

HEADS UP REAL NEWS ABOUT DRUGS AND YOUR BODY

www.scholastic.com/HEADSUP

Drugs and the Body—It Isn't Pretty

Nicotine. Heroin. Cocaine. Marijuana. Inhalants. Methamphetamine. Steroids. They all cause damage. Check out this diagram to find out how each part of the body is affected by drugs of abuse.

BRAIN

Honey, I Shrunk My Brain!

Inhalants can actually shrink the part of the brain that controls body movements.

Tired and Moody

A chemical called serotonin helps you stay in a good mood and get enough sleep. Ecstasy messes with the serotonin in your brain.

Bye-bye, Brain Cells!

Methamphetamine use can damage a large number of brain cells in the limbic system (or emotional brain).



Super Slow

Messages speed from your brain to your muscles at more than 200 miles per hour. Inhalants can put the brakes on quick communication.

The Next Step?

A working short-term memory is required for learning and performing tasks that call for more than one or two steps. Marijuana can impair short-term memory.

HEART

Body Blocking

Steroid use can lead to blocked blood flow to the heart or brain. The result: a stroke or a heart attack.

Fit as a...

Even very fit athletes can have a heart attack if they abuse cocaine or methamphetamine.

'N Sync

Inhalants can disrupt normal heart rhythms, which can cause a heart attack.

LUNGS

Sticky Black Tar

Need we say more? It coats the lungs of tobacco and marijuana smokers.



Poisoned

When an abuser sniffs inhalants, the toxic gas can replace oxygen in the lungs. Without oxygen, the brain and body suffocate and die.

LIVER

Risky Rupture

Steroid abuse has been associated with liver tumors and blood-filled cysts. Both the tumors and the cysts can rupture, causing internal bleeding.

IMMUNE SYSTEM

Sharing More Than Needles

Drug abusers who share non-sterile injection equipment are at risk for contracting HIV, Hepatitis B and C, and other infectious diseases.

NOSE

No More Nostrils

Snorting cocaine can create pimple-like abscesses that can turn into raw holes. The holes can eat away the cartilage that divides the nose.

MOUTH



Not a Good Look

Cigarette smoke discolors teeth. Smoking can also lead to gum disease and lost teeth.

Tense Teeth

Ecstasy use causes involuntary teeth clenching. Some users need to wear dental mouth guards. Others actually use pacifiers.

A Case of the Blahs

All drugs of abuse can make users lose the ability to feel normal happiness and pleasure.

How About a Mint?

Tar and nicotine build up on the teeth and tongue, leading to bad breath.

SKIN

Pizza Face

Steroids can cause acne pimples to pop up all over the face of a user.



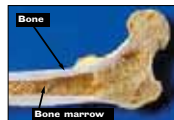
BONES

Forget About the NBA

Steroid use can keep bones from growing. Abusers may never reach their full, adult height.

Down in My Bones

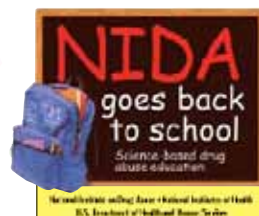
Inhalants damage the marrow inside of bones.



KIDNEYS

Boiling Over

Ecstasy users risk kidney failure when their body temperature soars and they become dehydrated.



To order additional copies of this Heads Up poster set, call 1-800-222-3844 and refer to NIDA 00010.

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Drugs and the Body—It Isn't Pretty

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

PAGE	CONTENT	SUMMARY	CURRICULUM AREAS
2	FOR TEACHERS ONLY	Additional resources and answer key	
3	HOW COMMON DRUGS OF ABUSE HARM	Chart reading exercise on drugs and their effects	Reading/Science
4	TRAGIC DATA	Data analysis activity on drug-related deaths	Reading/Math/ Critical Thinking
5	Q & A: PART ONE	Questions and answers on the brain, heart, lungs, and liver	Reading/Science
6	Q & A: PART TWO	Questions and answers on the mouth, skin, bones, and kidneys	Reading/Science
7	CROSS DRUGS OFF	Crossword puzzle for vocabulary building	Vocabulary/Science
8	ACTIVITY GONE BUST	Hands-on experiment that illustrates how marijuana affects balance, memory, and the senses	Science/Critical Thinking

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.





For Teachers Only

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



How Common Drugs of Abuse Harm

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.

