Dear Teacher,

This poster is a graphic tour of a body affected by various drugs of abuse. When your students observe the gross zits, tar-covered lungs, and yellow teeth, we imagine they’ll agree that drug use “isn’t pretty,” as our title declares.

You can use this poster as part of the larger drug education program Heads Up: Real News About Drugs and Your Body, a series of articles from Scholastic and the scientists at the National Institute on Drug Abuse (NIDA). You can also use it as a stand-alone teaching unit. In addition to the annotated body for your classroom wall, you’ll find six skills sheets.

As students investigate the images and complete the accompanying activities, they’ll not only obtain important information about how drug abuse harms the brain and the body, they’ll also be honing valuable skills that are probably already part of your teaching goals—skills like chart reading, vocabulary building, and critical thinking.

We hope these materials enrich your classroom.

—The Editors

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A note about our illustrator: Stephen Kroninger is a freelance collage artist. His illustrations have appeared in nearly every major newspaper and magazine in the United States. His work was the subject of an exhibit at the Museum of Modern Art. He lives in New York City with his wife and two daughters.
WEB WISE
For more information on common drugs of abuse, click on . . .

>>www.scholastic.com/HEADSUP
This is the home page for the Heads Up program. You’ll find
- a pop-up version of this poster
- a contest with great prizes for students and teachers
- close-ups on common drugs of abuse

>>www.drugabuse.gov
The National Institute on Drug Abuse’s site offers
- the latest scientific information on drug abuse and addiction
- links to special sites on marijuana, steroids, and club drugs
- fact sheets, statistics, and more

>>http://science-education.nih.gov
Under “Curriculum Supplements,” you can order or download an interactive teaching unit called The Brain: Understanding Neurobiology Through the Study of Addiction. For grades 9-12, it includes sections on
- the fundamentals of neurobiology
- the facts about how drugs alter the brain
- addiction as a treatable, chronic brain disease

>>www.sarasquest.org
Published by the National Institute on Drug Abuse, this is a middle school curriculum called Sara’s Quest, which features
- a character named Sara Bellum who discusses the effects of drugs in her magazine series Mind Over Matter
- coverage of marijuana, opiates, inhalants, hallucinogens, methamphetamine, nicotine, stimulants, and steroids
- a comprehensive teacher’s guide

ANSWER KEY
Check students’ responses.

How Common Drugs of Abuse Harm, p. 3
1 Answers may include any two of the following: swollen feet, acne, yellow skin, stunted growth, baldness, boys developing breasts, and girls sprouting facial hair.
2 Sharing needles to inject drugs puts a person at risk of contracting HIV, Hepatitis B and C, and other infectious diseases.
3 Nicotine causes kidneys to release epinephrine, a stress hormone.
4 Inhalants damage the cardiovascular and nervous systems.
5 endorphins

Tragic Data, p. 4
1 47
2 Greatest: Los Angeles, CA; Least: Milwaukee, WI
3 234
4 The age 45-97 group in Los Angeles, CA, had the greatest number of deaths.
5 The age 6-17 group had the fewest cases.

