

# DOWNLOAD PDF INVERTEBRATES (HOTLINKS FOR MIDDLE SCHOOL SCIENCE)

## Chapter 1 : Invertebrates | Free Lesson Plans | Teachers

*Invertebrates (HotLinks for middle school science) [Amy Gibson] on calendrierdelascience.com \*FREE\* shipping on qualifying offers.*

Students will understand the following: An invertebrate is an animal that has no spine, or backbone. Some invertebrates exhibit bilateral symmetry. An animal or plant that exhibits bilateral symmetry produces a mirror image only if a line is drawn through it at one particular place. An animal or plant that exhibits radial symmetry produces a mirror image if any line is drawn dividing it into two equal parts. For this lesson, you will need: Review with your students what they have learned about invertebrates, establishing that an animal that is classed as an invertebrate has no spine, or backbone. See how many invertebrates your class can cite as examples. Add jellyfish and starfish to the list if students do not mention them. Ask a volunteer to draw a picture of a starfish on the chalkboard. Label the drawing with the word invertebrate. Then have another volunteer draw a line dividing the starfish in half, pointing out that the two halves are identical; they are mirror images of each other. Demonstrate that no matter where the animal is divided, the two halves will be the same. Next, draw a simple outline sketch of a human being on the chalkboard, and have a volunteer draw a line dividing the sketch in half so that the two halves are mirror images of each other. Demonstrate that only one line will accomplish this. Any other line will divide the sketch, but the two parts will be different. Introduce the term symmetrical, explaining that both the starfish and the human are symmetrical because each can be divided into two halves that are mirror images of each other. Ask the students to explain the differences between the type of symmetry exhibited by the starfish and the human. Explain that the starfish exhibits radial symmetry, while the human exhibits bilateral symmetry. Ask your students to name animals that exhibit each type of symmetry radial: Give students the following homework assignment: Examine your house, yard, and neighborhood for examples of life forms—both animals and plants—that exhibit either radial or bilateral symmetry. Make a sketch of every life form you choose, and be able to explain why you believe it is either radially or bilaterally symmetrical. When students have completed their assignments, have them share their discoveries. Conclude with a discussion about the two kinds of symmetry and what significance they have. Point out that animals that have bodies with many parts that perform different functions exhibit bilateral symmetry, while radial symmetry is found in some simpler animals whose whole bodies perform the same few functions. Adaptations Adaptations for Older Students: Have each student choose one radially symmetrical animal from each of the phyla Porifera, Coelenterata, and Echinodermata and trace its complete scientific classification. Students should accompany each classification with a labeled sketch of the animal. Describe some of the bodily variations that can be found in jellyfish, and explain how these variations help jellyfish survive in their habitats. Jellyfish alternate between asexual and sexual reproduction. What evolutionary benefits would an organism gain from reproducing this way? How would human society have evolved differently if we had the same form of reproduction? Discuss the senses of a jellyfish. Give some examples of the stimuli they can detect, and explain how these senses help them to survive. Debate the following statement: For quite a while now, scientists have been using horseshoe crabs in their medical research. Often their experiments do not harm the crabs in any way, but this is not always true of other animal experiments. Debate whether the benefits of using animal research to improve human health outweigh the costs. Horseshoe crabs are often referred to as "living fossils" because they have survived as a species, virtually unchanged for millions of years, without becoming extinct. Compare their evolutionary history to that of human beings. What are the similarities and differences? Which species is more likely to survive indefinitely into the future and why? Evaluation You can evaluate your students on their assignments using the following three-point rubric: Extensions Guidelines for Horseshoe Crab Experimentation For several years now, scientists have been studying the immune systems of horseshoe crabs, which are among the most powerful in the animal kingdom. These experiments could potentially lead to ways to help humans heal themselves. Even though not all of the

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experiments result in harm to the horseshoe crabs, some of them do—and almost all of them involve removing the crabs from their natural habitat. As a result of those facts, many people feel strongly about whether the benefits of this experimentation outweigh the costs to the animals—and some people have gone to great lengths to try to establish explicit guidelines about what is and is not acceptable in animal experimentation. Have your students brainstorm a list of potential conditions that might be included in a set of horseshoe crab experimentation guidelines. Examples might include "Horseshoe crabs may be removed from their natural habitats, but the conditions in which they are kept must reasonably approximate natural conditions" and "All measures must be taken to alleviate any pain in the horseshoe crabs. Horseshoe crab predators come there, too, knowing that there will be plenty for them to feast on. Have your students conduct research to uncover other animals primarily birds that make the annual visit. Ask each student to choose one of the animals she or he discovers and study it in greater depth. Students should find out where the animal spends its winters and summers, what it looks like, and how many horseshoe crabs or horseshoe crab eggs it eats.

