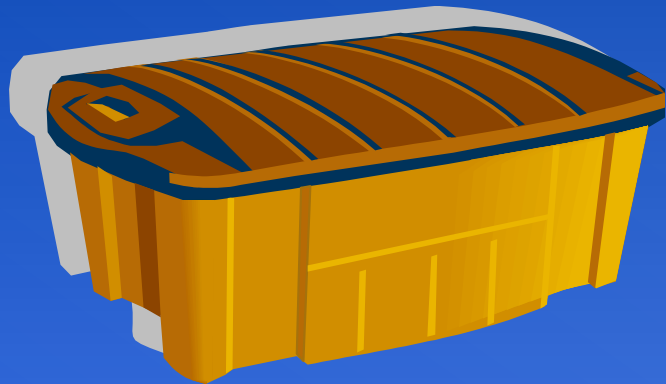
# Things to Include in Your Bed Bug Awareness Program

- Printed literature about bed bugs.
- Notices encouraging staff to report bed bug sightings right away.
- Give a copy of your bed bug action plan to each parent.
- Parents need to know how to identify and control harborages in their own homes.
- Keep records of bed bugs (or other pest) complaints on site in a log book.
- Keep record of all IPM actions and pesticide treatments according to your own School IPM plan.



# Households with Bed Bugs

- Households with bed bugs should take precautions to prevent transporting bed bugs to schools, daycares or other facilities.
- At home, clothing to be worn outside of the home should be washed and dried in a hot dryer for at least 20 minutes...
- ...then placed in a tightly sealed container such as a plastic bin until just before the child exits the home.
- This also applies to coats and backpacks.



# Benefits of School IPM

- Reduced pesticide use.
- Healthier learning environment for our children.
- Better long-term control of pests.
- Reduced liability of school districts.
- Lower cost to taxpayers / school budget.
- Promotes cooperation between staff.







The End!