

PHILADELPHIA ZOO

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Post-visit activity

Animal Behavior (9th-12th)

Classroom Activity

Amazing Animal Behaviors (Part II)

Use the included worksheets to have students complete the following tasks.

In Groups: Have students form small groups of 3-5 people. Groups should receive only the first page of the included worksheets. Groups will take a few minutes to explore the experiment that is outlined on the worksheet. This experiment involves two rats: one who is roaming freely in an arena and another who is in a restrainer. Scientists used this setup to study the reaction of the free rat and determine whether or not the behaviors that resulted exhibit signs of empathy and pro-social behavior. Students should record their predictions for the behaviors of each rat in each scenario.

After the groups have had some time to develop their predictions, they should receive the second worksheet that summarizes the experiment and the results. Students should compare their predictions to the actual results and answer the corresponding questions.

As a class: After group work is complete, the whole class should engage in discussion about their answers to the final questions. In addition, the class should discuss the following topic: How might pro-social and empathic behavior be evolutionarily beneficial to a species? How might these behaviors be detrimental instead? Can you see any trends in the types of animals that are generally social and the types that are generally solitary?

Standards

PA Academic: 3.1 C1, 3.4 D2, 3.4 D3

Next Generation Science: MS-LS1-8, MS-LS1-4, MS-LS4-4

New Jersey Core Curriculum: 5.1, 5.3C, 5.3D

Common Core: CCSS.ELA-LITERACY.RST.4, CCSS.ELA-LITERACY.RST.7, CCSS.ELA-LITERACY.W.7, CCSS.ELA-LITERACY.SL.1

Amazing Animal Behaviors (Part II)

Examine the following scenarios and predict what the rats will do in each case. Record your predicted behaviors in the provided spaces.

Test #1: Two rats are placed into a large arena. One rat is free to roam around, while the other rat is restrained by a device. There is a mechanism in place that, when pressed, will release the restrained rat. The free rat is physically able to press this mechanism. If the restrained rat were released, the two rats would be able to meet and mutually groom (a form of positive reinforcement). This is a novel scenario: neither rat has ever been in this arena, seen the restraint, or seen the release mechanism.

Predicted behaviors

<p>Free Rat: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Restrained Rat: _____</p> <p>_____</p> <p>_____</p> <p>_____</p>
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Test #2: Two rats are placed into a large arena. One rat is free to roam around, while the other rat is restrained by a device. There is a mechanism in place that, when pressed, will release the restrained rat. The free rat is physically able to press this mechanism. If the restrained rat were released, the two rats would NOT be able to meet and mutually groom. The free rat understands how to release the restrained rat and has done it with consistency in other scenarios.

Predicted behaviors

<p>Free Rat: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Restrained Rat: _____</p> <p>_____</p> <p>_____</p> <p>_____</p>
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Test #3: One rat is placed into a large arena. There is a container holding either an object or nothing. There is a mechanism in place that, when pressed, will open the container. The free rat is physically able to press this mechanism. The free rat understands how to work this mechanism and has done it with consistency in other scenarios.

Predicted behaviors

Free Rat: _____

Test #4: Two rats are placed into a large arena. One rat is free to roam around, while the other rat is restrained by a device. There is a mechanism in place that, when pressed, will release the restrained rat. The free rat is physically able to press this mechanism. There is a second, identical mechanism in the room. When this mechanism is pressed, a treat of chocolate is released to the free rat. If the restrained rat were released, the two rats would be able to meet and mutually groom (a form of positive reinforcement). Both rats would have access to the chocolate treat. The free rat understands how to work these mechanisms and has done it with consistency in other scenarios.

Predicted behaviors

Free Rat: _____

Restrained Rat: _____

Amazing Animal Behaviors (Part II)

Read the summary of the study behind these scenarios. Compare the actual results to your predictions, then answer the provided questions.

Helping a cagemate in need: empathy and pro-social behavior in rats

Inbal Ben-Ami Bartal, *et.al.*

Whereas human pro-social behavior is often driven by empathic concern for another, it is unclear whether non-primate mammals experience a similar motivational state. To test for empathically motivated pro-social behavior in rodents, a free rat was placed in an arena with a cagemate trapped in a restrainer. Within days, the free rat acted deliberately and quickly to open the restrainer and free the cagemate. Rats did not open an empty or object-containing restrainer. Rats freed cagemates even when rewarding social contact was prevented. When liberating a cagemate was pitted against chocolate contained within a second restrainer, rats opened both restrainers and in most trials, shared the chocolate. Thus, rats behave pro-socially in response to a conspecific's distress, providing strong evidence for biological roots of empathy.

- 1) Which of the results from this study surprised you the most? Which result differed the most from your predictions?

- 2) Do you believe that the behaviors of the rats demonstrate empathy and pro-sociality? Why or why not?

- 3) What evolutionary benefit can you see for these behaviors? How does this help the species survive and thrive?
