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Sincerely,

Kent
REAL Science Challenge Founder
Science Department Head (Burnaby South Secondary)

Contact Kent at realsciencechallenge@gmail.com

Science Competency / Practice: Questioning and Predicting

Sample Passage

Jordan and Taylor are typical teenagers who are worried about acne (aka pimples) developing on their faces. They seek advice from three of their friends, all of whom have a different hypothesis and treatment for acne.

Hypothesis 1
Pimples are caused by a diet that is high in oily, greasy, fried foods. Reducing the amount of junk food and other fried foods will prevent acne.

Hypothesis 2
Pimples are caused by sweat, bacteria, and dirt that accumulate on one's face throughout the day. Keeping skin free of sweat, bacteria and dirt will prevent acne.

Hypothesis 3
Pimples are caused by oily cosmetics that are applied to one's face. Oil-based cosmetics clog pores, thereby leading to acne.

1. According to Hypothesis #1, fried foods are to pimples as…
   a) Casts are to broken bones.
   b) Cavities are to rotten teeth.
   c) Vegetable oil is to cooking.
   d) Smoking is to cancer.
   e) French fries are to hamburgers.

2. Jordan comes down with the flu and the doctor prescribes anti-viral medication to fight the infection. During treatment, the pimples on Jordan''s face disappear. This supports which of the following hypotheses?
   a) Hypothesis 2 only.
   b) Hypothesis1 and 2.
   c) Hypothesis 2 and 3.
   d) Hypothesis 1, 2, 3.
   e) None of the hypotheses.

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3. Assuming all three hypotheses are true, all of the following will prevent pimples from forming EXCEPT…

a) Maintaining a lifestyle that includes getting regular exercise and enough sleep.
b) Washing your face several times a day with soaps that are gentle on your skin.
c) Using less or avoiding the use of any makeup.
d) Snacking on fewer potato chips and more fruits and vegetables.
e) Using facial wipes immediately after any moderate or intense exercise.

4. Assuming Hypothesis 3 is true, what would be the effect of wearing water-soluble cosmetics?

a) Taylor would have less acne because there would be less bacteria on her face
b) There would be no change to the amount of acne on Taylor's face.
c) Taylor would have more acne because water-soluble cosmetics are better at clogging pores.
d) Taylor would have less acne because her cosmetics would be easier to remove.
e) Taylor would have more acne because water-soluble cosmetics promote sweating and bacterial growth.

5. Which of the following findings would provide support to Hypothesis #2?

a) Teenagers who work in dental and medical offices also tend to have more acne.
b) Teenagers who eat more fruits and vegetables and less junk food tend to have less acne.
c) Teenagers who regularly participate in intense exercise also have more acne.
d) Teenagers who wash their faces three times a day with a gentle soap tend to have more acne.
e) Teenagers who wear less makeup tend to have less acne regardless of whether the makeup is oil-based or not

Contact Kent at realsciencechallenge@gmail.com

Science Competency / Practice: Planning and Conducting

Sample Passage

Soy protein (SP) can be used to replace fishmeal (FM). Fishmeal is the basic component found in the fish food used in aquariums to feed fish - especially carnivorous fish (note: carnivorous fish eat other fish). Scientists set up an experiment to study the effects of replacing FM with varying amounts of SP for young grouper fish (note: grouper is a type of fish). The grouper were fed fishmeal containing six levels of SP (SP 0%, 15%, 30%, 45%, 60%, and 75%) for 6 weeks. At the end of the 6 weeks, average body weight gain (BWG) and weight gain ratio (WGR) were measured.

1. What is a possible independent variable (IV) and dependent variable (DV) pair in this passage?
   a) IV: Average body weight gain; DV: Weight gain ratio.
   b) IV: Amount of FM; DV: Amount of SPC
   c) IV: Percentage of SP; DV: weight gain.
   d) IV: Weight gain; DV: Time
   e) IV: Time; DV: Amount of SPC

2. What could be a possible control group for this experiment?
   a) SPC 0%
   b) SPC 15%
   c) SPC 45%
   d) SPC 60%
   e) SPC 75%

3. Scientists want to study the effect of SP on a second type of fish species. What can we assume about the second fish species that will be included in the new study?
   a) The second fish species live in freshwater in the wild.
   b) The second fish species eat other fish in the wild.
   c) The second fish species live in saltwater in the wild.
   d) The second fish species live in the same ecosystem as the grouper.
   e) The second fish species are the same size as the grouper.

4. In a follow up study, scientists produced food pellets they fed to adult grouper fish. Scientists ensured that these food pellets - regardless of SP levels - were all the same size and mass. Thus, a food pellet with 15% SP had the same size as a food pellet with 75% SP. If, during the experiment, the fish tended to lose mass with pellets of greater SP concentrations, which of the following could explain this result?
   a) Pellets with more SP were less visible than pellets with less SP.
   b) The fish in the study were not carnivorous fish and, thus, could not digest the pellets.
   c) Soy protein has fewer calories per gram than fishmeal.
   d) Fish prefer pellets with more SP and, thus, eat more of them.
   e) Due to the pellet size, it was more difficult for fish to swallow pellets with more SP.

Contact Kent at realsciencechallenge@gmail.com

5. Instead of Soy Protein (SP), Milk Protein Concentrate (MP) may also be used to replace fishmeal (FM) in fish food. Scientists want to study whether SP or MP is a better option to replace FM. Using a sample population of grouper fish, how should scientists conduct their experiment? Assume scientists measure average body weight gain at the end of the trial.

a) Feed one half of the fish population with specific levels of MP; feed the other half with the same levels using SP; compare average body weight gain of fish between MP and SP diets at all levels.
b) Feed all fish in the population with various levels of MP; compare the average body weight gain at this diet with a diet with 0% SPC and 100% FM.
c) Feed all fish in the population with various levels of MP; compare the average body weight gain at this diet with a diet with 0% MP and 100% FM.
d) Feed half the population with 100% MP; feed the other half with 100% SP; compare the average body weight gain of fish between MP and SP diets.
e) Feed one half of the fish population with 50% MP and 50% FM; feed the other half with 50% SP and 50% FM; compare average body weight gain of fish between MP and SP diets.

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