Introducing Algebra

Stage 1

Challenge students to break these codes:

Set A
Let a = 2, b = 3, c =1

1. a + a + a + a + a
2. b + b + b + b + b + b
3. c + c + c
4. a + a + a + b + b + b + b + c + c
5. a + a + a + a + b + b + b + c + c + c + c +c

Set B
Repeat the above questions for a = 1, b = 4, c = 5

Set C
Repeat the above questions for a = 7, b = 1, c = 10

Set D
Ask students to invent a code to write the following in a shorter way:

a + a + a + a + a + a + a + a

Now students use their code to write the above 5 questions in a shorter way.

Tell students that mathematicians have chosen a code for writing the above types of problems. The chosen and now accepted code for writing:

a + a + a + a + a + a + a + a is **8a**

and for writing

b + b + b + b + b + b is **6b**

and so on.

Set E
Now ask students to use the **accepted** code to write the above 5 questions in a shorter way.

Stage 2 (To introduce like and unlike terms)

Set A

Ask students to now see if they can break these codes:

Let a = 2, b = 3, c =1

1. 3a + 5
2. 4a + 1
3. 5b + 2
4. 3b + 2a
5. 5a – c
6. 4c + 5a
7. 8b – 3a
8. 2a + 4b – 2c

Set B
Repeat the above questions for a = 4, b = 5, c = 2

Set C

Now they need to find a way of writing these sums and differences in a shorter way:

1. 3a + 2a
2. 5b + b
3. 3c + 7c
4. 2a + 4a + 7a
5. 6d + 2d + 3d
6. 3m + 2m + 5m
7. 2y + 8y + 5y + y
8. 6p + p + 9p

Stage 3

Now ask students to break these codes:

Set A
Let a = 2, b = 3, c =10

1. a x a x a x a
2. b x b x b
3. c x c x c x c x c
4. a x a x b x b x b x c x c
5. a x a x a x b x b x c x c x c

Set B

Invent a code to write the following in a shorter way:

a x a x a x a x a x a x a

Set C

Now use your code to write the above 5 questions in a shorter way.

Note:
After this lesson you can introduce a variety of vocabulary words such as:

Variable
Coefficient
Constant
Power
Base
Exponent

What you introduce will depend on your students.

Mathematics Lesson Plan for Introducing Algebra

Strand: Algebra

Focus: *At the end of this lesson students should be able to create their own 'code' for representing repeated addition and multiplication of variables and also to learn and use the accepted 'code' or method for writing these representations.*

Preparatory work, Homework checking/marking, prerequisite questions etc: *5-10 Minutes*

Mini Lesson 1: *10-15 Minutes:*
Introduce the idea of breaking codes and writing information using codes. Challenge the students to become 'code-breakers'. Have students complete Set A,B and C in Stage 1 from the teacher notes. The teacher can put these problems on a board or on an OHT.

Small Group/ Independent Work: *15-20 Minutes*
Students are encouraged to invent their own codes to write the given problems in a shorter way.

Share: *10 Minutes*
Students share their different methods of representing the given problems. The teacher summarizes the different methods

Mini Lesson 2: *10-15 minutes:*
The teacher introduces the 'accepted' and therefore 'correct' method for writing these problems.

Small Group/ Independent Work: *10 Minutes*
Students use the 'accepted' code to write the given questions in a shorter way. Students also try all the Stage 2 questions where they use the accepted code to 'decode' questions and also to discover how to simplify expressions with like terms.
Students also complete Stage 3 on their own and complete it for homework if not finished.

Share: *10 Minutes*
Discuss students' answers. If all students have finished Stage 3 then discuss their codes and then introduce the 'accepted' method for representing repeated multiplication.

Journal Writing/ Reflection: *10 Minutes*
Students summarize their findings in their 'Algebra Code-Breaker' Handout.