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## Chapter 2 : Lesson Day 1- Vertebrates vs Invertebrates | BetterLesson

*NGSS Life Science is a curriculum community for middle school and high school science teachers. Included in the animal science content area are anatomy experiments, animal classification lessons, observing animal behavior labs, animal biology projects, invertebrate classification activities, vertebrate anatomy worksheets and animal science exam.*

Objects and organisms can be described in terms of their parts. Engage, Explore, Explain, Elaborate, and Evaluate. This lesson plan model allows me to incorporate a variety of learning opportunities and strategies for students. With multiple learning experiences, students can gain new ideas, demonstrate thinking, draw conclusions, develop critical thinking skills, and interact with peers through discussions and hands-on activities. With each stage in this lesson model, I select strategies that will serve students best for the concepts and content being delivered to them. Students distinguish structures that define classes of animals and plants, and develop an understanding that all organisms go through predictable life cycles. They use chromebooks and pre-selected websites to find out the similarities and differences between them. The information they find is recorded on a matrix chart which is designed to organize the information they find by specific categories. With a completed matrix chart, students apply what they have learned by classifying a variety of animals into either a vertebrate or invertebrate category. Upon completion, students share and justify their thinking out loud. I wrap up the lesson with "I have, Who has.. Make observations of plants and animals to compare the diversity of life in different habitats. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment 5-PS Obtaining, Evaluating, and Communicating Information: Students research and read a variety of information on student friendly websites about invertebrates and vertebrates. They record characteristics about these types of animals on a matrix chart. This chart helps them distinguish between them. These Crosscutting Concepts include: Students research the structures of invertebrates and vertebrates and how these structures support their survival in life. Disciplinary Core Ideas within this lesson include: In addition, it is important to model think aloud strategies. This sets up students to be more expressive and develop thinking skills during an activity. Again before teaching this lesson, consider the time of year, it may be necessary to do a lot of front loading to get students to eventually become more independent and transition through the lessons in a timely manner. I model proper use of chromebooks early in the year. They understand the responsibility and accountability factors that allow them to use the chromebooks independently. I explain that today, they are classifying specific kinds of animals. What do you think these words mean? Then I call on groups to share out. As a class, I lead them into defining the words. I write them on the board: I let the video play and have students keep note of the different groups of animals they viewed. I selected this video to launch off this lesson because it keeps students attention and interest with a variety of animal images and a song related to the circle of life. At the end, I have students list groups of animals they saw in the video. As they note these aloud, I write them on the board: I continue and ask, "Based on our definitions above, do you think these animals are vertebrate or invertebrate? After identifying vertebrate animals, I share with them we will learn about invertebrate animals and more about vertebrate animals through research. I point out the vocabulary reference box and characteristics on the left side of the matrix. I have the terms vertebrate and invertebrate that we defined earlier in the lesson. Then I show them two additional terms two terms warm blooded and cold-blooded as they are in the box and go over them. I do this because my students are unfamiliar with these terms and part of their research includes identifying the type of body temperature of an animal. Once everyone is here, I instruct students to read through the information and record the details on their matrix chart. After a few rounds of guiding the students through the task, I notice students are comfortable with the assignment and let them finish it on their own. In the meantime, as students are researching, I circulate the room and check in with students. I observe key details written within their matrix chart. Once students have completed researching vertebrate classes of animals, I move them onto researching invertebrate animals. I instruct them to use the other side of matrix on the hand out to record characteristics of

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each group of invertebrates: These websites are more text based and requires reading for information skills. It is important guide students into finding the main ideas and noting the key points on the matrix. After our research, I bring students back together and I place a completed matrix under the document camera. As we review the details, I have students check their facts for accuracy.

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### Chapter 3 : Science - Middle School / Life Science, 7th Grade

*Note: Citations are based on reference standards. However, formatting rules can vary widely between applications and fields of interest or study. The specific requirements or preferences of your reviewing publisher, classroom teacher, institution or organization should be applied.*