Drug	Effects on the Body	Risks
CIGARETTES	<ul style="list-style-type: none"> stimulate and sedate the central nervous system cause kidneys to secrete epinephrine, a stress hormone 	<ul style="list-style-type: none"> can cause lung and heart disease, and cancer smoking while pregnant can cause birth defects
COCAINE	<ul style="list-style-type: none"> central nervous system stimulant releases brain chemical dopamine temporarily increases energy 	<ul style="list-style-type: none"> can cause fatal heart and lung failure, seizures, and strokes sharing needles to inject a liquid form of the drug increases risk of contracting HIV, Hepatitis B and C, and other infectious diseases
ECSTASY	<ul style="list-style-type: none"> overstimulates serotonin-producing nerve cells creates short-term feelings of pleasure and increases energy 	<ul style="list-style-type: none"> can cause nausea, fainting, and depression long-term use can cause memory problems and learning disabilities can cause a potentially fatal heat condition called hyperthermia
HEROIN	<ul style="list-style-type: none"> central nervous system depressant induces euphoria by releasing endorphins, hormones that block pain and anxiety 	<ul style="list-style-type: none"> can cause vomiting, respiratory failure, pneumonia, and miscarriage chronic users may develop collapsed veins, heart infections, and liver disease sharing needles to inject heroin increases risk of contracting HIV, Hepatitis B and C, and other infectious diseases
INHALANTS	<ul style="list-style-type: none"> stimulate the brain to give a temporary head rush, or high some inhalants dilate blood vessels, causing the heart to pump dangerously fast 	<ul style="list-style-type: none"> can damage the cardiovascular and nervous systems, causing headache, nausea, slurred speech, loss of coordination, and breathing difficulties can cause depression and memory loss can cause death from suffocation and heart failure
MARIJUANA	<ul style="list-style-type: none"> active ingredient THC creates feelings of mild euphoria and relaxation 	<ul style="list-style-type: none"> affects memory and coordination long-term use may cause lung disease
METHAMPHETAMINE	<ul style="list-style-type: none"> causes the release of high levels of the brain chemical dopamine, which creates an intense rush and feelings of euphoria 	<ul style="list-style-type: none"> can cause insomnia, confusion, tremors, convulsions, and aggressive behavior can damage blood vessels, cause respiratory problems, and irregular heartbeat damage to brain cells, over time, can result in a severe movement disorder
STEROIDS	<ul style="list-style-type: none"> disrupt normal hormonal balance can draw out masculine traits 	<ul style="list-style-type: none"> can cause aching joints, swollen feet, acne, balding, skin to yellow can stunt a teen's growth boys can develop breasts girls may sprout facial hair risk of heart failure and liver cancer

POP QUIZ

- How do steroids affect a user's appearance? Give two examples.
- What are the risks of sharing needles to inject drugs?
- Why is the common smoker's excuse "Smoking relaxes me" not true?
- Which systems do inhalants damage?
- Which hormone blocks pain and anxiety?



Tragic Data: Understanding Stats

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.

DRUG-RELATED DEATHS BY SEX AND AGE IN 2000

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

Source: Office of Applied Studies, SAMHSA, Drug Abuse Warning Network 2000 (8/2001 update)

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? The least?
- 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.

HEADS UP REAL NEWS ABOUT DRUGS AND YOUR BODY



Reading/Science

Q & A—Part One

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.