Cross Drugs Off, p. 7
1 addiction
2 limbic
3 depressant
4 cancer
5 cocaine
6 stimulant
7 hippocampus
8 steroids
9 heroin
10 inhalants
This chart details the effects and risks associated with the more common drugs of abuse. Study the chart to answer the questions in the Pop Quiz below.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Effects on the Body</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIGARETTES</td>
<td>• stimulate and sedate the central nervous system</td>
<td>• can cause lung and heart disease, and cancer</td>
</tr>
<tr>
<td></td>
<td>• cause kidneys to secrete epinephrine, a stress hormone</td>
<td>• smoking while pregnant can cause birth defects</td>
</tr>
<tr>
<td>COCAINE</td>
<td>• central nervous system stimulant</td>
<td>• can cause fatal heart and lung failure, seizures, and strokes</td>
</tr>
<tr>
<td></td>
<td>• releases brain chemical dopamine</td>
<td>• sharing needles to inject a liquid form of the drug increases risk of contracting HIV, Hepatitis B and C, and other infectious diseases</td>
</tr>
<tr>
<td>ECSTASY</td>
<td>• overstimulates serotonin-producing nerve cells</td>
<td>• can cause nausea, fainting, and depression</td>
</tr>
<tr>
<td></td>
<td>• creates short-term feelings of pleasure and increases energy</td>
<td>• long-term use can cause memory problems and learning disabilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• can cause a potentially fatal heat condition called hyperthermia</td>
</tr>
<tr>
<td>HEROIN</td>
<td>• central nervous system depressant</td>
<td>• can cause vomiting, respiratory failure, pneumonia, and miscarriage</td>
</tr>
<tr>
<td></td>
<td>• induces euphoria by releasing endorphins, hormones that block pain and anxiety</td>
<td>• chronic users may develop collapsed veins, heart infections, and liver disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• sharing needles to inject heroin increases risk of contracting HIV, Hepatitis B and C, and other infectious diseases</td>
</tr>
<tr>
<td>INHALANTS</td>
<td>• stimulate the brain to give a temporary head rush, or high</td>
<td>• can damage the cardiovascular and nervous systems, causing headache, nausea, slurred speech, loss of coordination, and breathing difficulties</td>
</tr>
<tr>
<td></td>
<td>• some inhalants dilate blood vessels, causing the heart to pump dangerously fast</td>
<td>• can cause depression and memory loss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• can cause death from suffocation and heart failure</td>
</tr>
<tr>
<td>MARIJUANA</td>
<td>• active ingredient THC creates feelings of mild euphoria and relaxation</td>
<td>• affects memory and coordination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• long-term use may cause lung disease</td>
</tr>
<tr>
<td>METHAMPHETAMINE</td>
<td>• causes the release of high levels of the brain chemical dopamine, which creates an intense rush and feelings of euphoria</td>
<td>• can cause insomnia, confusion, tremors, convulsions, and aggressive behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• can damage blood vessels, cause respiratory problems, and irregular heartbeat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• damage to brain cells, over time, can result in a severe movement disorder</td>
</tr>
<tr>
<td>STEROIDS</td>
<td>• disrupt normal hormonal balance</td>
<td>• can cause aching joints, swollen feet, acne, balding, skin to yellow</td>
</tr>
<tr>
<td></td>
<td>• can draw out masculine traits</td>
<td>• can stunt a teen’s growth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• boys can develop breasts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• girls may sprout facial hair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• risk of heart failure and liver cancer</td>
</tr>
</tbody>
</table>

**POP QUIZ**

1. How do steroids affect a user’s appearance? Give two examples.
2. What are the risks of sharing needles to inject drugs?
3. Why is the common smoker’s excuse “Smoking relaxes me” not true?
4. Which systems do inhalants damage?
5. Which hormone blocks pain and anxiety?
The most recent survey of drug-related deaths in U.S. metropolitan areas shows that drugs spare no one. They claimed the lives of both men and women in nearly every age group. Study the data table below to answer the questions that follow.