There are so many resources available that it is hard to narrow them down and decide which ones to incorporate into class. The Internet has also brought us the concept of interactive science lessons where students can see and hear things that they could not years ago, such as an up-close look at the planets and how they orbit around the sun. This article will provide information whether you are a new teacher looking for ideas to get started, or a seasoned science teacher just looking for new ideas. Life Science and Biology A science unit in biology can be fun for both teachers and students. Since there are many different aspects to Biology, there is a wide range of lessons available. The biggest problem might be narrowing it down. There are also many fun experiments middle school science students can do, such as growing mold and learning about our senses. Biology Lesson Plans A number of lesson plans for teaching an understanding of life sciences including the human system, the animal life cycle, and genetics. Entomology This site includes resources, lesson plans, and general information about entomology. School of Forest Resources A list of lessons and activities about forestry, water, and wildlife. US Department of Agriculture This site has an enormous amount of information for kids and teachers about all things related to agriculture. Plants for Kids Experiments and lessons for learning about the physiology of plants. This includes a good list of topics to cover with lessons and experiments to go with each one. Biology An introduction to biology along with several different topics to work with. Ecology and the Environment A unit on ecology and our environment can be very important in our current environment. Incorporating lessons on how students can help to conserve our planet is not only educational, but it can also provide them with real life lessons they can use in their current lives. Students can look at their own energy consumption, and their schools energy consumption. They can also talk about the different kinds of renewable energy. The Environmental Protection Agency This includes several tools to help teachers teach about waste, and talk about how students can make a difference. Community Science A website dedicated to teaching students about preserving our resources. Science Lesson Plans An extensive list of science lesson plans including a large section on ecology and our environment. Environment Teaching This site includes lesson plans, worksheets, along with several other resources for teaching about the environment. Exploring the Environment Modules and activities for teaching about many aspects of the environment. Rainforest Alliance A list of curriculums for middle school ages along with other ages for teaching about the rainforest. Geology Geology is the study of the materials that make up the Earth. The challenge for many teachers is how to make studying rocks and how they form interesting for their middle school science students. There are many different lesson plans that can be used to get the students involved in projects that are fun such as creating a real looking fake rock, and comparing a candy bar to a rock. Earthquakes and how they form is also a topic to cover in this science unit. The Rock Cycle A list of lessons and ideas for teaching about the rock cycle. Geology Online A very extensive list of geology lesson plans for all ages including middle school. Discovery Education A unit on earthquakes. This will help to learn about the different types of earthquakes and the impact on civilization. Geology and Earth Science This has a huge list of topics to cover with lesson plans and resources. Geological Survey An extensive list of resources, lessons, and activities for middle school teachers. Coal Education Several experiments from a Kentucky Coal organization. Astronomy Astronomy is much more than just studying about the planets and our solar system. In a science unit about astronomy, teachers can show the students about black holes, comets, meteors, and even about the Aurora Borealis. The number of topics is limitless, and each has their own sense mystery since so much about this subject is unknown. Middle school science students will be eager to learn more about this fascinating subject. Teach Space Science A list of lessons and websites for many different aspects of

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Astronomy. X-Ray Observatory This includes many different classroom activities and materials for teaching about the universe. Amazing Space Tools and activities for teaching about astronomy. Science Class A list of astronomy subjects to cover with links and information about different activities and labs. Astronomy Workshop A site that includes information about the solar system, calculators, and tools to visualize the planets and the sun. Discovery Channel School A resource of online astronomy activities with instructions and suggested discussion topics. Chemistry and Physics A unit on chemistry and physics is one of the best for experiments for middle school science students. Middle school science students usually enjoy learning about the different chemicals and how they react with each other. Teachers can cover topics such as the properties of solutions and have students make ice cream in a zip lock bag. Polymers are also a common unit covered, and making slime is a great way to show the concept. Research Science Engineering Center Technology resources for middle school. Reach out Michigan Lessons in physical science for all ages including middle school. Aeronautics Lesson plans and activities to teach about all aspects of aeronautics. Teach Engineering Many lesson plans and ideas for teaching about engineering along with other types of science. Inquiry in Action Several classroom activities and lessons for teaching chemistry.

### Chapter 4 : Delicious Classification: Vertebrates and Invertebrates | Activity | calendrierdelascience.com

*HMNS Middle School Invertebrates Page 2 grocery stores and worms at bait stores. Another option is to get plastic creatures from stores that sell plastic animals, such as party stores or toy stores.*

### Chapter 5 : Animals: 7 StudyJams! Interactive Science Activities | Scholastic

*Plan your lesson in Classification Systems and Biology / Life Science with helpful tips from teachers like you. To introduce the Invertebrates.*

### Chapter 6 : Invertebrate Practice Test - ProProfs Quiz

*The Biodiversity of Ocean Invertebrates teaching resources support students in meeting the following middle school NGSS Performance Expectations. Life Science MS-LS2.*

### Chapter 7 : Biodiversity of Ocean Invertebrates | Q?rius

*I teach the Day 1-Vertebrate and Invertebrate Animals lesson because many of my students have very limited background in science since the elementary school's within my district do not formally teach science prior to my students entering the 5th grade (the middle school); therefore, they have not been exposed to earlier grade level NGSS.*

### Chapter 8 : Vertebrates and Invertebrates | Worksheet | calendrierdelascience.com

*High School Middle School Science Biology Biodiversity Biological Structure and Organization Classification of Systems Conduct Investigations Multi-cellular Organisms Life Science Using Similarities to Classify Organisms.*

### Chapter 9 : Middle School Lesson in Classification Systems Introduction to Invertebrates

*1. An invertebrate is an animal that has no spine, or backbone.: 2. Some invertebrates exhibit bilateral symmetry.: 3. An animal or plant that exhibits bilateral symmetry produces a mirror image only if a line is drawn through it at one particular place.*