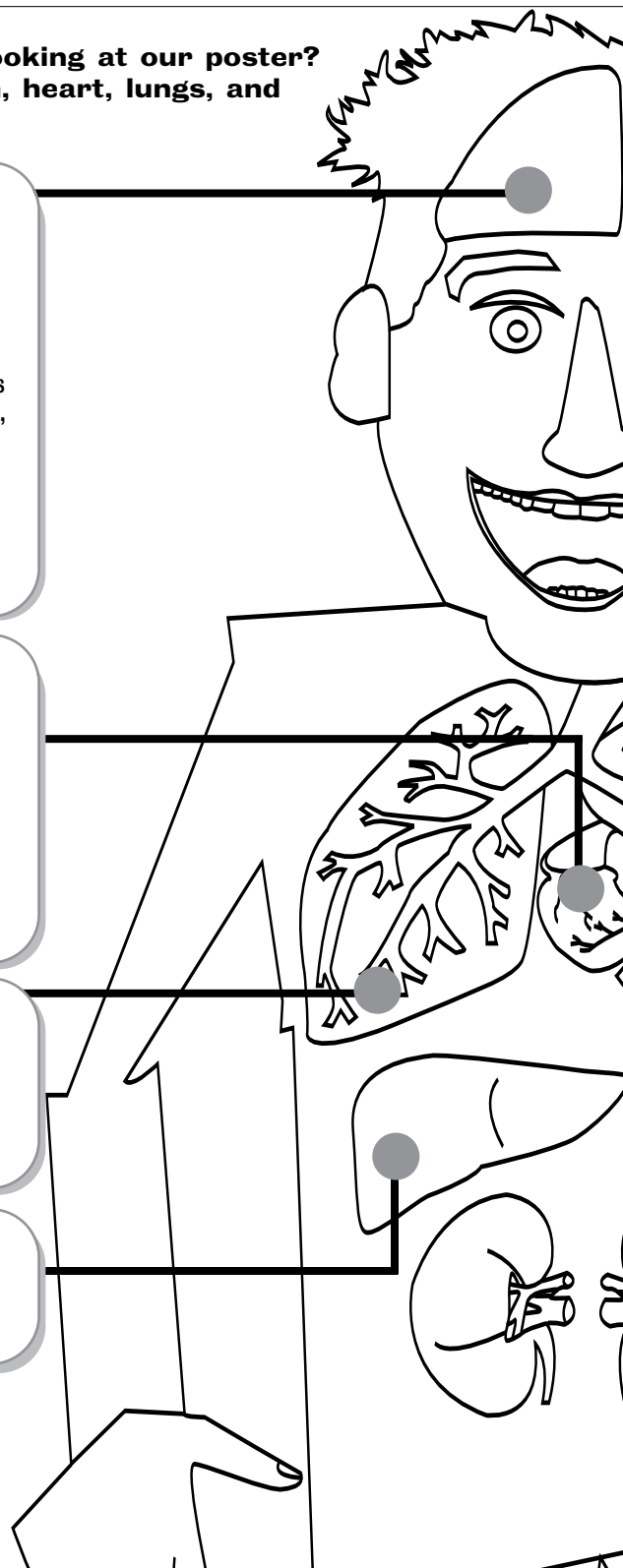
LIVER

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**



HEADS UP REAL NEWS ABOUT DRUGS AND YOUR BODY



Reading/Science

Q & A—Part Two

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.

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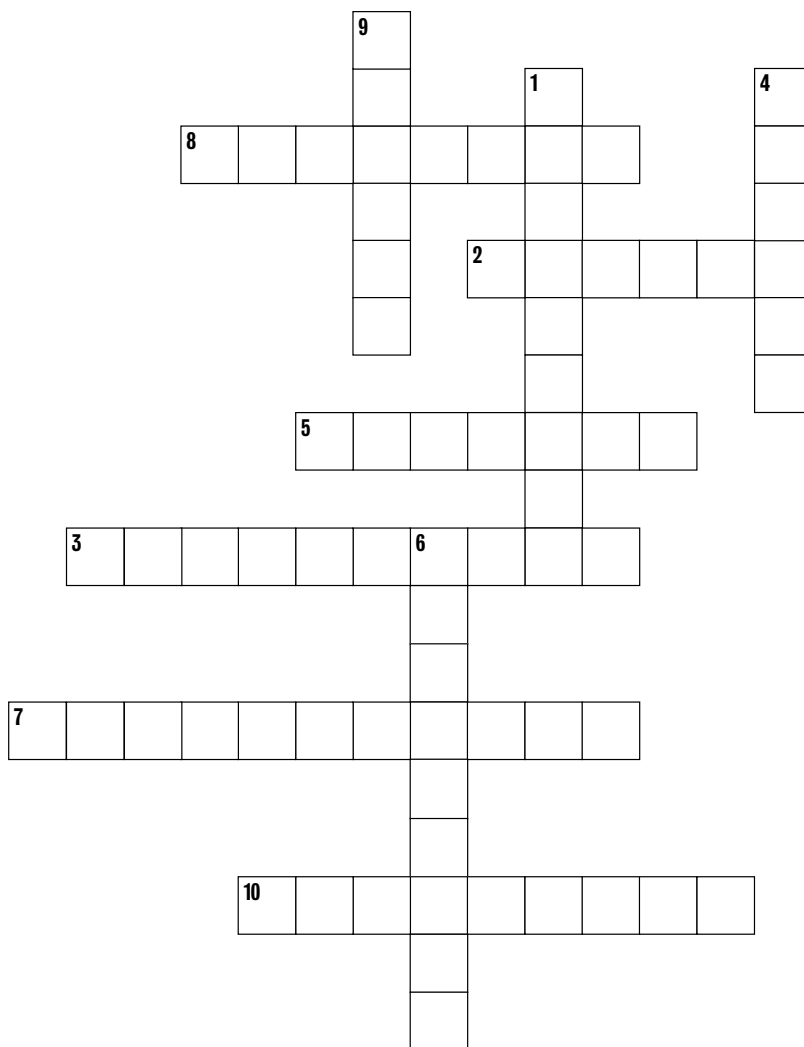
Vocabulary/Science

Cross Drugs Off

Comb the information on the poster. Then, use your brainpower to complete this crossword puzzle. Need some help? Check out our glossary.

CLUES

- 1 When drugs become an uncontrollable habit, the problem is called _____.
- 2 The brain's center of emotional behavior is the _____ system.
- 3 Heroin is classified as a _____, or the type of drug that slows a person down and causes confusion.
- 4 Tar from cigarette smoke damages healthy lung cells and can then cause lung _____.
- 5 Snorting the drug _____ can eat away the cartilage that divides the nose. It can also cause the heart to race.
- 6 Cocaine is a _____, or the type of drug that causes a person to "speed up" and experience jitters and irrational behavior.
- 7 If the _____ part of the brain is not working properly, you may have a hard time remembering what you did last week.
- 8 Taking _____, alters testosterone levels, and can stunt bone growth and cause acne to sprout.
- 9 _____ is a highly addictive drug that depresses the central nervous system and blocks pain to induce temporary euphoria.
- 10 When sniffed, the chemicals from _____ can replace oxygen in the lungs.



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

HEADS UP REAL NEWS ABOUT DRUGS AND YOUR BODY



Hands-on Science/Critical Thinking

Activity Gone Bust

**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 in to 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 in to 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.

