

MATHEMATICS GRADE 7

Ratios and Proportions

CRITERIA B and C - SUMMATIVE ASSESSMENT

Using a logical process to simplify quantities and establish equivalence can help analyse competition and cooperation

Equivalence, Quantity, and Simplification

When was the last time you shed all your skin? Could you survive off crumbs on the floor? Do your antennae ever get stuck when you wear a hat? If you were a bug or other small animal, these issues may be part of your daily life. In this project, we will compare some quantities that bugs deal with, and see how they might affect you if you were a human-sized bug.

ASSESSMENT TASK:

Your **goal** is to determine the physical qualities a bug might have if it were the size of a human (**role**). The **audience** you will be presenting your information to is a group of scientists who want to create human-bug hybrids to live in our cities. The **situation** you find yourself in is that you are trying to determine what kind of physical traits these new creatures may possess. Your **product** is an analysis on what these new creatures will be capable of. You will be **assessed** on criteria B and C.



TASK INSTRUCTIONS:

You will conduct some online research into the physical traits of a small bug or animal. You will create ratios that compare the animal's size to how far it can jump and how quickly it can move/run. You will then, in your PE class, document your height, how fast you can run, and how high you can jump. You will then create three tables to show the data you collected for yourself and on your bug/animal.

Final Products (4 parts):

1. You will create 3 tables; one for you, and one for each of your animals. It will have the animal's size (in cm), and either how high it can jump or how fast it can run. You will show the animal's speed or jumping height as a ratio with its current size, its speed or jumping height if it was your size, its speed or jumping height if it was your parent's size, and its speed or jumping height if it was the size of a school bus.

2. You will make a visual display of something your chosen bug/animal could do if it were your size. Showing what it could lift, how high it could jump, or how fast it could run if it were bigger. You should create this on paper, and show your proportional relationship next to your display.

The Write-Up

Were your results surprising? Would you be able to survive if you were the size of a bug? Could you jump as high or run as fast as the other bugs around you?

If bugs were the same size as humans, how would they get around? Would they need cars and airplanes? Could they simply run to their destinations? Compare how long it takes you to drive to school, and how long it may take a bug to walk to school from your house.

Example Table

| Mr. Hamm | Height | Speed | Jump height |
|-----------------|---------|-----------|-------------|
| (Bug size) | 1.1 cm | .032 m/s | .41 cm |
| (My size) | 179 cm | 5.2 m/s | 66 cm |
| (Size of a bus) | 1065 cm | 30.94 m/s | 392.7 cm |

| (Bug Name) | Height | Speed | Jump Height |
|-----------------|--------|-------|-------------|
| (Bug Size) | | | |
| (My Size) | | | |
| (Size of a bus) | | | |

ASSESSMENT RUBRIC CRITERION B:

| Level | Descriptor |
|-------|---|
| 0 | The student does not reach a standard described by any of the descriptors below. |
| 1–2 | The student is able to: i. apply, with teacher support , mathematical problem-solving techniques to discover simple patterns ii. state predictions consistent with patterns. |
| 3–4 | The student is able to: i. apply mathematical problem-solving techniques to discover simple patterns ii. suggest relationships and/or general rules consistent with findings . |
| 5–6 | The student is able to: i. select and apply mathematical problem-solving techniques to discover complex patterns ii. describe patterns as relationships and/or general rules consistent with findings iii. verify these relationships and/or general rules. |
| 7–8 | The student is able to: i. select and apply mathematical problem-solving techniques to discover complex patterns ii. describe patterns as relationships and/or general rules consistent with correct findings iii. verify and justify these relationships and/or general rules. |

ASSESSMENT RUBRIC CRITERION D:

| Level | Descriptor |
|-------|--|
| 0 | You do not reach a standard described by any of the descriptors below. |
| 1–2 | You are able to: <ul style="list-style-type: none"> i. identify some of the elements of mathematical strategies to find probabilities of games. ii. apply mathematical strategies to find a solution to the authentic real-life situation, with limited success (probability calculations are oversimplified and there is limited success of applying probability) |
| 3–4 | You are able to: <ul style="list-style-type: none"> i. identify the relevant elements of mathematical strategies to find probabilities of games ii. select, with some success, adequate mathematics strategies to model the authentic real life situation (probability calculations are simple) iii. apply mathematical strategies to reach a solution that is valid. iv. discuss whether the solution makes sense in the context of the authentic real-life situation (You discuss the fairness of the game) |
| 5–6 | You are able to: <ul style="list-style-type: none"> i. identify the relevant elements of mathematical strategies to find probabilities of games ii. select adequate mathematical strategies to model probabilities of games iii. apply the selected mathematical strategies to reach a valid solution to the authentic real-life situation (Probabilities are not just simple ratios) iv. explain the degree of accuracy of the solution v. explain whether the solution makes sense in the context of probabilities of games. |
| 7–8 | You are able to: <ul style="list-style-type: none"> i. identify the relevant elements of mathematical strategies to find probabilities of games ii. select appropriate mathematical strategies to model probabilities of games iii. apply the selected mathematical strategies to reach a correct solution to the authentic real-life situation (Probability calculations involve complex strategies such as compound or conditional events). iv. justify the degree of accuracy of the solution v. justify whether the solution makes sense in the context of probabilities of games (Your mathematics is correct without error and you have reached a correct solution). |

COMMAND TERMS:

Use - Apply knowledge or rules to put theory into practice.

Present - Offer for display, observation, examination or consideration.

Identify - Provide an answer from a number of possibilities. Recognize and state briefly a distinguishing fact or feature.

Apply - Use knowledge and understanding in response to a given situation or real circumstances. Use an idea, equation, principle, theory or law in relation to a given problem or issue.

Select - Choose from a list or group.

Discuss - Offer a considered and balanced review that includes a range of arguments, factors or hypotheses. Opinions or conclusions should be presented clearly and supported by appropriate evidence.

Explain - Give a detailed account including reasons or causes.

Justify - Give valid reasons or evidence to support an answer or conclusion.