<table>
<thead>
<tr>
<th>Metropolitan Area</th>
<th>SEX Male</th>
<th>SEX Female</th>
<th>AGE 6-17</th>
<th>AGE 18-24</th>
<th>AGE 25-34</th>
<th>AGE 35-44</th>
<th>AGE 45-97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta, GA</td>
<td>168</td>
<td>65</td>
<td>3</td>
<td>23</td>
<td>46</td>
<td>72</td>
<td>89</td>
</tr>
<tr>
<td>Baltimore, MD</td>
<td>417</td>
<td>115</td>
<td>5</td>
<td>32</td>
<td>98</td>
<td>240</td>
<td>157</td>
</tr>
<tr>
<td>Boston, MA</td>
<td>242</td>
<td>100</td>
<td>2</td>
<td>32</td>
<td>78</td>
<td>131</td>
<td>100</td>
</tr>
<tr>
<td>Chicago, IL</td>
<td>658</td>
<td>205</td>
<td>8</td>
<td>76</td>
<td>176</td>
<td>355</td>
<td>254</td>
</tr>
<tr>
<td>Cleveland, OH</td>
<td>110</td>
<td>33</td>
<td>2</td>
<td>3</td>
<td>18</td>
<td>48</td>
<td>72</td>
</tr>
<tr>
<td>Dallas, TX</td>
<td>228</td>
<td>92</td>
<td>5</td>
<td>41</td>
<td>65</td>
<td>107</td>
<td>104</td>
</tr>
<tr>
<td>Denver, CO</td>
<td>166</td>
<td>68</td>
<td>5</td>
<td>15</td>
<td>44</td>
<td>89</td>
<td>89</td>
</tr>
<tr>
<td>Detroit, MI</td>
<td>500</td>
<td>200</td>
<td>10</td>
<td>35</td>
<td>97</td>
<td>257</td>
<td>305</td>
</tr>
<tr>
<td>Kansas City, MO</td>
<td>146</td>
<td>75</td>
<td>6</td>
<td>22</td>
<td>36</td>
<td>75</td>
<td>83</td>
</tr>
<tr>
<td>Las Vegas, NV</td>
<td>201</td>
<td>76</td>
<td>5</td>
<td>12</td>
<td>49</td>
<td>82</td>
<td>138</td>
</tr>
<tr>
<td>Los Angeles, CA</td>
<td>866</td>
<td>326</td>
<td>10</td>
<td>79</td>
<td>201</td>
<td>420</td>
<td>482</td>
</tr>
<tr>
<td>Milwaukee, WI</td>
<td>92</td>
<td>39</td>
<td>1</td>
<td>5</td>
<td>22</td>
<td>52</td>
<td>51</td>
</tr>
<tr>
<td>New York, NY</td>
<td>691</td>
<td>227</td>
<td>2</td>
<td>47</td>
<td>169</td>
<td>353</td>
<td>353</td>
</tr>
<tr>
<td>Phoenix, AZ</td>
<td>431</td>
<td>156</td>
<td>6</td>
<td>48</td>
<td>126</td>
<td>200</td>
<td>207</td>
</tr>
<tr>
<td>Salt Lake City, UT</td>
<td>95</td>
<td>31</td>
<td>0</td>
<td>10</td>
<td>37</td>
<td>48</td>
<td>34</td>
</tr>
<tr>
<td>San Francisco, CA</td>
<td>235</td>
<td>49</td>
<td>0</td>
<td>14</td>
<td>48</td>
<td>91</td>
<td>133</td>
</tr>
<tr>
<td>Seattle, WA</td>
<td>191</td>
<td>73</td>
<td>1</td>
<td>18</td>
<td>47</td>
<td>97</td>
<td>101</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>160</td>
<td>73</td>
<td>2</td>
<td>13</td>
<td>41</td>
<td>88</td>
<td>91</td>
</tr>
</tbody>
</table>


POP QUIZ

1. According to the above chart, how many 18-24 year olds from New York, NY died as a result of drug use in 2000?
2. Which city experienced the greatest number of male deaths due to drug use in 2000?
3. How many drug-related deaths were reported in 2000 in Denver, CO?
4. Which age group in which city had the largest number of drug-related deaths?
5. Which age group had the fewest number of drug-related deaths overall?

THINK TANK

Can you think of some possible reasons why some cities would see more drug-related deaths than other cities? Discuss.
Why?. . . How?. . . Left with questions after looking at our poster? Check out Part One of our Q & A on the brain, heart, lungs, and liver below. Then, check out Part Two on p. 6.

**BRAIN**

Q: Why does it matter if the brain shrinks?
A: The effects of brain atrophy (shrinkage) may include difficulties with learning, thinking, remembering, and coordination.

Q: Which brain cells does methamphetamine attack?
A: Methamphetamine use damages brain cells that contain the chemicals dopamine and serotonin. Over time, the drug causes reduced levels of dopamine, which can result in symptoms similar to those of Parkinson’s disease, a severe movement disorder.

Q: How does marijuana affect memory?
A: THC, the active ingredient in marijuana, deadens the neurons in the hippocampus, the part of the brain that’s in charge of short-term memory.

**HEART**

Q: How does cocaine use cause heart attacks?
A: Cocaine makes blood vessels narrow and tight, which can cut off blood flow to the heart.

Q: Why do inhalants disrupt heart rhythms?
A: The chemicals in inhalants work on the part of the brain that controls the heart beat. When a heart attack and death results, it’s called Sudden Sniffing Death Syndrome (SSDS). SSDS can occur even in first-time sniffers.

**LUNGS**

Q: What happens to lungs coated with sticky black tar?
A: The tar clogs the air sacs, blocking the flow of oxygen. The tar and other chemicals in smoke can also damage healthy lung cells, so that tumors can grow. The result: lung cancer or emphysema.

**LIVER**

Q: What are other dangers to the livers of steroid users?
A: Steroid use can lead to liver cancer.

Still have questions? Fantastic! Curiosity is a great thing! Go to: www.scholastic.com/headsup or www.drugabuse.gov
Here’s the other half of the story. Your questions on the mouth, skin, bones, and kidneys are answered here.

MOUTH
Q: How does ecstasy cause teeth clenching?
A: Ecstasy works on the part of the brain that sends messages to muscles. It can cause muscle spasms, including spasms of the muscles of the jaw.

Q: Why do drugs cause the blahs?
A: When something makes you feel good, your brain produces dopamine, a chemical which turns on the pleasure circuit in your brain. But all the drugs of abuse pump so much dopamine into the brain that receptors shut down.

SKIN
Q: Why do steroids cause zits?
A: Steroids cause the balance of hormones in the body to be disrupted. This can lead to skin problems including acne and oily skin.

BONES
Q: How do steroids stunt your growth?
A: Steroids create high levels of hormones that wouldn’t naturally occur until early adulthood. The hormone glut signals bones to stop growing, so that young steroid abusers never reach their full, adult height.

Q: Why does marrow matter?
A: Inhalants damage the marrow inside of bones, which manufactures the red blood cells that carry oxygen to muscles and organs, including the brain.

KIDNEY
Q: How does ecstasy cause body temperature to soar?
A: Ecstasy acts on the hypothalamus part of the brain. There it ramps up heart rate and blood pressure and disrupts the brain’s ability to regulate body temperature. This can lead to a potentially fatal heat reaction called hyperthermia, which can lead to kidney failure and death.

Still have questions? Fantastic! Curiosity is a great thing! Go to: www.scholastic.com/headsup or www.drugabuse.gov
Comb the information on the poster. Then, use your brainpower to complete this crossword puzzle. Need some help? Check out our glossary.

**Glossary**

**Addiction:** the state in which a person becomes dependent on a drug

**Cocaine:** a stimulant that is most often snorted

**Depressant:** a drug that slows a person down, reducing anxiety and breathing rate

**Heroin:** a depressant that is most often injected

**Hippocampus:** part of the limbic system. It helps form and store memories.

**Inhalants:** products that give off mind-altering fumes—such as paint thinners, aerosols, and glues

**Limbic System:** the brain part responsible for emotions, motivations, and pleasure

**Steroids:** chemicals that act like the male hormone testosterone. They are used by some athletes to bulk up muscles, but can damage organs, including the liver, kidneys, and heart.

**Stimulant:** a drug that causes a person’s body and brain to race, increasing heart rate and blood pressure
Just how important is it to keep your brain healthy?
See for yourself.

Abusing marijuana can make everyday tasks difficult. THC, the most powerful chemical in marijuana, interferes with normal functioning of the brain. Here are three ways THC can trip you up. 1) It acts on the receptors in the brain that are in charge of the five senses: touch, sight, hearing, taste, and smell; 2) THC affects the hippocampus, part of the brain’s depot for sorting and forming memories; 3) the chemical interferes with the workings of the cerebellum, the part of the brain most responsible for coordinating balance.

The experiment below simulates how basic functions can become difficult under the influence of marijuana. Try it out!

YOU NEED
one deck of playing cards • very dark sunglasses • a radio • a timer • paper • a pencil

TO DO

• Find a flat work space.

• Trial 1: Have your partner shuffle a deck of cards and place the deck face down in front of you. Your objective is to sort the hearts and diamonds into a pile on your left, and the spades and clubs to your right. Have your partner keep time and record how long it took you to finish sorting the entire deck.

• Trial 2: You’re going to simulate what it would be like if marijuana messed with your eyesight. Put on a pair of sunglasses and repeat the exercise in Trial 1. Make sure your partner times you again.

• Trial 3: Imagine your hippocampus is under attack. You’re getting forgetful. Repeat Trial 2. But this time, sort the hearts and diamonds into a pile on your right and the spades and clubs in to a pile on your left. Also, have your partner turn on the radio to a station you don’t like. Your partner should time you again.

• Trial 4: This activity will mimic the effect of a dysfunctional cerebellum, so you’ll lose coordination. Repeat Trial 3. For this round, you can only use one hand. And you have to use the one you normally don’t use. Lefties, use your right hand, and righties, use your left. Sit on your free hand. Again, make sure your partner is timing you.

CONCLUSION

Compare the results for each trial. How different are they? Why? How did you feel as the trials progressed?

THINK TANK

Imagine the card activity as your schoolwork, favorite hobby, or team sport instead. Now look at your performance records. Would you have gotten a bad grade, missed a goal, etc.? Discuss.